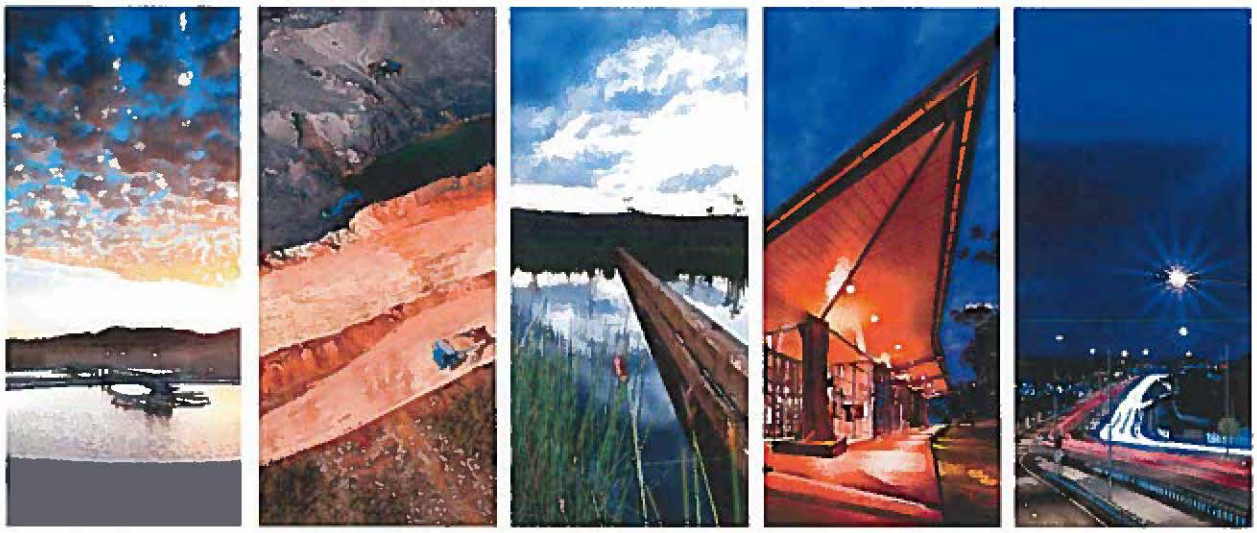

Remedial Investigation Report

AOI-7
Girard Point Refinery
3144 Passyunk Avenue
Philadelphia Energy Solutions Complex
Philadelphia, Pennsylvania

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1. Introduction

This Remedial Investigation (RI) Report (RIR) has been prepared for Area of Interest (AOI) 7, also known as Girard Point Fuels Processing Area, at the Philadelphia Energy Solutions Refining and Marketing LLC (PES) Refining Complex (facility). Sunoco Inc. (R&M) (Sunoco) transferred the facility, also known as the Philadelphia Refining 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 facility is ongoing as part of previously-established programs and the 2012 Buyer Seller Agreement. The facility has operated, and is planning to continue to operate, as an oil refinery, marketing terminal, and petrochemical complex.

1.1 Facility Description

The facility is located along the banks of the Schuylkill River in the City of Philadelphia, Philadelphia County, Pennsylvania. Portions of the facility occupy both the eastern and western Schuylkill River banks. The facility, which is located on industrial property, covers approximately 1,300 acres of land with access restricted by fencing and security measures. The area surrounding the property is characterized by a mixture of residential, commercial, and industrial properties. Current operations at the facility consist of the production of fuels and basic petrochemicals for the chemical industry.

AOI 7, also known as the Girard Point Fuels Processing Area, encompasses approximately 130 acres and is located on the east side of the Schuylkill River. AOI 7 is bordered by Lanier Avenue/AOI 3 to the east, Pennypacker Avenue/AOI 6 to the south and Schuylkill River to the west and north (Figures 1 and 2). The entire western and northern boundary of AOI 7 along the Schuylkill River is bound by a sheet pile wall. The extent of the sheet pile wall is shown on Figure 2.

1.2 Facility Operational History and Current Use

The facility has a long history of petroleum transportation, storage, and processing. The oldest portion of the facility started petroleum related activities in the 1860s, when the Atlantic Refining Company was established as an oil distribution center. In the 1900s, crude oil processing began and full-scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia, were also produced at the facility for a time. The facility has operated continuously as a refining, product distribution, and storage facility. Use of the facility has remained similar following the transfer of ownership to PES.

AOI 7 formerly contained a fluid catalytic cracker (FCC) unit, carbon monoxide (CO) CO boiler, sulfur plant, East and West Sludge Basin - RCRA Tank, Hazardous Waste Incinerator, and crude units. Based on review of historical reports and aerial photographs, early refining units in AOI 7 were built in the 1940s. AOI 7 currently consists of crude units, FCC and alkylation units, flares, cooling towers and above ground storage tanks (ASTs). The ASTs contain primarily naphtha crude,

waste oil, and cat charge stocks. Eight liquefied petroleum gas (LPG) tanks are located in the south-central portion of this area. A wastewater treatment plant (WWTP) is located along the southwestern portion of AOI 7 and an associated oil-water separator in the northeastern portion of AOI 7. Four clean closed RCRA hazardous waste ASTs are also located in the western portion of AOI 7 approximately 150 feet north of the WWTP. There are a total of 8 occupied buildings in AOI 7, including 4 control rooms (buildings 711, 6622, 6625, and 6626), Electrical Building 450, Firehouse Building 442, Maintenance Building 440, and the Canteen Building 595

There are a total of five Solid Waste Management Units (SWMUs Nos. 87, 88, 89, 90, and 91) located in AOI 7 that were addressed in several previous Resource Conservation and Recovery Act (RCRA) investigations as part of the United States Environmental Protection Agency (USEPA) Corrective Action process and during the Act 2 site characterization activities. These SWMUs include three in the NW Fill Area (SWMU 87 Buried Lead Sludge Area 1, SWMU 88 Buried Lead Sludge Area 72 and SWMU 89 Buried Lead Sludge Area 73); SWMU 90 Storage Tank Area/Buried Lead Sludge Area 74 and SWMU 91 Storage Tank Areas/Buried Lead Areas 5, as shown on Figure 2.

On July 12, 2011, Sunoco reported a hydrocarbon sheen on the Schuylkill River to the National Response Center. The sheen was directly adjacent to the Girard Point No. 3 Separator. In response to the sheen on the river, Sunoco investigated the source of hydrocarbons to the river through the installation of monitoring wells and exploratory excavation around a process sewer junction box associated with the 137 Crude Unit. The monitoring wells demonstrated measurable oil on the water table, and the exploratory excavation revealed integrity issues with the junction box. Interim actions completed to address these findings included sealing the junction box and associated bulkhead penetration with concrete. Construction of a ten recovery well hydraulic control system was completed on August 23, 2012. Groundwater and Light Non-Aqueous Phase Liquid (LNAPL) are extracted using pneumatic submersible pumps, and total fluids pass through an oil/water separator. Water is discharged to an onsite process sewer, and LNAPL is recovered in a 1,100-gallon holding tank and recycled by the refinery. Since the start-up of the system through December 2016 17,226,885 gallons of water and 111,648 gallons of LNAPL have been recovered by the system. Performance of this system is documented in the Semi-Annual, Groundwater Remediation Status Reports submitted to the PADEP. Details and/or modifications to this interim action will be documented in the Cleanup Plan.

Groundwater gauging of select monitoring wells in AOI 7 occurs on an annual basis during the second quarter of each year. Annual gauging activities and results are reported in Quarterly Reports prepared by Evergreen.

1.3 Regulatory History/Overview

Sunoco and the PADEP entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to the facility. Sunoco's Phase I Remedial Plan (Phase I Plan), dated November 2003, was included as an attachment to the CO&A. In accordance with the CO&A and Phase I Plan, a Current Conditions Report and Comprehensive Remedial Plan (CCR) was prepared by Sunoco in June 2004. The Phase I Plan and the CCR divided the facility into 11 AOIs, and presented a prioritization of the AOIs based on specific risk factors. The CCR also presented the Phase II remedial approach and schedule to characterize each of the 11 AOIs, and to conduct Phase I and II

corrective action activities in accordance with the 2003 CO&A and the Phase I Plan. Since 2003, Sunoco has performed site characterization activities at all 11 AOIs in accordance with the 2003 CO&A. Sunoco has prepared and submitted a corresponding Site Characterization Report (SCR) for each AOI 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 facility, entering the facility into the Act 2 program. This NIR was later updated and submitted to the PADEP in November 2014 in order to revise the ownership identity to PES and the remediator identify to Evergreen. In November 2011, the facility was formally entered into the PA One Cleanup Program with the USEPA 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). As previously discussed, characterization and remediation work at the facility is currently being performed under the September 2012 Buyer Seller Agreement signed by Sunoco, PES, and the PADEP.

The following provides a timeline of major events and submissions for the facility and AOI 7:

2004

- The PADEP and USEPA signed an agreement entitled "One Cleanup Program Memorandum of Agreement (MOA or One-Cleanup Program)," which clarifies how sites remediated under Pennsylvania's Voluntary Cleanup Program may satisfy RCRA corrective action requirements through characterization and attainment of remediation standards established under the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2).
- Langan prepared the CCR for the Philadelphia Refinery and Belmont Terminal.

2005

- PADEP, USEPA, 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.

2006

- Sunoco submitted a NIR to the PADEP for the Philadelphia Refinery thereby entering the facility, with the exception of Belmont Terminal, into the Act 2 program.

2010

- Sunoco submitted a Site Characterization Work Plan (Work Plan) to the PADEP and USEPA on May 26, 2010. This work plan summarized proposed activities to be completed to characterize AOI 7 in accordance with the objectives of the CCR. The Work Plan also included proposed activities to characterize the five leaded tank bottom RCRA SWMUs in AOI 7.
- Submittal of a Site Characterization/Remedial Investigation Report (SCR/RIR) in September 2010 for AOI 7 that documented the results of the characterization activities completed in accordance with the 2010 Work Plan.

2011

- On November 8, 2011, the USEPA provided an acknowledgment letter to Sunoco formally accepting the Sunoco Facility into the One Cleanup Program.
- Sunoco submitted the Work Plan for Site Wide Approach to document the site-wide remedial approach extending beyond the requirements of the 2003 CO&A. The PADEP and USEPA reviewed and provided input to this report. Sunoco submitted a letter of commitment stating the facility will be remediated according to the Work Plan for Site Wide Approach.

2012

- Sunoco submitted a Site Characterization/Remedial Investigation Report for AOI 7.
- Sunoco transferred the facility to PES.
- Sunoco, PES, and PADEP signed the Buyer-Seller Agreement which established the environmental remediation and management obligations of Sunoco and PES following the sale of the facility.

2013

- The legacy remediation liability for environmental impacts existing prior to the conveyance of the facility to PES was transferred from Sunoco to Evergreen.
- The PADEP provided Evergreen comments on the 2012 SCR/RIR.

2014

- Evergreen submitted an updated NIR to the PADEP for the facility.

2015

- Langan, on behalf of Evergreen, submitted a Human Health Risk Assessment (HHRA) Report to establish a site-specific standard (SSS) for lead in soil at the facility, the Belmont Terminal, and the Sunoco Partners Marcus Hook Industrial Complex (Langan, 2015).
- The HHRA was approved by the PADEP in a letter dated May 6, 2015 establishing a SSS of 2,240 milligrams per kilogram (mg/kg) for lead in soil.

Evergreen submitted a Work Plan in April 2016 to the PADEP describing characterization activities to be performed in AOI 7 to complete the RIR activities. On April 7, 2016 the PADEP, Evergreen and GHD met to discuss the Work Plan. The PADEP provided comments to the Work Plan via email on April 13, 2016. In accordance with the Work Plan for Site Wide Approach, Evergreen is submitting this RIR for AOI 7 to formally satisfy the requirements of Act 2 as specified in 25 PA Code §250.408. This RIR describes site characterization work conducted following the last submittal (2012 SCR/RIR). Activities that have been performed in order to complete characterization as required by an RIR under Act 2 include:

- Additional characterization of surface soil (0 to 2 feet below ground surface [ft. bgs] interval) and subsurface soil (2 to 15 ft. bgs) including targeted soil investigations in potential contaminant source areas, such as historic product handling and storage locations, former hazardous waste tanks, open storage tank incident areas, and known product releases.

- Horizontal and vertical delineation of impacts in soils.
- Additional soil sampling in areas with LNAPL.
- Additional groundwater sampling from monitoring wells not containing LNAPL.
- Collection groundwater samples beneath LNAPL samples.
- Delineation of LNAPL.
- Evaluation of LNAPL mobility.
- Investigation of the potential vapor intrusion to indoor air pathway at occupied buildings.
- Collection of air samples above LNAPL plumes.
- Qualitative evaluation of contaminant fate and transport.

As discussed with the PADEP, Stantec, and Evergreen during a meeting conducted in September 2015, Evergreen is in the process of developing a site-wide MODFLOW model to perform quantitative fate and transport modeling. Following the approval of this and other RIRs, Evergreen intends to submit a Cleanup Plan, pursuant to 25 PA Code §250.410, which will present remedies chosen to allow attainment of the selected remediation standards in soil and groundwater.

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 facility NIR, the updated facility NIR, as well as the report notices and their proof of receipt/publication.

1.4 Selection of Constituents of Concern

A list of the constituents of concern (COCs) in soil and groundwater for AOI 7 is included as Table 1. This list is an updated listing of the compounds identified in the Work Plan as the COCs for the facility under Pennsylvania One Cleanup Program and will be referred to as the petroleum short list. This list includes all current constituents from the Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E of PADEP's Closure Requirements for Underground Storage Tank Systems, with the exception of the waste oil parameters. In May 2009, two additional COCs, 1,2,4- trimethylbenzene (1,2,4-TMB) and 1,3,5-trimethylbenzene (1,3,5-TMB), were added to the list of COCs based on the PADEP's revisions to the petroleum short list of compounds and at the request of the PADEP. The COC listing for groundwater was also revised in 2012 to follow the soil COC listing. The additional compounds added to the groundwater COC list included anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, and benzo(b)fluoranthene.

Additional compounds were added to Evergreen short list for AOI 7 in three of the investigation areas during the 2016 sampling events. Mercury and hexavalent chromium were added to the soil sampling for the borings completed to investigate soils in the vicinity of the incinerator, sludge basins and the hazardous waste tanks.

1.5 Selection of Applicable Standards and Screening Levels

The media of concern for AOI 7 include soil and groundwater. The potential vapor intrusion into indoor air exposure pathway was also evaluated through the collection of the indoor air samples. The approach for attaining Act 2 remediation standards for the media of concern is described below by media. As the current and anticipated future use of the facility is industrial, standards for non-residential properties were chosen for comparison.

1.5.1 Soil

All soil results were screened using a multi-step process, as described in this section. Soil results were first screened against the PADEP non-residential, used aquifer (total dissolved solids [TDS] <2,500 micrograms per liter [µg/l]) medium specific concentrations (MSCs) developed by the PADEP to implement the Statewide Health Standard (SHS). The following process was used to select the soil SHS for each COC:

- The highest value of either 100 times the groundwater MSC or the generic value MSC was selected to represent the soil to groundwater numeric value.
- The selected used aquifer, non-residential soil to groundwater numeric value was then compared with the non-residential direct contact value (0 to 2 feet or 2 to 15 ft. bgs, as applicable).
- The more stringent of the soil to groundwater value and the direct contact value was selected as the soil MSC, otherwise referred to as the SHS, for initial comparison of soil sample results.

The SHS value is usually driven by the soil-to-groundwater MSC, and the soil-to-groundwater pathway will be addressed in the groundwater investigation presented in this report. In order to further evaluate the risk posed by the concentrations of COCs which were detected above their respective SHS, the next step is to compare all of the soil analytical results to the non-residential direct contact MSCs. Soil sample locations that will require further pathway evaluation or require a remedial measure in order to attain a standard under Act 2 were identified through comparison to the non-residential direct contact MSCs.

An exception to this soil screening process exists for lead. On February 24, 2015, Evergreen submitted a Human Health Risk Assessment Report to PADEP which presented the development of a risk-based SSS for lead in soil. In a letter dated May 6, 2015, PADEP approved the report, and a non-residential direct contact site-specific numerical standard for lead of 2,240 milligram per kilogram (mg/kg) was established. This SSS is used in place of the default 0 to 2 ft. bgs direct contact standard for lead.

1.5.2 Groundwater

Groundwater sample analytical results were screened against the PADEP MSCs for non-residential properties overlying used aquifers with TDS less than or equal to 2,500 µg/l (SHS). Where constituent concentrations are above the SHS, Evergreen evaluated application of the site-specific remediation standard using the pathway elimination option.

1.5.3 Potential Vapor Intrusion into Indoor Air

Indoor and ambient air sample results collected in AOI 7 were screened against the USEPA Region 3 Regional Screening Levels (RSLs) for Industrial Air Target Risk (TR)=1e^{-6}, Target Hazard Quotient (HQ)=0.1 (updated May 2016); the PADEP Indoor Air Statewide Health Standard Vapor Intrusion Screening Values, Non-Residential (January 2017); and the Occupational Safety and Health Association (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 Value (TLVs) were used for compounds without established OSHA PELs. In accordance with the PADEP Vapor Guidance, since indoor air is the only potential exposure pathway, the results were also compared to the USEPA Region 3 RSLs for Industrial Air TR=1e^{-5} and Target Hazard Quotient (HQ)=0.1. These values were used as the threshold to indicate whether additional controls will be necessary to address vapor intrusion. Any such controls will be presented in the Cleanup Plan.

2. Environmental Setting

This section summarizes the geologic framework and general hydrogeologic properties of sedimentary deposits and bedrock underlying the south Philadelphia area, with emphasis near the facility. A brief discussion of historical and present-day topography and hydrology is also included. This section provides a regional context from which sedimentary deposits observed beneath AOI 7 can be classified and characterized for the purposes of this RIR. Much of the information presented in this section was summarized during conceptualization of a site geologic model that is being used in the development of a numerical groundwater flow model by Stantec as presented in the AOI 1 RIR (Stantec, 2016).

In general, the groundwater resources and stratigraphic framework of the facility area have been well-documented through a variety of data sources, including previous groundwater resource investigations dating back to the early 1900s, state and federal geologic mapping projects, groundwater modeling studies, and consultant site characterization and remedial investigation reports. Those data sources are summarized herein. In large part, available well and test boring logs from previous on-site and local subsurface investigations were the most valuable resource in evaluating the local subsurface stratigraphy. As such, subsurface information from approximately 750 well and test boring logs was considered in the evaluation of regional conditions. A database of stratigraphic "picks" on interpreted vertical lithologic unit boundaries (and, where possible, geologic formations) was also developed and includes all identified records of boreholes completed to bedrock at and near the facility. The purpose of the "picks" database was to archive interpretation of individual borehole lithologies to bedrock, so that stratigraphic profiles could be developed for this RIR and the Schreffler lithologic model (Schreffler, 2001) could be refined and updated for site-specific use at the facility (Stantec, 2016). One stratigraphic profile was developed for use in this RIR and is presented herein to support evaluation of the lithologic character, geographic extent, and thickness of each geologic unit identified. A structure contour map of the bedrock surface was also developed and used to support the discussion presented below.

2.1 Hydrology and Topography

The facility occupies a large area adjacent to the Schuylkill River near its confluence with the Delaware River. This region has a long history of human influence and disturbance, dating back to the early 17th Century when European settlers first arrived. The following sections present a brief discussion of the significant land surface morphologic changes that are apparent when comparing modern environments and topography to that shown on historical maps.

2.1.1 Historical Topography and Natural Depositional Environments

The City of Philadelphia Archives and several online archival resources have catalogued and provide free access to copies of many historical maps of Philadelphia. Based on a review of many of those maps, much of the land area occupied by the present-day Philadelphia Refinery was formerly tidal marsh and lowlands that once fringed the Schuylkill River. Figure 3 presents a geo-referenced United States Geological Survey (USGS) topographic map from 1898 (20-foot contour interval). The map indicates that several small tributary streams, digitized on-screen and shown as blue lines, formerly dissected that marshland and presumably would have exchanged water with the tidal Schuylkill River on a semi-diurnal basis. Several islands were also present throughout the lowlands, most notably League Island, which are interpreted as erosional remnants of uplands that formed sometime after deposition of the Trenton "gravel" sediments (discussed in detail below).

At that time, relatively higher topography was apparent north and west of the Schuylkill River, near Gibson's Point. South and east of that general area, the Schuylkill River coursed through a distinctive meander around Point Breeze, and appeared to have formed an erosive cut bank along present-day AOI 2 where higher elevations were present (and favoring point bar deposition north of AOI 10). A southwest/northeast trending ridge of higher elevation was also present south of Point Breeze near AOI 4 and between those two areas of higher elevation a stream was mapped to have been present. That stream appears to have originated in southern AOI 1 and flowed southwest through AOIs 3 and 7, towards its confluence with the Schuylkill River. Numerous other small streams and ditches draining the lowlands surrounding Hollander Creek were also noted. Additional historic maps indicate that by 1900, an earthen dike had been constructed along the banks of the lower Schuylkill River, and sluices were present at each stream/ditch confluence. Other maps show wooden pilings in places along the Schuylkill River. In general, the construction of containment dikes, sluices, and shoreline hardening would have altered the natural tidal exchange between the Schuylkill River and these historic creeks, thereby limiting the natural accretion of sediment in the marshes that once fringed the river. Moreover, the modifications indicated on these maps would have altered the pre-existing tidal regime and dynamic equilibrium of the Schuylkill River.

2.1.2 Post-Industrialization

Figure 3 indicates that by 1898, storage of petroleum near Point Breeze and Gibson Point had already begun. According to archived records, much of the remaining tidal marsh and lowland environments nearby were reclaimed and routinely dewatered for farming practices around this same time period (mostly on the west side of the Schuylkill River). Industrialization warranted further land filling activity and shoreline hardening, including bulk-heading and filling of the tributary streams that modified and generally raised the antecedent topography into its present-day

configuration. Farms were displaced in favor of industrial and commercial land uses. Although some clusters of residential property and open space exist or have existed near the facility, most land in south Philadelphia is presently and has been used for industrial and commercial purposes for over 100 years (IST, 1998).

Light Detection and Ranging (LiDAR) data obtained from the USGS (USGS, 2010) and topographic contours published in 2007 by the City of Philadelphia indicate that present-day topography is relatively flat in the study area, and land surface elevations generally range from a few feet below sea-level near Mingo Creek to approximately 30 feet above sea level near the eastern boundary of the Philadelphia Refinery in AOIs 1 and 8 [referenced to the North American Vertical Datum of 1988 (NAVD 88)] (Figure 4). Although subtle, the high-resolution LiDAR model displays topographically low areas that based on location, likely correlate to the locations of former stream valleys (e.g., Franklin Delano Roosevelt Park). In addition to raising the land surface, much of the filled areas were either paved and/or rendered relatively impervious (Figure 5), which decreased rates of recharge to the water table and necessitated the construction of numerous sewers to convey stormwater runoff (and also sewage) to the Schuylkill and Delaware Rivers.

2.2 Regional Geology and Hydrogeologic Conditions

The facility occurs within the up-dip limits of the Atlantic Coastal Plain, generally within 2 miles of the "Fall Line," where crystalline bedrock of the Appalachian foothills intersects the ground surface (outcrops) (Figure 6). 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, 1992). In general, the resulting sedimentary record in the vicinity of the Philadelphia Refinery is complex, largely incomplete, and under-represented by only Cretaceous and Quaternary deposits, separated by a regional disconformity (Stantec, 2012). A summary of those deposits is presented below.

2.2.1 Coastal Plain Deposits

2.2.1.1 Anthropogenic Fill

For reasons discussed, much of the facility and surrounding area is underlain by historical fill material, which was placed for the purpose of reclaiming lowlands along the banks of the tidal Delaware and Schuylkill Rivers during industrialization. These fill materials are heterogeneous in nature and have been described on borehole logs by others as a mixture of compacted soil and anthropogenic debris, including sand, clay, silt, gravel, cinders, concrete, asphalt, crushed stone, ash, glass, brick fragments, and wood. Apparent fill thickness ranges from a veneer where antecedent topography was highest to greater than 50 feet where it was used as railroad ballast just east of the Philadelphia Refinery. Within the locations of former stream valleys and marshes (Figure 3), the historical fill material is generally 20 feet or greater in thickness.

The fill materials may contain isolated lenses of groundwater (perched groundwater) where coarse or granular materials are separated from the underlying water table by low permeability sediments. The fill may also be saturated and/or in hydraulic connection with the water table along the axes of former stream channels, where the water-table appears to intersect the fill, or where the fill was placed on marshland. However, at most locations across the Philadelphia Refinery, the fill layer occurs above the regional water-table under average head conditions.

2.2.1.2 Quaternary Deposits

Quaternary sedimentary deposits are present beneath the Philadelphia Refinery and are generally representative of geologically-recent cycles of deposition and erosion that occurred within the last 200,000 years. These cycles of sedimentation were the result of a series of glacial and interglacial periods, namely the Illinoian and Wisconsin glaciations, separated by an intervening interglacial period and followed by the present interglacial period through the Holocene (Sevon et al., 1999). Depositional environments through this Period were primarily controlled by sea-level and the successive down-cutting and infilling of ancestral river valleys, primarily that of the Schuylkill and Delaware Rivers (Owens and Minard, 1979). Details of the Quaternary deposits present at the Philadelphia Refinery are described below.

2.2.1.2.1 Recent (Holocene) Alluvium

Predominantly gray, muddy deposits with occasional sandy, gravelly, and organic-rich lenses comprise the most-recent alluvium present at the Philadelphia Refinery. These sediments were deposited in dynamic floodplain, channel, and marsh environments through the Holocene. As noted, the upper surface of alluvium, in most places covered by fill, defines the antecedent topography that pre-dated development of the Philadelphia Refinery area. This geologic unit is generally present below an elevation of approximately 20 feet NAVD 88. The alluvium ranges in thickness from a few feet at higher elevations, away from the present Schuylkill and Delaware River estuaries, to approximately 15 feet within the former floodplains of buried tributary streams. However, adjacent to and fringing these major river estuaries, apparent marsh deposits accreted in freshwater environments to as much as 60 feet thick (to elevations as low as approximately -60 feet NAVD 88) as sea-level transgressed and flooded the incised river valleys through the Holocene. Figure 3 provides some estimation of how extensive the tidal marshes once were prior to development, generally along the Schuylkill River south of and surrounding Point Breeze. A stratigraphic profile location map is presented on Figure 7. Stratigraphic profile A-A' supports this interpretation and distribution of the most recent alluvial deposits across the Philadelphia Refinery (Figure 8).

Similar to the fill described above, most recent alluvium at the facility has limited water-bearing capacity due to its fine-grained texture. However, heterogeneities within the alluvium may allow for the presence of localized seasonal perched groundwater resulting from the percolation of recharge water. Within former marsh areas along the Schuylkill and Delaware River estuaries, the regional water-table occurs within the Holocene alluvium. At locations distal to the rivers and where the Schuylkill River appears to have eroded older alluvial deposits (e.g., along the western periphery of AOI 2), the Holocene alluvium occurs above the regional water-table and is unsaturated.

2.2.1.2.2 Pleistocene Alluvium ("Trenton Gravel")

Geologically-recent glacial outwash deposits, commonly referred to informally as the Trenton "gravel", have long been recognized in the vicinity of southeastern Pennsylvania along the Delaware River valley. Sevon and Braun (2000) provide a comprehensive map of glacial deposits in Pennsylvania, including the presence of sand and gravel outwash, interpreted as stratified drift, along the present Delaware River. Owens and Minard (1979) published a comprehensive summary of previous research into these deposits and subdivided the "Trenton gravel" into two distinct deposits (the Spring Lake and Van Sciver Lake beds) based on topographical position and lithology at those type sections. Low et al. (2002) indicate that in most places the Trenton gravel rests directly atop Cretaceous sediments and is overlain by younger alluvium of Holocene age near the Schuylkill River.

Based on literature review presented in the AOI 1 RIR (Stantec, 2016), the Trenton gravel was interpreted as a heterogeneous, stratified alluvial deposit of primarily sand and gravel, with occasional beds of clay and silt (the Van Sciver Lake beds), that resulted from glacial outwash through the Delaware River valley sometime after the Illinoian glacier receded. At the Philadelphia Refinery, the Trenton gravel is commonly described on boring logs as a brown, reddish-brown or, where stained, black, fine to coarse sand with lenses of gravel. The gravel fraction is often multicolored and comprised of a mixture of sub-angular to sub-rounded, sedimentary and metamorphic rocks derived from the Appalachian Piedmont. The Trenton gravel generally ranges in thickness from a few feet up to approximately 30 feet near the Philadelphia Refinery. It appears to be laterally continuous and its thickness depends on the antecedent Cretaceous topography that it filled and on the degree of erosion from above (Stantec, 2016). Along the Schuylkill River at the George C. Platt and Penrose Avenue bridges, and in places beneath the Delaware River, Greenman et al. (1961) mapped the Trenton gravel to be present beneath thick sections of Holocene alluvium to elevations near -60 feet NAVD 88, and those interpretations are shown on Figure 8.

The regional water-table at the Philadelphia Refinery most often occurs within the Trenton gravel, and, as a result of its stratigraphic position, this geologic unit forms the bulk of the unconfined aquifer (along with localized areas of saturated alluvium and fill). Published well records indicate that the Trenton gravel can be a prolific aquifer (Paulachok, 1991). Nevertheless, due to lateral changes in Trenton gravel thickness and to its heterogeneous character, hydraulic properties and groundwater yields can vary widely. Stantec reviewed published data and available on-site aquifer testing data regarding the hydraulic properties of the Trenton gravel and presented those data in the AOI 1 RIR (Stantec, 2016) which are included as Figures 9 and 10 in this report.

A nearly 7-day groundwater extraction test was conducted at recovery well RW-2 at the Philadelphia Refinery (IST, 1998). During testing, RW-2 was pumped at a constant rate of 225 gallons per minute (gpm). Distance-drawdown data analyzed along transects of observation wells suggested that the area of influence extended approximately 1,680 feet from the pumping well under relatively isotropic conditions. The hydraulic conductivity (k) was estimated to be greater than 400 feet per day (ft./d). More recently, a 24-hour pumping test was conducted at the former DSCP property at monitoring well DSCP-MW-65, a well that appears to be screened across the Trenton gravel and underlying sandy Cretaceous deposits (ARCADIS, 2013). Analysis of that data provided in the referenced report supports comparable aquifer properties at that site. However, it is noted

that during the test, the Trenton gravel was dewatered and individual aquifer k values could not be calculated/resolved. Other, in-situ, single well instantaneous displacement tests and short-duration pumping tests for remedial system design suggest a much lower k for the Trenton gravel, on average, but test results vary widely, from less than 1 ft./d to over 600 ft./d. The observed wide range in k values over relatively short distances is consistent with this geologic unit's lithologic heterogeneity.

2.2.1.3 Cretaceous Deposits

Many studies of the Atlantic Coastal Plain near the Philadelphia Refinery have identified the presence of Cretaceous age sediments in the subsurface. These are the oldest sedimentary deposits in the area and are configured in a southeasterly-thickening wedge, overlain by the much younger Quaternary deposits described above and underlain by Piedmont crystalline bedrock. Greenman et al. (1961) detailed the age, character, configuration, and hydraulic properties of these deposits in southeastern Pennsylvania. At the time of that publication, the Cretaceous deposits were assigned primarily to the Raritan Formation and noted to represent three distinct, fining-upward cycles of non-marine sedimentation. Similarities to lithologic sequences identified on borehole logs were correlated to previously-identified strata at their type locality in New Jersey, where the deposits are much thicker and more easily distinguished. Other similar, near time-equivalent geologic formations of Cretaceous age were elsewhere identified in Maryland and Delaware (Jordan, 1962), and more recently authors began wholly referring to the Cretaceous deposits in south Philadelphia as the Potomac-Raritan-Magothy (PRM) aquifer system.

In south Philadelphia, the PRM aquifer system is subdivided into six geologic units in order of increasing age:

- The upper clay unit
- Upper sand unit
- Middle clay unit
- Middle sand unit
- Lower clay unit
- Lower sand unit (Schreffler, 2001)

Near the Philadelphia Refinery, it is generally true that these units thin, intercalate, and exhibit gradual facies changes that make separation of individual units difficult. Total thickness of PRM deposits at the facility ranges from 0 feet, where Quaternary deposits are present atop bedrock, to more than 100 feet within paleochannels incised into bedrock. A structure contour map of the top of the bedrock surface is included as Figure 11. Details of the individual units based on boring log records and published descriptions as presented in the AOI 1 RIR (Stantec, 20016) are presented below.

2.2.1.3.1 Upper Clay Unit

The upper clay unit is a variegated clay/silt that is sometimes discernible from older clay units of the PRM where sandy and gravelly. In general, it is thin when compared to the other PRM clay units in

south Philadelphia, and in places distal to the Delaware River the upper clay may be entirely absent (Greenman et al., 1961). On the basis of geophysical log signature, others have mapped the upper clay to be at least 0.5 feet thick and up to 30 feet thick at the Philadelphia Refinery, exhibiting its greatest thickness in northern portions of the study area while pinching out to the south (IST, 1998). At the Philadelphia Refinery, Stantec assigned the upper clay to first occurrences of light brown, tan, mauve, yellow, gray, and less-commonly, red sandy, silty clay beneath the Quaternary alluvium. However, overall stratigraphic correlation of the PRM across the facility supports the upper clay unit pinching out or being truncated by younger deposits throughout most of the AOIs (Figure 8).

The upper clay unit by nature acts as a confining or leaky confining bed. Where present, it creates hydraulic separation between the upper sand unit and water-table aquifer.

2.2.1.3.2 Upper Sand Unit

The upper sand unit is a varicolored but predominantly brown to gray sand with varying amounts of gravel, clay, and silt (Greenman et al., 1961). Nearer the Philadelphia Refinery, it has been described as mostly silty and/or clayey fine to medium sand (IST, 1998). Where the upper clay is absent, the upper sand occurs directly beneath, and is typically discernable, from the coarser and more heterogeneous Trenton gravel above. Stantec used color and lithologic changes, in addition to subtle changes in drilling conditions including Standard Penetration Test (SPT) blow counts, to make "picks" on upper sand occurrences (Stantec, 2016) to create the current geologic interpretation for the facility. In general, the upper sand appears restricted to northern portions of the refinery (AOIs 1, 2, 4, and 8) where it subcrops the Trenton gravel. The upper sand unit, where present, rarely exceeds 10 to 20 feet in total thickness.

The upper sand unit is an excellent aquifer where its thickness and extent are sufficient (Greenman et al., 1961). Aquifer testing of the upper sand unit in New Jersey has indicated that the aquifer has similar hydraulic properties to the middle and lower sand units where discrete (Navoy and Carleton, 1995). At the Philadelphia Refinery, Stantec did not identify any existing testing data for wells discretely screened across the upper sand unit from which to infer sole hydraulic properties (Stantec, 2016). The upper sand generally occurs in pockets beneath the Philadelphia Refinery and comprises a portion of the unconfined aquifer. Most wells that fully penetrate the unconfined aquifer in northern areas of the refinery may intersect and be influenced by the hydraulic properties of the upper sand.

2.2.1.3.3 Middle Clay Unit

Whereas other clay units of the PRM are described as being sandy and gravelly in places, the middle clay unit is generally regarded as being a laterally extensive and uniformly massive confining bed of thick, red and white clay with very little sand (Greenman et al., 1961). Near the Philadelphia Refinery, others have found the middle clay to be nearly continuous in the subsurface (IST, 1998). Thicknesses of the middle clay unit generally range from approximately 20 feet, near the Belmont Terminal area, to just over 1 foot in southeastern AOI 1. While the middle clay appears to be everywhere present, at least on the eastern side of the Schuylkill River, its characteristically muddy texture can vary and become finely-laminated/bedded and intercalated with muddy sand. West of the Schuylkill River and particularly under areas north of Point Breeze, the middle clay unit (in

addition to most if not all of the PRM) appears to have been incised and completely removed by erosion. Downgradient, nearer AOI 9 and the George C. Platt Bridge, some pockets or thin lenses of middle and/or lower clay may be present under a thick section of Quaternary alluvium. At other locations beneath the Philadelphia Refinery, the middle and lower clay units appear to be in direct contact with each other, where the middle sand is absent (Stantec, 2016).

The middle clay unit, in places resting directly on and combining with the lower clay unit, acts as a significant confining bed at the Philadelphia Refinery. In a regional context, it creates hydraulic separation between the unconfined aquifer and deeper, confined to semi-confined aquifer(s) of the middle and/or lower sand units.

2.2.1.3.4 Middle Sand Unit

The middle sand unit is a light-colored, stratified, fine to coarse sand with occasional gravel and clay that was generally deposited in lenticular masses along the axes of troughs carved into the lower clay unit (Greenman et al., 1961). As such, it is by nature discontinuous in the subsurface. Stantec has mapped the presence of middle sand at the Philadelphia Refinery based on stratigraphic position and where present, is commonly described on boring logs as brown or orange sand and gravel. In some areas where the lower clay was entirely removed, it may be indistinguishable from and rest unconformably atop the lower sand unit. At those locations, Stantec used subtle changes in sample descriptions, including color and/or texture, of the sequences of sand below the middle clay to infer the contact between those units. The middle sand unit, where discernable from the lower sand, has been observed at thicknesses up to approximately 15 feet beneath the Philadelphia Refinery and is generally thickest in lenticular or tabular bodies.

Much like the other sand units of the PRM, the middle sand unit can be a prolific aquifer where it is laterally continuous and of sufficient thickness. Aquifer testing of the middle sand in New Jersey has indicated that the aquifer has similar hydraulic properties to the lower sand unit (Navoy and Carleton, 1995). At the Philadelphia Refinery, Stantec did not identify any wells discretely screened across the middle sand unit from which to infer sole hydraulic properties (Stantec, 2016). Most deep refinery wells are screened in the lower sand, or potentially across the lower and middle sand units, where hydraulically connected.

2.2.1.3.5 Lower Clay Unit

Published descriptions of the lower clay unit indicate that it appears very similar to, and is sometimes inseparable from, the middle clay unit where the middle sand is absent. The lower clay is generally tough, red clay but is known from drilling records to contain softer zones of gray clay stratified with fine sand. The lower clay tends to exhibit its greatest thickness along the lateral margins of paleochannels in underlying bedrock, and can be thin to absent along the axes of paleochannels where eroded prior to deposition of the middle sand unit (Greenman et al., 1961). Of the PRM clay units, Stantec has interpreted the lower clay unit to be the least significant at the Philadelphia Refinery in terms of both its lateral extent and vertical thickness. (Stantec, 2016) This is based on stratigraphic correlation and likely the result of erosion prior to deposition of the middle sand. Generally gray and red, commonly sandy clay and muddy sand zones were assigned to the lower clay if observed below and distinguishable from the middle clay. Where present, the lower clay was observed at thicknesses ranging from less than 1 foot to no greater than 10 feet. The

lower clay appears to thicken and become more continuous to the south and east of the Philadelphia Refinery.

Where physically connected, the lower and middle clay units combine to form a significant confining bed at the Philadelphia Refinery. In a regional context, they create hydraulic separation between the unconfined aquifer and deeper, confined to semi-confined aquifer of the lower sand unit. The lower clay can also create localized areas of hydraulic separation between the lower and middle sands, where discretely present.

2.2.1.3.6 Lower Sand Unit

The lower sand unit is a varicolored but predominantly white to yellow sand with gravel, usually fining upward to a cap of fine to medium sand with occasional yellow and gray clay lenses. As further described below, the lower sand unit is the oldest of the PRM deposits and rests unconformably atop bedrock. The lower sand is generally thickest (up to 87 feet thick) along the axial troughs of paleochannels carved into bedrock by discharge through former positions of the Schuylkill and Delaware Rivers (Greenman et al., 1961). At the Philadelphia Refinery, the lower sand unit is present as a nearly continuous deposit, with the exception of some areas west of the Schuylkill River where it appears that the river entirely removed the PRM. Where present, the lower sand unit is observed to range in thickness from approximately 20 feet to a maximum of just over 50 feet, where it fills a bedrock paleochannel beneath a portion of AOI 1. Philadelphia Refinery borehole logs indicate that the lower sand unit is commonly yellow, white, and pale gray in color and predominantly medium to coarse sand with gravel, or gravel with sand. The lower sand's gravelly texture beneath the refinery has been well documented on drilling logs.

Of the PRM aquifer system, it can be argued that the lower sand unit was historically the most important groundwater resource in south Philadelphia. Figure 10 summarizes hydraulic information available for the lower sand unit, based on published aquifer testing results. Proximal to the Philadelphia Refinery at the Philadelphia Naval Shipyard (PNSY), a wealth of historical testing data is available for the lower sand unit and indicates an average k value of approximately 134 ft./d. Across the Delaware River in New Jersey, k values seem to be slightly higher. At the Philadelphia Refinery, there are several wells that appear to be discretely screened within the lower sand unit. However, Stantec did not identify any aquifer testing data derived from testing of onsite lower sand wells (Stantec, 2016). It is noted that Stantec recently installed two new AOI 4 monitoring wells screened within the lower sand unit aquifer. Those wells will be utilized for the collection of slug test data and for two short-duration, constant-rate pumping tests to estimate lower sand hydraulic properties at the Philadelphia Refinery. The data from this testing will be submitted in future Act 2 submittals.

2.2.2 Bedrock

Bedrock beneath the Coastal Plain near south Philadelphia has been inferred from surface outcroppings above the "Fall Line," and has been described in the subsurface where penetrated by past drilling activities. Bosbyshell (2008) has mapped schist of the Wissahickon Formation to occur in Philadelphia along the "Fall Line" (Figure 6). Relatively small bodies of granitic gneiss, resulting from igneous intrusions into the country rock during metamorphism, can also be present. Most

boring log records of deep holes drilled at the Philadelphia Refinery indicate that schist is present beneath the Coastal Plain, in agreement with published maps.

Available data pertaining to the bedrock surface beneath the Philadelphia Refinery suggests that the surface generally dips to the southeast but contains local complexity. Greenman et al. (1961) recognized the presence of four paleochannels incised into bedrock and attributed those features to previous positions of the Schuylkill River. Two of those channels, referred to as the Schuylkill River and League Island Troughs by those authors, occur beneath parts of the Philadelphia Refinery and influence the total thickness of the Coastal Plain sedimentary sequence above them (Figure 11). Through boring log review, Stantec has identified additional detail in the bedrock surface beneath the Philadelphia Refinery, including a small bedrock paleochannel beneath the southern portion of AOI 1 that appears to be an extension of the League Island Trough, and a few localized bedrock surface highs (pinnacles) (Stantec, 2016).

In general, bedrock can store and transmit groundwater primarily through secondary porosity structures (e.g., fractures, joints). Bosbyshell (2008) indicates that the Wissahickon Formation can yield up to 20 gpm to wells in the mapped area above the "Fall Line." Balmer and Davis (1996) indicate that in Delaware County, Pennsylvania, the Wissahickon Formation is the most productive of the consolidated rock aquifers present in that county and can yield anywhere from 0 gpm to 300 gpm to wells (data from 127 wells). However, the wells included in their report were generally located above the "Fall Line" and were not screened below significant accumulations of Coastal Plain sediments. In general, when compared to the permeability and thickness of the Coastal Plain deposits, the water-bearing properties of the Wissahickon Formation beneath the Philadelphia Refinery are considered de-minimis.

3. Soil Investigation

The following sections summarize the soil investigation activities performed in AOI 7. Previous investigations are summarized in Section 3.1. The site characterization activities conducted for this RIR in 2016 were completed by Aquaterra, Stantec, and GHD, on behalf of Evergreen. The goal of the 2016 activities was to characterize soil in potential source areas, such as historic product handling and storage locations, former hazardous waste tanks, open storage tank incident areas, and known product releases In addition to collecting soil samples from borings advanced for the source-targeted soil investigations, soil samples were collected during monitoring well installation activities regardless of whether the area was expected to contain a source of petroleum compounds in soil.

All characterization fieldwork was performed in accordance with Evergreen's *Quality Assurance/Quality Control Plan and Field Procedures Manual (*Appendix B). Soil borings were advanced using a variety of methods including hand auger, backhoe, split spoons in conjunction with hollow stem augers, and split spoons driven using direct push methods. The general strategy for the investigation was to characterize soil in the 0 to 2 ft. bgs and greater than 2 ft. bgs intervals (unsaturated soil). Generally, subsurface soil samples were collected at the depth exhibiting the highest photoionization detector (PID) response and/or above the water table. Delineation was completed to the non-residential direct contact MSC and the numeric SSS (for lead). Table 2

summarizes the soil boring rationale and soil boring logs are included in Appendix C. All soil analytical results are summarized on Tables 3a and 3b, which compares the results to the 1) non-residential SHS (as previously defined in this report, the more stringent of the soil to groundwater numeric value and the direct contact value), 2) the non-residential direct contact MSC, and 3) the numeric SSS (for lead) (Soil Screening Levels). Samples were analyzed for the Petroleum Short List of compounds. Three samples were also analyzed for mercury and hexavalent chromium based on historic operations in specific areas. Analysis of soil samples was conducted by Lancaster Laboratories. All laboratory analytical reports from this investigation work are included in Appendix D.

3.1 Summary of Previous Soil Analytical Results

To supplement data previously collected as part of the historical RCRA investigations, two additional site characterization/remedial investigations were completed in AOI 7 in 2010 and 2011. During these investigations, a total of 33 shallow soil borings and 15 new monitoring wells were installed in 2010 and an additional 21 monitoring wells were installed in 2011 to investigate LNAPL in the vicinity of the No. 3 and 4 Separators. Information from these investigation is presented in the 2010 SCR/RIR (Langan, 2010) and the 2012 SCR/RIR (Langan, 2012). The soil borings completed in the SWMU areas include; SWMU 87 (8 soil borings); SWMU 88 (6 soil borings); SWMU 89 (6 soil borings); SWMU 90 (8 soil borings); and SWMU 91 (5 soil borings). A total of 9 soil additional borings were advanced outside of the SWMU areas at unpaved areas**.** An additional 24 borings were completed in 2012 and 3 borings were completed in 2013 to support additional characterization activities. The data from all of the borings were analyzed for the Petroleum Short List. There was no evidence of leaded tank bottoms in the five SWMU areas, none of the soil samples had exceedances of the current non-residential direct contact MSCs or the numeric SSS (lead). A limited number of the soil samples had exceedances the current non-residential soil to groundwater MSCs for the ethylene bromide, benzene, 1,2,4–trimethylbenzene, 1,3,5-trimethylbenzene and 1,2-dichloroethane. The locations of the soil borings are shown on Figure 2, as historic soil borings, the soil data from these investigations is summarized in Tables 4a and 4b. The 2010 and 2012 SCR/RIR are included in Appendix I.

AOI 7 includes ASTs and many soil samples have been collected for tank characterization and closure under 25 PA Code Chapter 245, in addition to sampling completed as part of the Act 2/One Cleanup Program. Although the rationale and results of all of these soil sampling projects are not discussed in detail in this RIR, as they have been submitted to PADEP under 25 PA Code Chapter 245 reporting, they are relevant to the characterization of AOI 7 under Act 2. The analytical results for these tank-related assessments are included on Tables 4a and 4b, and the soil sample locations are shown on Figure 2 as historic sample locations. The investigation of select tank incidents was performed as part of the field effort for this RIR, and those results are discussed in the following sections.

3.2 Historic Product Handling/Storage Areas

In order to investigate areas of historic product handling and storage, eleven soil borings (AOI7- BH-16-34 through BH-16-44) were advanced within the footprints of former tanks during the 2016 site characterization activities. Aerial photos were reviewed to identify locations of historically

removed ASTs. In the field, the former tank footprints were evaluated for evidence of impacts (i.e., surface staining, distressed vegetation). No visual impacted were noted during the field activities, so each soil boring was advanced in the center of each former tank footprint. None of the collected soil sample results exceeded the non-residential soil to groundwater or direct contact MSCs, or the numeric SSS (for lead).

3.3 Open Storage Tank Incidents

Evergreen intends to address all open AOI 7 storage tank incidents for which it is responsible through the 25 PA Code Chapter 245 CAP Program under separate cover. In 2014, the PADEP provided Evergreen with a list of the open Evergreen tank incidents in the PADEP database for AOI-7 as summarized in Table 5. Soil characterization activities were conducted to further investigate several open storage tank incidents within AOI 7. For borings associated with storage tank incidents that involve releases within tank berms, soil analytical results are presented in this RIR for informational purposes only as they relate to overall AOI 7 soil characterization. These data will be used in separately prepared SCRs for the identified open storage tank incidents, which will be submitted under separate cover to the PADEP in order to satisfy the requirements of 25 PA Code Chapter 245. The following summarizes the incidents that the PADEP provided to Evergreen, available information for these tanks, completed investigation activities during the 2016 site characterization activities and whether this tank will have a separate SCRs submitted to fulfill the requirements of 25 PA Code Chapter 245.

This section also includes groundwater data from the 2016 site characterization activities, if applicable to the discussion of the Tank Incident. The groundwater results are further discussed in Section 4.

3.3.1 UST 002/003, Incident 5825 and UST, Incident 5915

Two underground storage tanks (UST 002 and UST 003) were reported to be in AOI 7 and were assigned incident numbers 5825 and 5915 by the PADEP. Evergreen reviewed their records and UST 002 and UST 003 are actually located in AOI 5. Therefore, no investigation was completed to address UST 002 and 003 as part of this AOI 7 RIR.

3.3.2 Tank 270 (Former Tank Number GP 270, Former PADEP Tank 032A, Incident 40386)

Tank 270 was an AST primarily used to store recovered oil. A release of approximately 2,720 gallons was reported to the PADEP on June 28, 2009. Incident No. 40386 was assigned to Tank 270 by the PADEP. Stantec submitted an SCR dated November 23, 2009 which detailed the excavation and soil sampling completed in response to the release. Stantec collected 15 soil samples at 0- to 6-inch intervals from the sidewalls of the excavation and analyzed the samples for the PADEP's short list of constituents for Fuel Oil No. #4, #5, #6, and waste oil. On November 6, 2013, PADEP approved that the SCR demonstrated that the SHS was achieved in soil for the Act 2 parameters. The PADEP re-affirmed this approval in an April 13, 2016 email to Evergreen.

A request to close the incident for Tank 270 will be included in the separate SCR to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.3 Tank 271 (PADEP Tank 033A, Incident 29142)

Tank 271 was an AST which formerly was used to store crude oil. Sunoco completed an in-place closure report on May 16, 2002. Soil samples were collected in June 2002 from six Geoprobe soil borings, GP1-GP-6. The samples were analyzed for PADEP Act 2 short list of parameters for Fuel Oil #4, #5, #6, and Lubricating Oils and Fluids. The samples GP-4 (1.5 to 2.0 ft. bgs) and GP-5 (1.5 to 2.0 ft. bgs) exceeded the nonresidential soil-to-groundwater MSCs for benzene. All of the soil results were below the non-residential direct contact MSC. Samples from the locations that exceeded the soil to groundwater MSCs were also analyzed using the Synthetic Precipitation Leaching Procedure (SPLP) for benzene. The SPLP result from GP-5 was non-detect. The SPLP result from GP-4 exceeded the non-residential groundwater MSC. Sunoco notified PADEP on June 26, 2002 of a reportable release from Tank 271 of an unknown quantity. PADEP responded on July 31, 2002 with an issue of a Notice of Violation (NOV) and incident No. 29142 was assigned to this release. Sunoco submitted a SCR for Tank 271 in December 2002.

Since none of the soil samples exceeded the non-residential direct contact MSC, no additional soil samples were collected from Tank 271 during the 2016 site characterization activities. A groundwater sample was collected in C-58 and C-136 during the 2016 site characterization activities to characterize groundwater downgradient of Tank 271. The results from C-58 and C-136 did not have any exceedances of the non-residential MSCs during the 2016 site characterization activities for benzene or any other COCs. This result was consistent with the 2010 groundwater sample from C-58 which did not have any exceedances of the non-residential groundwater MSCs.

Tank 271 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.4 Tank 272 (Former PADEP Tank 054A/034A, Incident 45694 and 42279)

Tank 272 is an AST primarily used to store crude oil. On November 11, 1993, approximately 126 gallons of crude oil was reportedly released from Tank 272. The contaminated soil was removed for off-site treatment and the Pennsylvania Department of Environmental Resources (PADER the predecessor for the PADEP) was notified on November 12, 1993. Incident No. 45694 was assigned by the PADER. On March 8, 2011, an unknown quantity of crude oil was reportedly released and PADEP was notified on March 9, 2011. Incident No. 42279 was assigned to this incident. During the 2016 site characterization activities, four borings (BH-16-009 to BH-16-012) were completed for Tank 272. None of the soil results exceeded the non-residential soil to groundwater or direct contact MSCs, or the numeric SSS (for lead).

A groundwater sample was collected in C-58 and C-136 during the 2016 site characterization activities to characterize groundwater downgradient of Tank 272. The results from C-58 and C-136 did not have any exceedances of the non-residential MSCs during the 2016 site characterization activities. This result was consistent with the 2010 groundwater sample from C-58 which did not have any exceedances of the non-residential groundwater MSCs.

GP 272 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.5 Tank 273 (Former PADEP Tank 035A, Incident 45697)

Tank 273 is an AST primarily used to store residual oil. A release of approximately 78 gallons reportedly occurred on June 6, 1995. The impacted materials were removed by Sunoco. PADER was notified and Incident No. 45697 was assigned to this release. During the 2016 site characterization activities, four borings (BH-16-013 to BH-16-016) were completed for Tank 272. None of the soil results exceeded the non-residential soil to groundwater or direct contact MSC, or the numeric SSS (for lead). Groundwater was assessed by evaluating groundwater in downgradient well C-132. Groundwater results in C-132 were below the non-residential groundwater MSC during the 2016 site characterization activities.

Tank 273 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.6 Tank 275 (Former PADEP Tank 057A, Incident 45689)

Tank 275 was an AST used primarily to store residual oil. A release of approximately 84 gallons reportedly occurred on September 16, 1991. Chevron notified PADER on September 17, 1991 and Incident No. 45689 was assigned by the PADER. The contaminated soil was removed and disposed of off site, as documented in the October 28, 1991 letter submitted to PADER. On May 25, 2006, a 30-Day Notification of Intent to Close Aboveground Storage Tanks was submitted to PADER with the intention of permanently closing and demolishing Tank 275. An Amended Tank Closure Report was completed on December 28, 2006 following the demolition of the tank. On January 7, 2008, a Tank Closure Confirmatory Sampling Activities Report was submitted for the closure of AST 275. Activities completed as part of the tank closure included; 6 perimeter soil samples, 3 subsurface from tank soils and 4 samples adjacent to an aboveground pipe line. Each soil sample was analyzed for PADEP Act 2 short list of parameters for Fuel Oil numbers 4, 5, and 6 and used motor oil (except lead). There were no exceedances in soil samples for nonresidential soil to groundwater or direct contact MSCs from these samples.

Since the soil sample data collected during the tank closure activities did not exceed the SHS, no additional soil data was collected as part of the 2016 characterization activities. Groundwater sampling in C-58, C-96 and C-131 characterized groundwater quality in the area of Tank 275. The two downgradient wells C-58 and C-96 did not have any exceedances of the groundwater non-residential MSCs during the 2016 site characterization activities. Side-gradient well C-131 had one detection of BaP which slightly exceeded the non-residential groundwater MSCs during one of the two groundwater sampling events. No other results exceeded the non-residential groundwater MSCs during both events.

GP 275 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.7 Tank 277 (Former PADEP Tank 039A, Incident 38132)

Tank 277 was an AST used primarily to store heavy gas oil. On September 16, 2006, a 30-Day Notification of Intent to Close Aboveground Storage Tanks was submitted to PADEP with the intention of permanently closing and demolishing Tank 277. An Amended Tank Closure Report was completed on December 28, 2006 following the demolition of the tank. A Closure Confirmatory

Sampling Activities Report was submitted on September 12, 2007 which included the results from 12 samples. Each soil sample was analyzed for PADEP Act 2 short list of parameters for Fuel Oil numbers 4, 5, and 6 and used motor oil (except lead). None of the soil results exceeded the non-residential soil to groundwater or direct contact MSCs with the exception of 10 benzene samples which exceeded the soil to groundwater MSCs. All the samples met the non-residential direct contact MSC.

Since all of the data collected during the closure confirmation sampling met the non-residential direct contact MSC, no additional soil data was collected during the 2016 site characterization activities. Groundwater sampling in C-112 characterized groundwater quality in the area of Tank 277 during the 2016 site characterization activities. MW-112 did not have any exceedances of the non-residential groundwater MSCs during the 2016 site characterization activities.

3.3.8 Tank 281 (Former PADEP Tank 043A, Incident 5913 and 30777)

Tank 281 is an AST used primarily to store heavy gas oil. On September 18, 1999, approximately 84 gallons was reported released from Tank 281. PADER was notified on September 19, 1999 and Incident No. 30777 was assigned by the PADEP. On November 24, 2001, approximately 200 gallons of gas oil was reportedly released from Tank 281. Free product was recovered and contaminated soil was removed to be disposed of off-site. PADEP was notified on November 24, 2001 and Incident No. 5913 was assigned by the PADER. During the 2016 site characterization activities, four borings (BH-16-005 to BH-16-008) were completed for Tank 281. None of the soil results exceeded the non-residential soil to groundwater or direct contact MSC, or the numeric SSS (for lead). Groundwater was assessed by evaluating groundwater in downgradient well C-96, which did not exceed the nonresidential groundwater MSCs in the 2016 site characterization activities.

Tank 281 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.9 Tank 1002 (PADEP Tank 139A, Incident 36456)

Tank 1002 was an AST used primarily to store recovered oil. On April 14, 2004, Sunoco submitted notification of permanent closure of Tank 1002. On January 12, 2006, Sunoco submitted a 30-day Notification of Intent to Close Aboveground Storage Tanks letter to PADEP. Sunoco notified the PADEP of a release on May 2, 2005 and the PADEP assigned incident number 36456. On June 26, 2006, Sunoco submitted a 90 Day Site Characterization Status Report detailing the results of the five collected samples to document the closure activities. All of the soil results met the non-residential soil to groundwater and direct contact MSCs, with the exception of one sample which exceeded the non-residential soil to groundwater MSCs for benzene and naphthalene. All the soil results were below the non-residential direct contact MSC.

Since the data collected during the SCR activities did not exceed the non-residential direct contact MSC no additional soils samples were collected during the 2016 site characterization activities. Groundwater sampling in C-104 characterized groundwater quality in the area of Tank 1002 during the 2016 site characterization activities. C-104 did not have any exceedances of the groundwater non-residential groundwater MSC during the 2016 site characterization activities. C-104 did have exceedances of the non-residential MSCs in 2015 for benzo(a)pyrene in 2014 and 2015 and for

benzo(g,h,i)perylene in 2015. C-104 had no exceedances for all COCs during three sampling events in 2016.

Tank 1002 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.10 GP 1100 (PADEP Tank 140A, Incident 36578)

Tank 1100 was an AST used primarily to store slop oil/recovered oil. On April 14, 2004, Sunoco submitted notification of permanent closure of Tank 1100. Sunoco notified the PADEP of a release from Tank 1100 on May 31, 2006 based on the results of the soil characterization results. Sunoco submitted a 90-site characterization report to the PADEP which documented the results of the eight soil samples collected to support the tank closure. One soil sample had a benzene exceedance of the soil to groundwater MSC for benzene and another sample (GP-1100-CV2) had a Benzo(a)pyrene (BaP) exceedance of the non-residential direct contact MSC. None of the other soil results exceeded the soil to groundwater or direct contact MSCs. The 2016 site characterization activities completed delineation of the BaP sample that had direct contact MSC exceedance with borings BH-16-017 and BH-16-018. Groundwater was assessed by evaluating groundwater in downgradient wells C-157 and C-163 during the 2016 site characterization activities. Both C-157 and C-163 did not have exceedances of the groundwater non-residential SHS during the 2016 site characterization activities.

Tank 1100 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.11 Tank 1108 (Former PADEP Tank 149A, Incident 45700)

Tank 1108 was an AST used to primarily store fuel oil #6. A release from Tank 1198 was reported to the PADEP on September 6, 1998, and Incident No. 45700 was assigned. On May 17, 2000, Sunoco submitted an Aboveground Storage Tank System Closure Notification Form to PADEP with the intent to remove the tank. An Amended Registration Permanent Closure Report was submitted to PADEP on August 29, 2000. During the 2016 site characterization activities, three borings (BH-16-001 to BH-16-003) were completed for Tank 1180. BH-16-004 could not be installed due to access restrictions. None of the results from these borings exceeded the soil to groundwater or non-residential direct contact MSCs. Groundwater was assessed by evaluating groundwater in downgradient well C-54 during the 2016 site characterization activities. C-54 did not have any exceedances of the non-residential groundwater MSCs during the 2016 site characterization activities.

GP 1108 will be included in the separate SCR prepared for the tanks in AOI 7 to be submitted to the PADEP in accordance with 25 PA Code Chapter 245.

3.3.12 UST M5, Incident 45686/45699 and UST M4, Incident 6134

GPM005 (M5) was a fiberglass UST used to primarily store diesel oil. GPM004 (M4) was a fiberglass UST used to primarily store recovered oil. A leak was detected in M5 in September 1990, and the tank was taken out of service. Repairs to the UST M5 were complete in January 1991 and Incident No. 45686 was assigned to this incident by the PADER. USTs M5 and M4 were removed in

November 1997, and a closure report was submitted in June 1998. On May 8, 1998, Sunoco submitted a Notification of Reportable Release and Incident No. 45699/NOV was assigned to this release by the PADEP. PADEP sent a letter to Sunoco on March 17, 1999 and rescinded the NOV based on documentation received by PADEP indicating the UST was in compliance with the 1998 UST technical upgrade or closure requirements before December 22, 1998.

On March 2, 1999, a Site Assessment Report was submitted by Handex for UST M5/M4. The soil investigation activities completed during the tank removal in 1998 included the collection of eight soil samples. None of soil samples exceeded the soil to groundwater or direct contact MSCs. Groundwater samples collected from the excavation of UST M-5/4 had exceedances of the non-residential groundwater MSCs for benzene and toluene. Groundwater samples collected from wells C45, C60, C55, and C56 on August 26, 1998 did not have exceedances of the non-residential groundwater MSCs.

During the 2016 site characterization activities, a new monitoring well (C-172) was installed in the location of former UST M-5/4, as shown on Figure 2. Soil samples were collected during the monitoring well installation and the results of this sampling did not exceed the soil to groundwater or direct contact MSCs or the numeric SSS (for lead).Two groundwater sampling events were completed in C-172 during the 2016 site characterization activities and none of the groundwater results exceeded the non-residential groundwater MSCs.

3.4 Historic Releases

The following section discusses known historic releases that were investigated as part of the AOI 7 characterization activities. As part of the remedial investigation under Act 2, historic releases that could have created sources for COCs in soil were identified based on the available information. In order to identify areas that would require further investigation, a review of internal facility files was completed. PADEP also reviewed its records and provided information on historic incidents.

Based on information obtained, targeted soil investigations were performed as described in the following subsections. This section also includes groundwater data from the 2016 site characterization activities, if applicable. The groundwater results are also further discussed in Section 4.

3.4.1 Crude Oil at M Avenue at 1232 Unit

There was a release from a 24-inch crude line that runs from Tank 272 to the 1232 Unit. Based on field observations and limited access, one soil boring (BH-16-027) was completed in the area potentially impacted by this release according to site personnel, which was reportedly at M Avenue near 1232. The 0 to 2 ft. bgs sample from BH-16-027 had no exceedances of the non-residential soil to groundwater or the direct contact MSC, or the numeric SSS (for lead). A deeper sample could not be completed due to refusal. Groundwater sampling in monitoring well C-163 and C-51 was completed during the 2016 site characterization activities and all the results were below the nonresidential groundwater MSCs.

3.4.2 Slop Oil Backup from Sewer Near 1232 Unit

According to site personnel, there was a reported backup in the slop oil line from the sewer which occurred near the bulkhead. Soil boring BH-16-028 was completed in the vicinity of this area, and groundwater sampling was completed in C-157 and C-163 as part of the 2016 site characterization activities. Both the 0 to 2 ft. bgs and the 2 to 15 ft. bgs soil samples from BH-16-028 did not exceed the non-residential soil to groundwater or direct contact MSC or the numeric SSS (for lead). The groundwater samples from C-157 and C-163 met the non-residential groundwater MSCs.

3.4.3 Charge Line from Tank 284 to Tank 1232 Unit

A former release from the charge line between Tank 284 and 1232 Unit was investigated. According to refinery personnel, the line runs outside of the tank berm in that area. Four soil borings, BH-16-019 to BH-16-022, and groundwater sampling in C-130 and C-51 were completed as part of the 2016 site characterization activities for this area. The soil results from these borings did not exceed the non-residential soil to groundwater or direct contact MSCs, or the numeric SSS (for lead). The groundwater results from C-130 and C-51 were below the groundwater non-residential SHS.

3.4.4 9th and L Ave between Unit 433 and Tank 1232 Unit

A former release occurred from a line which ran along L Avenue between 433 and 1232 Unit. Four soil borings, BH-16-023 to BH-16-026, and groundwater sampling from monitoring wells C-54, C-58 and C-136 were completed during the 2016 site characterization activities. Each boring had a 0 to 2 ft. bgs and 2 to 15 ft. bgs soil samples which did not exceed the non-residential soil to groundwater or direct contact MSC, or the numeric SSS (for lead), with the exception of BH-16-025 which has exceedances of the soil to groundwater MSCs for benzene and naphthalene. The groundwater results from C-54, C-58 and C-126 were below the groundwater non-residential MSC.

3.5 Additional Investigation Areas

The following section discusses additional investigation areas that were investigated as part of the AOI 7 2016 site characterization activities. As part of the remedial investigation under Act 2, historical activities that could have impacted soil were identified based on the available information. In order to identify areas that would require further investigation, a review of internal facility files was completed.

Based on information obtained, targeted soil investigations were performed as described in the following subsections. This section also includes groundwater data from the 2016 site characterization activities, if applicable. The groundwater results are further discussed in Section 4.

3.5.1 Former Incinerator

No post closure data was available from the area of the former incinerator after it was closed, cleaned and partially dismantled in 1999. Although there were no documented releases from the incinerator, boring BH-16-045 was completed during the 2016 site characterization activities to verify that there were no impacts from the former incinerator. In addition to the COCs in Table 1, the soil sample was analyzed for hexavalent chromium and mercury. The soil sample from BH-16-045

had no exceedances of the non-residential soil to groundwater or direct contact MSCs, or the numeric SSS (for lead).

3.5.2 Former Sludge Basins

The former sludge basins were closed in 1999 by power washing, testing the sump water, concrete coring and concrete analyses. All the collected data met appropriate criteria in 1999. The HDPE and concrete were then removed and the area backfilled. The 2016 site characterization activities completed soil boring BH-16-046 at the perimeter of the former sludge basins. In addition to the COCs in Table 1, the soil samples were analyzed for hexavalent chromium and mercury. The soil results from the 0 to 2 ft. bgs and 2 to 15 ft. bgs soil samples did not exceed the non-residential soil to groundwater or direct contact MSC, or the numeric SSS (for lead), with one exception. Mercury barely exceeded the SHS in the 0 to 2 ft. bgs soil sample but did not exceed the nonresidential direct contact MSC.

3.5.3 Former Hazardous Waste Tanks (1004-1007)

No releases from these tanks were noted in any of the reviewed information. The 2016 site characterization activities included one boring, BH-16-047, from the location of these tanks. In addition to the COC list summarized in Table 1, soils were also analyzed for hexavalent chromium and mercury. None of the soil results exceeded the non-residential soil to groundwater or direct contact MSC, or the numeric SSS (for lead). No additional closure information was available for these tanks.

3.6 Delineation of Direct Contact MSC/SSS Exceedances

In order to complete horizontal and vertical characterization in soil, areas exhibiting exceedances of the non-residential direct contact MSC and the SSS for lead were delineated. In one instance, the concentration of lead in historic sample BNA-10 from 2 to 4 ft. bgs was re-sampled for verification. These areas and associated investigations are described below.

- A historic soil sample collected in BNA-10 from 2 to 4 ft. bgs. had a lead detection above the numeric SSS for lead. BH-16-033 (2 to 4 ft. bgs) was completed to confirm this lead detection. Lead was not detected in this sample, so no additional soil samples were necessary for delineation for BNA -10.
- Lead had been reported exceeding the non-residential direct contact MSC in the 2010 SCR/RIR (Langan, 2010) for several samples. However, these data results were compared to the current numeric SSS for lead and none of these results exceeded the SSS, therefore no additional delineation was required for these historic lead results.
- One soil sample collected during investigation activities for Tank 1100 (GP-1100-CV2) had an exceedance of the direct contact standard for BAP. The soil samples from BH-16-017 and BH-16-018 delineated this exceedance for BaP.
- None of the data collected during the 2016 site characterization activities exceeded the non-residential direct contact MSCs.

3.7 Site Characterization in the 0-2 ft. bgs Interval, 2-15 ft. bgs Interval and Beneath LNAPL

In response to PADEP comments to previous site characterization activities, additional soil sampling was completed to complete characterization in the 0 to 2 ft. bgs interval, 2 to 15 ft. bgs. Interval, and beneath LNAPL. These areas and associated investigations are described below.

- As shown on Figure 12a, none of the soil samples collected from the 0 to 2 ft. bgs interval during the 2016 site characterization activities exceeded the non-residential direct contact MSC and the numeric SSS (lead). Two locations exceeded the soil to groundwater MSCs, BH-16-025 (for benzene, naphthalene) and BH-16-046 (for mercury).
- The following locations had soil samples collected from the 2 to 15 ft. bgs. interval to complete site characterization in these areas since only shallow soil samples had been collected at these locations, not to delineate exceedances: BH-16-030 (for former C-169) , BH-16-031 (for former BH-10-20), BH-16-032-(for BH-12-56). All of the other 2016 borings included a 2 to 15 ft. bgs sample, if possible, to also address site characterization in this interval. None of the results from the samples collected from 2 to 15 ft. bgs exceeded the non-residential direct contact MSC, or the numeric SSS (for lead). Four locations exceeded the soil to groundwater MSCs for the following locations BH-16-025 (for benzene and naphthalene), BH-16-029 (benzene), BH-16-30 (benzene) or BH-16-43 (lead). The subsurface soil sampling results are presented on Figure 12b.
- Soil samples from BH-16-029 and BH-16-030 were specifically selected to be collected in the vicinity of monitoring wells C-143 and C-169, which have identified LNAPL to address the PADEP request for soil samples in LNAPL areas. None of the results from these samples exceeded the non-residential direct contact MSCs or the numeric SSS (lead). BH-16-029 and BH-16-030 exceeded the soil to groundwater MSC for benzene.

4. Groundwater Investigation

4.1 Historic Groundwater Investigations

Available well construction details are summarized in Table 6. Previous consulting reports describe and present results from various historic groundwater sampling events that have been conducted within AOI 7. All of the available analytical data for wells located in AOI 7, are presented in Table 7a and 7b and in the 2010 and 2012 SCR/RIR in Appendix I. Major groundwater sampling events summarized in Tables 7a and 7b include comprehensive events conducted in 2013 by Langan, and annual perimeter groundwater sampling events performed by Stantec. Review of the historic data show limited detections of lead, benzene and chrysene above the non-residential MSCs in groundwater.

4.2 Well Installation Activities

This section describes well installation activities that were performed as part of the 2016 remedial investigation. Activities are discussed by purpose in order to clarify characterization goals. All fieldwork was performed in accordance with *Evergreen Field Procedures (*Appendix B). Monitoring

well locations are shown on Figure 2. Well logs, including both lithologic information and well construction details, are included in Appendix C. Well construction details are also summarized in Table 6. The following sections discuss the well installation strategy/rationale; however, a summary is also available as Table 2.

4.2.1 LNAPL Delineation Monitoring Well Installation

In order to better delineate LNAPL plumes interior to AOI 7, additional water-table monitoring wells, C-170 and C-171, were installed. Prior to the installation of the monitoring wells, well locations were cleared for subsurface utilities to 8 ft. bgs. using a hydrovac truck. Monitoring well installation activities were performed using hollow stem auger methods by Total Quality Drilling of Mullica, New Jersey under the oversight of GHD in July 2016. During borehole advancement, surface and subsurface soil samples were collected for laboratory analysis of the petroleum short list compounds. Continuous soil sampling using a split spoon sampler was performed. A GHD geologist screened soil with a PID and logged sample lithologies. LNAPL was not observed in either C-170 or C-171.

4.3 Groundwater Sampling Events

A comprehensive characterization groundwater sampling event, consisting of 39 monitoring wells was conducted in July/August 2016. More focused events were conducted in May 2016 for C-104 and C-127 and in August/September 2016 for the newly installed wells (C-170, 171, and 173). All fieldwork was performed in accordance with *Evergreen Field Procedures (*Appendix B). Monitoring well locations are shown on Figure 2. All of the sampling was completed using low flow methodologies. All samples were analyzed for the petroleum short list COCs by Lancaster Laboratories, located in Lancaster, Pennsylvania.

Groundwater sampling analytical results, including all historic results for AOI 7, are summarized in Tables 7a, 7b, and 8 and in Appendix J. Groundwater results are also presented on Figures 19 and 20, for the water table and deep groundwater unit, respectively. Concentrations of the following COCs were detected above the non-residential MSC during the 2016 groundwater sampling events: benzene, isopropyl benzene, 1,2-dibromoethane (EDB), toluene, 1,2,4-TMB, xylenes, benzo(a)anthracene, benzo(a)pyrene, beno(g,h,i)pyrene , benzo(b)fluoranthene, chrysene, naphthalene, and lead. The following observations can be made concerning the groundwater exceedances.

- The groundwater MSC exceedances in C-57 and C-131 are delineated by non-detect concentrations in C-51, C-157 and C-163.
- The groundwater exceedances in C-146, C-150, C-152, C-161 and C-169 are associated with the 3 separator remedial system.
- The groundwater exceedance in C-62 is delineated by non-detect concentrations in C-106 and C-170.
- The remaining wells with groundwater MSC exceedances, C-104, C-127, C-145, and C-168, are located in close proximity to the bulkhead and do not have any wells that can delineate

these concentrations. The sample in C-168 was a groundwater sample collected beneath LNAPL.

- None of the monitoring wells screened in the lower, semi-confined aquifer had exceedances of the non-residential groundwater MSCs.

4.4 Well Gauging Activities

Stantec presently conducts annual groundwater and LNAPL gauging of all existing wells at the Philadelphia Refinery. The site-wide annual well gauging event, which is typically conducted during the second quarter of each year, is used to identify the presence of LNAPL and determine groundwater flow patterns. Liquid level measurements, groundwater contour figures, and product thickness figures are submitted to PADEP with the Philadelphia Refinery Remediation Program Groundwater Remediation Status Reports during the first half of each year. Groundwater elevation contours from the May 2016 annual gauging event are illustrated on Figure 13. In addition to the annual event, the wells included in the July and August 2016 groundwater sampling events were gauged as part of the September 2016 groundwater event and are shown on Figure 14.

5. Site-Specific Hydrogeologic Conditions

In Section 2 above, details regarding the methodology and interpretation of regional geologic conditions were presented. The purpose of this discussion of site-specific conditions is to refine the regional hydrogeologic framework to summarize conditions observed beneath AOI 7, with an emphasis on groundwater occurrence, groundwater flow, and hydraulic head potentials. It is understood that although this RIR is designed to address subsurface conditions beneath AOI 7, PADEP has previously requested that investigations of individual AOIs look beyond the boundary of the AOI being investigated. As such, GHD has utilized well gauging from AOIs 5, 6, and 7. Groundwater contouring and evaluation of head conditions in the study area are included on Figures 13 and 15.

5.1 Geologic Formations and Units Observed

On the basis of available lithologic data from boring logs, the principle of stratigraphic position, results of past investigations, review of historical maps, attempted correlation of observed lithologies across the study area to a published geologic framework (e.g., Quaternary deposits and the PRM aquifer system) documented in the AOI 1 RIR (Stantec, 2016), GHD has interpreted the following stratigraphy in the subsurface beneath AOI 7. A generalized stratigraphic column is included as Table 10 and the cross section through the facility, including AOI 7, is shown on Figure 8.

5.1.1 Anthropogenic Fill

Apparent fill is present everywhere beneath the existing land surface in AOI 7 and has been identified averaging approximately 10 feet. Stratigraphic Profile A – A' (Figure 8) presents the interpreted fill thickness in AOI 7.

5.1.2 Recent (Holocene) Alluvium

Recent alluvial deposits that post-date the Trenton gravel are present beneath filled areas within AOI 7. In general, recent alluvium defines the antecedent topography that preceded industrialization at the Philadelphia Refinery. In large part, recent alluvium within the facility is fine-grained, brown to brownish gray silt/clay with occasional lenses of sand and gravel that commonly grades with depth to include some sand. In places, decomposing organic material has also been indicated. The thickness of the recent alluvium within AOI 7 has been observed to range from approximately 20 to 35 feet. The recent alluvium is the most significant units to occur beneath AOI 7, as shown on Figure 8.

5.1.3 Trenton "Gravel"

The Trenton "gravel" does not occur throughout AOI 7. The Trenton "gravel" ranges in thickness from approximately 10 feet to pinching out along the boundary of AOI 7. Its predominant lithology appears to be silty, clayey, poorly-sorted sand with gravel, but includes secondary sandy gravel and clay/silt lithologies in lenses. As described site-wide, the Trenton gravel is a heterogeneous unit that is reflective of its depositional environment.

5.1.4 Upper Clay Unit/Upper Sand Unit/Middle Clay/Middle Sand/Lower Clay

The PRM upper clay/upper sand/middle clay/middle sand and lower clay units are not interpreted to be present beneath AOI 7. It appears that these units were truncated by erosion prior to or contemporaneous with deposition of the Trenton "gravel". The Trenton "gravel" or alluvium (where the Trenton "gravel" is absent) rests unconformably above the Lower Sand unit as shown on Figure 8.

5.1.5 Lower Sand Unit

In general, the lower sand coarsens with depth, from a dense fine to medium pale gray, pale yellow and white quartz sand to white and varicolored sandy gravel and gravelly sand. An area of sandy gravel has been mapped beneath AOI 7 in the Lower Sand Unit. The thickness of the lower sand in AOI 7 is approximately 20 feet.

5.1.6 Crystalline Bedrock

Bedrock where encountered, has been described as moderately to highly-weathered mica schist. As shown on Figure 6, bedrock elevations beneath AOI 7 range from a maximum of approximately -60 feet NAVD 88, near the AOI 7/AOI 3 boundary, to a minimum of approximately -80 feet NAVD 88 in the northwest portion of AOI 7.

5.2 Aquifer Hydraulic Properties

Two aquifers have been identified beneath AOI 7. In general, these are the water-table (unconfined) and lower (semi-confined) aquifers. Stantec identified and evaluated properties of those aquifers at the facility through review of approximately 300 well records as documented in the AOI 1 RIR (Stantec, 2016). Records reviewed included well gauging data and where available, lithologic logs, physical properties, and well/aquifer testing data. Hydrostratigraphic units were assigned by Stantec

to wells where possible using the stratigraphic profiles and nearby and deep boreholes as control points. Overall, approximately 90 percent of existing monitoring wells used at the facility are screened across the unconfined aquifer and are designed to intersect the water table. Of the remaining 10% screened in the lower aquifer, approximately 9% partially penetrate the lower sand and 1% are screened in either the middle sand, or across the middle clay.

It is noted that intervening PRM upper sand and middle sand aquifers do not appear to be present beneath AOI 7. It is also noted that hydraulic head potentials between the unconfined and lower aquifers are downward across AOI 7. These site-specific hydrogeologic conditions are discussed further below and are supported by Figures 13 and 15 which show groundwater elevation contours for both aquifers for 2016.

5.2.1 Methodology for Evaluation of Hydraulic Data

For the purposes of evaluating hydraulic head, flow direction(s) and magnitudes of groundwater flow for the aquifers identified in this RIR, GHD reviewed 2015 and 2016 water levels from annual, site-wide gauging data within the facility .For wells gauged by GHD, depth-to-water measurements were collected with an optical interface probe and reported to the nearest hundredth of a foot. Water-table elevations were calculated using surveyed well top-of-casing elevations and, where necessary due to LNAPL accumulations, corrected using LNAPL density data from the nearest available LNAPL sample data (see Table 9) for density assignments and for gauging data.

5.2.2 Unconfined (Water-Table) Aquifer

Beneath AOI 7, the unconfined aquifer is primarily composed of saturated portions of the fill and alluvium and the Trenton "gravel." On average, the saturated thickness of the unconfined aquifer beneath AOI 7 is approximately 20 to 30 feet. As a part of the AOI 1 RIR, Stantec (Stantec, 2016) mined existing data and has identified estimations of horizontal hydraulic conductivity (k_h) for the unconfined aquifer from 15 in-situ aquifer (slug) tests and two, short-duration pumping tests (see Figure 9). None of these tests were identified in AOI 7. From those tests, estimated values of unconfined aquifer k_h vary two orders of magnitude across the facility. The wide range of estimated values of k_h is reflective of the heterogeneous nature of the Trenton gravel. Anomalously low values of k_h may also be the result of poor well-aquifer hydraulic communication related to inadequate well development, or fouling of the well screen. Stantec is presently evaluating potential values of reported unconfined aquifer k_h as a part of site-wide numerical model calibration and sensitivity analysis.

5.2.2.1 Hydraulic Heads and Groundwater Flow

As shown on Figure 14, water-table mounds are apparent in AOI 7. A few of these mounds are found immediately adjacent to the bulkhead and one is in the southeastern portion of the site. The mounding along the bulkhead is due to the lower hydraulic conductivity of the bulkhead as compared to site soils. The mounding in the southeast may be due to the lower permeability soils beneath the tank areas. There is also an area of groundwater depression in the southwestern portion of AOI 7. Review of historic groundwater contours show that these contours are consistent with previous groundwater contours. Evaluation of groundwater mounding/depression is an

important component of understanding horizontal hydraulic gradients since they strongly influence contaminant fate and transport in an analytical or numerical model.

Groundwater flows to the west and north towards the river. The gradient towards the west is 0.001 ft./ft. and the gradient towards the north is 0.006 ft./ft. This pattern is consistent with the historical contours and supports that flow in AOI 7 is towards the river.

5.2.3 Semi-confined (Lower) Aquifer

Groundwater flow within the lower aquifer beneath AOI 7 has been contoured utilizing data from AOI 5, 6, and 7 wells, and the resultant potentiometric surfaces are shown on Figure 15 for synoptic well gauging events conducted in May 2016. The groundwater flow direction is to the west under a hydraulic gradient of approximately 0.002 ft./ft.

GHD evaluated the vertical hydraulic head gradients for May and August 2016 between the unconfined and lower aquifer throughout AOI 7. There is a downward gradient between the unconfined and lower aquifers. These gradients are consistent with previous data collected in AOI 7 (2010 RIR and 2012 RIR).

Beneath the study area, the lower aquifer is primarily composed of saturated portions of the lower sand unit. On average, the saturated thickness of the lower aquifer beneath AOI 7 is approximately 25 feet. Evergreen has recently conducted slug and pumping tests on the lower aquifer in AOI 4 and AOI 9 in support of the facility wide fate and transport modeling.

6. LNAPL Investigation

6.1 LNAPL Characterization Sampling

Various petroleum products have been stored and distributed within AOI 7. Historic testing have been completed to characterize the LNAPL at the Site. The results of the tests are summarized in Appendix E and are discussed below. Stantec has gone back through the historic LNAPL sampling and has reclassified some of the LNAPL types as summarized in Table 11, these re-classifications are also included below.

AOI 7, 2004

In 2004, LNAPL samples from wells C-65, C-106, and C-107 were collected and submitted to Torkelson Geochemistry, Inc. (Torkelson) for analysis. Torkelson completed gas chromatograph analysis of the samples LNAPL characterization data included product type, density, proportions of product, weathering, and similarities to other samples.

- Well C-65 is located near the northwestern corner of the bulkhead of AOI 7. Torkelson characterized the sample from C-65 as being extreme-severely weathered lube oil with residual oil (Langan 2004). Stantec reclassified this as heavy distillate in 2016.
- Well C-106 is located near the northwestern corner of the bulkhead of AOI 7. Torkelson characterized the sample from C-106 as being extremely weathered lube oil with middle distillate and gasoline (Langan 2004). Stantec reclassified this as heavy distillate in 2016.

- Well C-107 is located near the northwestern corner of the bulkhead of AOI 7. Torkelson characterized the sample from C-107 as being extremely weathered residual oil (Langan 2004). Stantec reclassified this LNAPL as heavy distillate in 2016.

AOI 7, 2010

In 2010, an LNAPL sample from well C-143 was collected and submitted to Torkelson for analysis. Torkelson completed gas chromatograph analysis of the samples LNAPL characterization data included product type, density, proportions of product, weathering, and similarities to other samples.

- Well C-143 is located near the northwestern corner of the bulkhead of AOI 7. Torkelson characterized the sample from C-143 as being extremely weathered residual oil (Langan 2010). C-143 was not gauged during the 2016 site characterization activities since it no longer exists.

AOI 7, 2012

In 2012, LNAPL samples from wells C-147, C-148, C-150, C-151, C-152, C-153, C-154, C-161, C-162, C-166, C-167, and C-168 were collected and submitted to Torkelson for analysis. Torkelson completed gas chromatograph analysis of the samples LNAPL characterization data included product type, density, proportions of product, weathering, and similarities to other samples.

- Well C-168 is located near the northwestern corner of the bulkhead of AOI 7. LNAPL in this well has been classified as crude (Stantec, 2016).
- Wells C-147, C-148, C-152, and C-166 are located near the north northwestern corner of the bulkhead of AOI 7. LNAPL in these wells have been classified as crude (Stantec, 2016).
- Wells C-150 and C-151 are located near the northwestern corner of the bulkhead of AOI 7. LNAPL in these wells have been classified as crude (Stantec, 2016).
- Wells C-153, C-154, C-161, C-162, and C-167 are located near the north northwestern corner of the bulkhead of AOI 7. LNAPL in these wells have been classified as crude (Stantec, 2016).

6.2 LNAPL Distribution

Numerous monitoring wells across AOI 7 have been gauged for LNAPL over the course of implementing the investigation and remediation programs. Stantec completed LNAPL and groundwater elevation gauging events in May 2016. During this event, 79 wells were gauged in the unconfined and semi-confined zones. LNAPL was detected in 13 wells with a maximum thickness of 2.45 feet at well C-106 during the May 2016 gauging. Figure 16 presents the May 2016 apparent LNAPL thicknesses from the annual gauging and Figure 17 presents the LNAPL thickness from the September 2016 gauging.

Based on review of the apparent LNAPL thickness data, observations suggest that LNAPL in C-150, C-152, and C-169 are controlled by the 3 separator remedial system as shown on Figure 17. LNAPL in C-64, C-97, C-146, and C-154 are located immediately adjacent to the 3 separator system and do show LNAPL thickness greater than in historic gauging events.

LNAPL in C-106 was delineated during the 2016 site characterization activities by C-170 and C-171. C-170 and C-171 could not be installed closer to C-106 due to a new 30-foot buffer along the bulkhead in this area that PES has created for safety reasons. The LNAPL thickness in C-106

during the 2016 gauging was greater than observed in historic LNAPL gauging events. Evaluation of a remedial action for the LNAPL in C-106 will be included in the Cleanup Plan.

LNAPL in C-168 is delineated by C-170 and the 3 separator system. LNAPL thickness in this well has been relatively constant based on current and historical data. Evaluation of the need for a remedial action for the LNAPL in C-168 will be included in the Cleanup Plan.

7. Vapor Intrusion

The vapor intrusion pathway in AOI 7 was evaluated for potential receptors of vapors originating from subsurface soil or groundwater, in accordance with the PADEP, Land Recycling Program; Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil under Act 2, January 2017 (VI Guidance).

7.1 Indoor Air Sampling

Evergreen and PES identified 8 occupied buildings in AOI 7, including 4 control rooms, WTP Control Room, Electrical Building, Firehouse, 440 Building and the canteen. Indoor air and outdoor ambient (background) air samples were collected in March 2016, as summarized in Table 12 and shown on Figure 18. The samples collected in March 2016 are expected to represent relative worst-case indoor conditions during the heating season. Indoor air samples were collected at some of these locations in 2012 as summarized in Appendix K and summarized in Table 12.

A building survey and inspection was conducted to identify any potential indoor air sources of volatile organic compounds (VOCs) possibly already present within the building (e.g., smoking, cleaning products, building products, manufacturing chemicals, etc.), the number and frequency of occupants within the various buildings, and potential preferential migration pathways through the building slab (e.g., utility conduits, slab cracking, etc.). At each building GHD completed a Building Survey and Indoor Air Sampling Field Sheet, which is included in Appendix K.

Each indoor air sample location was selected based on occupancy and specific building characteristics such as building size and location of the occupied space within a building. The numbers of samples collected for each building was based on a combined approach from Appendix Z of the PADEP VI Guidance and professional judgement. Ambient samples were also collected to assess background conditions.

Indoor and ambient air samples were collected using 6-liter capacity Summa™ canisters in a suitable location(s) in each building at a representative breathing zone height (i.e., 3 to 5 feet above grade). Canisters were laboratory-certified clean in accordance with Appendix Z of the PADEP VI guidance. The canisters were fitted with a laboratory-calibrated critical orifice flow-regulation device sized to limit the indoor air sample collection flow rate to allow for 8-hour sample collection. Canisters maintained a minimum residual negative pressure of approximately 1 to 5 inches of mercury following sample collection. Written documentation of all field activities, conditions, and sampling processes, including names of field personnel, dates and times, etc. were recorded. Documentation included building designation, building use, building characteristics, occupant information, and weather conditions at the time of sampling (temperature (inside and outside),

barometric pressure, wind direction and speed, and humidity).This information is included in Appendix K.

Outdoor air sampling locations were selected for collection of an ambient air sample in AOI 7. The outdoor locations were set at the same general elevation of the samples in the buildings and were in a position that is generally upwind of the buildings being assessed.

Table 13 summarizes the indoor air data and compares the detected concentrations to the generic screening criteria. As shown in Table 13, all detected concentrations of constituents in indoor air were below the Pennsylvania generic non-residential SHS for indoor air. Since the SSS is being applied in AOI 7 but the VI pathway is the only exposure pathway, these data were also screened against and met the EPA RSL based on criteria calculated at the lower of a target cancer risk of $1x10^{-5}$ and a non-cancer hazard quotient of 0.1. The location of indoor and outdoor air samples is shown on Figure 18.

Additional indoor air sampling is not required as part of the remedial investigation, but one additional round will be conducted and reported in a future Act 2 deliverable as a confirmation that COCs are not detected in indoor and ambient air at levels unacceptable for occupational exposure.

7.2 Air Sampling over LNAPL Plumes

In August 2016, three air samples (two locations and one duplicate) were collected to evaluate outdoor air quality in locations over NAPL plumes within AOI 7, at the request of the PADEP. The locations of these samples are shown on Figure 18 and the results are summarized in Table 14. These samples were collected from the breathing zone (3-5 feet above floor/ground level) using Summa© canisters with laboratory-provided regulators set to collect air over one continuous 8-hour period. The samples were packaged by field personnel and transported by FedEx to Lancaster Laboratories under Chain-of-Custody documentation for analysis of volatile organic compounds (VOCs) on the Act 2/One Cleanup program petroleum short list by EPA method TO-15.

Table 14 summarizes the outdoor air data and compares the detected concentrations to background concentrations. PADEP operates a network of air toxics monitoring stations that analyze for VOCs. Regional ambient air quality in the Philadelphia area where the refinery is located is best represented by data from the Marcus Hook monitoring station (latitude 39.8178, longitude - 75.4142). USEPA's background residential indoor air values are also included in Table 14 to determine whether detected concentrations are within background levels. As shown in Table 14, the results for the ambient air samples collected from over LNAPL in AOI-7 are within the background levels for this area. The location of indoor and outdoor air samples is shown on Figure 18. No additional sampling is proposed for the air quality over the LNAPL areas.

8. Quality Assurance/Quality Control

All fieldwork conducted as part of the site characterization activities was performed in accordance with the methods outlined in Appendix B, Evergreen Field Procedures. Methods established by Evergreen to examine data quality are outlined in the Evergreen Data Usability Standard Operating Procedure (SOP). An assessment of analytical data collected as part of this investigation under the

SOP is also included in Appendix G in the data usability assessment. The following sections describe specific aspects of quality assurance/quality control procedures that pertain to the activities outlined in this report.

8.1 Equipment Decontamination

All sampling equipment was either dedicated or decontaminated in accordance with the field sampling procedures to prevent cross-contamination. Prior to sampling, the equipment was decontaminated with successive rinses of detergent, potable water, and distilled water.

8.2 Equipment Calibration

Air quality monitors used for both air monitoring and soil screening were calibrated prior to use. Both a zero calibration and a span calibration using gases of known concentration as recommended by the manufacturer (i.e., 100 parts per million by volume (ppm_v) isobutylene for the photoionization sensor) were performed.

8.3 Sample Preservation

Samples were placed directly into chemically preserved and/or non-preserved glassware provided by the analytical laboratory, as appropriate. All samples were preserved and shipped at a temperature of approximately 4°Celsius (C) or less by application of ice prior to shipment to the analytical laboratory. This temperature was maintained during shipment by placing ice in zip-top bags above, around, and below the sample containers.

8.4 Documentation

Chain-of-custody forms were maintained throughout the sampling program to document sample acquisition, possession, and analysis. Chain-of-custody documentation accompanied all samples from the field to the laboratory. Each sample was assigned a unique identifier that was recorded in the field notes as well as on the chain-of-custody document.

9. Conceptual Site Model

GHD's conceptual understanding of the present conditions identified at AOI 7 and nearby proximity is summarized as follows.

9.1 Description and Site Use

- The Philadelphia Refinery is located along the banks of the Schuylkill River in the City of Philadelphia, Philadelphia County, Pennsylvania. The facility, which is located on industrial property, covers approximately 1,300 acres of land with access restricted by fencing and security measures. Current operations at the facility consist of the production of fuels and basic petrochemicals for the chemical industry.
- The area surrounding the facility is characterized by a mixture of residential, commercial, and industrial properties.

- AOI 7, also known as the Girard Point Fuels Processing Area, encompasses approximately 130 acres and is located on the east side of the Schuylkill River. AOI 7 is bordered by Lanier Avenue/AOI 3 to the east, Pennypacker Avenue/AOI 6 to the south and Schuylkill River to the west and north.
- The entire western and northern boundary of AOI 7 along the Schuylkill River is bound by a sheet pile wall.
- AOI 7 formerly contained a FCC unit, CO boiler, sulfur plant, East and West Sludge Basin - RCRA Tank, Hazardous Waste Incinerator, and crude units. AOI 7 currently consists of crude units, FCC and alkylation units, flares, cooling towers and ASTs. Eight LPG tanks are located in the south-central portion of this area. A WWTP is located along the southwestern portion of AOI 7. Four clean-closed RCRA hazardous waste ASTs are also located in the western portion of AOI 7 approximately 150 feet north of the WWTP. There are a total of 8 occupied buildings in AOI 7, including 4 control rooms (buildings 711, 6622, 6625, and 6626), Electrical Building 450, Firehouse Building 442, Maintenance Building 440, and the Canteen Building 595.
- There are a total of five SWMUs (SWMU Nos. 87, 88, 89, 90, and 91) located in AOI 7. These SWMUs include three in the NW Fill Area (SWMU 87 Buried Lead Sludge Area 1, SWMU 88 Buried Lead Sludge Area 72 and SWMU 89 Buried Lead Sludge Area 73); SWMU 90 Storage Tank Area/Buried Lead Sludge Area 74 and SWMU 91 Storage Tank Areas/Buried Lead Areas 5, as shown on Figure 2.

9.2 Geology and Hydrogeology

9.2.1 Geologic Framework

- The Philadelphia Refinery occurs within the up-dip limits of the Atlantic Coastal Plain, generally within two miles of the "Fall Line."
- Beneath AOI 7, the following Coastal Plain deposits may be present, in order of increasing depth/age: apparent fill, Quaternary alluvium [including Holocene and Pleistocene (Trenton "gravel") deposits], and the Cretaceous PRM aquifer system lower sand unit.
- The PRM upper clay, upper sand, middle sand, and lower clay are interpreted to have been cut or laterally "pinch" out in AOI 7.

9.2.2 Unconfined (Water-Table) Aquifer

- Beneath AOI 7, the unconfined aquifer is primarily composed of saturated portions of unconsolidated materials primarily in the fill and alluvium, with lesser amount in the discontinuous Trenton "gravel".
- On average, the saturated thickness of the unconfined aquifer beneath AOI 1 is approximately 20 to 30 feet.
- No aquifer testing was identified in AOI 7. However, aquifer tests have been conducted in other AOIs, and Evergreen is planning additional aquifer testing as part of the facility wide fate and transport numerical model.

- Water-table mounds are apparent in AOI 7. A few of these mounds are found immediately adjacent to the bulkhead and one is in the southeastern portion of the site. The mounding along the bulkhead is due to the lower hydraulic conductivity of the bulkhead as compared to site soils. The mounding in the southeast may be due to the lower permeability soils beneath the tank areas. There is also an area of groundwater depression in the southwestern portion of AOI 7. Review of historic groundwater contours show that these contours are consistent with previous groundwater contours.
- Groundwater flows to the west and north towards the river. The gradient towards the west is 0.001 ft./ft. and the gradient towards the north is 0.006 ft./ft. This pattern is consistent with the historical contours and supports that flow in AOI 7 is towards the river.

9.2.3 Lower Aquifer (Semi-Confined)

- Beneath AOI 7, the lower aquifer is primarily composed of saturated portions of the lower sand geologic unit.
- On average, the saturated thickness of the lower aquifer beneath AOI 1 is approximately 25 feet.
- Groundwater flow within the lower aquifer beneath AOI 7 has been contoured utilizing data from AOI 5, 6, and 7 wells, and the resultant potentiometric surfaces for synoptic well gauging events conducted in May 2016. The groundwater flow direction is to the west under a hydraulic gradient of approximately 0.002 ft./ft.
- GHD evaluated the vertical hydraulic head gradients for May and August 2016 between the unconfined and lower aquifer throughout AOI 7. There is a downward gradient between the unconfined and lower aquifers. These gradients are consistent with previous data collected in AOI 7 (2010 RIR and 2012 RIR).
- Evergreen has recently conducted slug and pumping tests on the lower aquifer in other AOIs in support off the facility wide fate and transport modeling.

9.3 Compounds of Concerns

9.3.1 Soil

- Soil delineations were performed to the non-residential direct contact MSC, and the numeric SSS (for lead) for COCs on the petroleum short list at all locations in AOI 7 and for hexavalent chromium and mercury at three locations in AOI 7.
- No soil samples collected during the 2016 site characterization activities exceeded the non-residential direct contact MSCs in AOI 7, leaving only one historic sample (GP-1100-CV) with a direct contact exceedance for BaP in AOI 7. This sample was delineated by the 2016 site characterization activities.

9.3.2 Groundwater

- Two rounds of characterization groundwater sampling were completed in 2016 in addition to other sampling in 2011, 2012 and 2013 as a part of this RIR and groundwater samples were analyzed for the Act 2/One Cleanup Program petroleum short list COCs.
- Concentrations of the following COCs were detected above the non-residential MSC in the water table aquifer during the 2016 groundwater sampling events: benzene, isopropyl benzene, EDB, toluene, 1,2,4-TMB, xylenes, benzo(a)anthracene, beno(a)pyrene, beno(g,h,i)pyrene , benzo(b)fluoranthene, chrysene, naphthalene, and lead.
- None of the monitoring wells screened in the lower, semi-confined aquifer had exceedances of the non-residential groundwater MSCs.

9.3.3 Indoor/Ambient Air

- An indoor and outdoor air sampling event was conducted on March 13, 2016, to represent ambient air and indoor air conditions during the heating season when levels of VOCs inside buildings are expected to be higher than during warmer months.
- None of the COCs were detected above the PADEP VI screening criteria or the USEPA RSLs.

9.4 LNAPL Distribution and Mobility

- Numerous monitoring wells across AOI 7 have been gauged for LNAPL over the course of implementing the investigation and remediation programs. Stantec completed LNAPL and groundwater elevation gauging events in May 2016. During this event, 79 wells were gauged in the unconfined and semi-confined zones. LNAPL was detected in 11 wells with a maximum thickness of 2.45 feet at well C-106 during the May 2016 gauging.
- Based on review of the apparent LNAPL thickness data, LNAPL in C-150, C-152 and C-169 are controlled by the 3 separator remedial system. LNAPL in C-64, C-97, C-146 and C-154 are located immediately adjacent to the 3 separator system and do show LNAPL thickness greater than in historic gauging events. LNAPL in this area has been characterized as crude.
- LNAPL in C-106 was delineated during the 2016 site characterization activities by C-170 and C-171. The LNAPL thickness in C-106 during the 2016 gauging was greater than observed in historic LNAPL gauging events. LNAPL in this area has been characterized as heavy distillate.
- LNAPL in C-168 is delineated by C-170 and the 3 separator system. LNAPL thickness in this well has been relatively constant based on current and historical data. LNAPL in this area has been characterized as crude.

9.5 Qualitative Fate and Transport of Selected Compounds

- A soil to groundwater model to evaluate the soil to groundwater pathway was not developed for the qualitative fate and transport assessment presented in this RIR. Rather, a qualitative-level assessment of groundwater data was warranted at this stage of the investigation.
- Of the COCs identified to be present in groundwater exceeding the non-residential MSC beneath AOI 7, the majority of these compounds are associated with monitoring wells (C-146,

C-150, C-152, C-161, and C-169) associated with the 3 separator system and therefore will be evaluated in the Cleanup Plan.

- The remaining groundwater concentrations are very low concentrations of semi-volatiles, with the exception of a few volatiles in C-168. Many of semi-volatile exceedances are of compounds that were not previously sampled prior to the 2016 site characterization activities. As discussed below:
  - The groundwater of BaP MSC exceedances in C-57 (BaP) and C-131 (BaP and Benzo(g,h,i) perylene) are delineated by non-detect concentrations in C-51, C-157, and C-163.
  - The groundwater exceedance in C-62 (BaP) is delineated by non-detect concentrations in C-106 and C-170.
  - The remaining wells with groundwater MSC exceedances, C-104 (BaP), C-127 (Benzo(g,h,i)perylene), C-145 (BaP), and C-168 (1,2,4-Trimethylbenzene, Benzene, Benzo(a)pyrene and Benzo(b)fluoranthene, Benzo(g,h,i)perylene) are located in close proximity to the bulkhead and do not have wells that can delineate these concentrations. The sample in C-168 was a groundwater sample collected beneath LNAPL.
- The most elevated concentrations of benzene and 1,2,4-Trimethylbenzene in unconfined aquifer groundwater correlate to locations beneath free-phase LNAPL (C-168). It should be noted that the groundwater sample from beneath LNAPL in C-106 did not have exceedances of the groundwater MSCs.
- The areas that are not proposed to be evaluated for remedial action in the Cleanup Plan have very low levels of semi-volatile compounds and are delineated by other monitoring wells or the bulkhead.
- Quantitative fate and transport analysis of selected dissolved-phase COCs in, and potentially across, AOI 7 aquifers, will be performed in general accordance with ACT 2 guidance to assess risk to potential receptors and to assess plume stability utilizing a 3-dimensional, steady-state, numerical groundwater flow (MODFLOW) model presently under development.

9.6 Potential Migration Pathways and Site Receptors

- AOI 7 encompasses approximately 130 acres and is located on the east side of the Schuylkill River and access is restricted by fencing and security measures.
- PES is responsible for overall facility security and oversight of contractor safety, and PES implements PPE and work plan/permitting protocols that mitigate the potential for worker exposure to impacted soil, groundwater, and/or LNAPL through the direct contact pathway.
- AOI 7 areas with identified surface soil exceedances of the direct-contact MSC for BaP, have been delineated and remedies will be addressed in future Act 2 submissions, including a Facility-Wide Cleanup Plan.
- Concentrations of petroleum short list COCs identified through indoor and ambient air sampling met the PADEP indoor air criteria and the USEPA RSLs.

- Free-phase and residual LNAPL present beneath portions of AOI 7 appear to be contained within the property boundary and where present, of limited mobility.
- Dissolved-phase petroleum short list COCs, are present in unconfined aquifer groundwater at concentrations above their respective SHS MSCs within AOI 7 and adjacent to the river.
- None of the COCs exceeded the groundwater MSCs in the lower aquifer.
- The Schuylkill River is adjacent to, AOI 7 but the bulkhead separates the water table aquifer and the river.
- The unconfined aquifer is not utilized for municipal or nearby communal, potable water supply in south Philadelphia. Langan completed a potable well search in 2016 and did not identify any potable wells within 1 mile of the facility. The map showing the results of this survey is included in Appendix L.

10. Qualitative Fate and Transport Assessment

On September 28, 2015, Evergreen's team of consultants met jointly with the PADEP to discuss the groundwater fate and transport modeling approach under Act 2 at the Philadelphia Refinery facility. At that time, it was collaboratively decided that individual AOI RIR submissions would include qualitative assessments of contaminant fate and transport, including an evaluation of plume stability, COC trends, and potential impacts to surface water. Findings and conclusions of the AOI specific, qualitative assessments of fate and transport will ultimately be used in a calibrated, steady-state MODFLOW model to perform quantitative fate and transport, including predictive simulations that will address cumulative mass loading to potential receptors.

The following discussion qualitatively summarizes factors that may influence contaminant fate and transport at AOI of the facility.

10.1 Geologic Framework

As discussed in detail in Sections 2 and 5 of this report, the geologic framework present beneath and in close proximity to AOI 1 can be summarized as follows:

- The Philadelphia Refinery occurs within the up-dip limits of the Atlantic Coastal Plain, generally within two miles of the "Fall Line."
- Beneath AOI 7, the following Coastal Plain deposits may be present, in order of increasing depth/age: apparent fill, Quaternary alluvium [including Holocene and Pleistocene (Trenton "gravel") deposits], and the Cretaceous Potomac-Raritan-Magothy (PRM) aquifer system lower sand unit.
- The PRM upper clay, upper sand, middle sand, and lower clay are interpreted to have been cut or laterally "pinch" out in AOI 7.

10.2 Hydrogeology

As summarized above and discussed in detail in Section 5 of this report, the geologic framework present beneath and in close proximity to AOI 7 supports the following hydrogeologic conditions:

- Two aquifers have been identified beneath the Philadelphia Refinery. In general, these are the water-table (unconfined) and a lower aquifer. Their properties are as follows.

10.2.1 Unconfined (Water-Table) Aquifer

- Beneath AOI 7, the unconfined aquifer is primarily composed of saturated portions of unconsolidated materials primarily in the fill and alluvium, with lesser amount in the discontinuous Trenton "gravel".
- On average, the saturated thickness of the unconfined aquifer beneath AOI 7 is approximately 20 to 30 feet.
- No aquifer testing was identified in AOI 7. However, there have been aquifer tests in other parts of the refinery, and Evergreen has recently conducted additional aquifer testing in other AOIs as part of the facility wide fate and transport numerical model.
- Water-table mounds are apparent in AOI 7. A few of these mounds are found immediately adjacent to the bulkhead and one is in the southeastern portion of the site. The mounding along the bulkhead is due to the lower hydraulic conductivity of the bulkhead as compared to site soils. The mounding in the southeast may be due to the lower permeability soils beneath the tank areas. There is also an area of groundwater depression in the southwestern portion of AOI 7. Review of historic groundwater contours show that these contours are consistent with previous groundwater contours.
- Groundwater flows to the west and north towards the river. The gradient towards the west is 0.001 ft./ft. and the gradient towards the north is 0.006 ft./ft. This pattern is consistent with the historical contours and supports that flow in AOI 7 is towards the river.

10.2.2 Lower Aquifer (Semi-Confined)

- Beneath AOI 7, the lower aquifer is primarily composed of saturated portions of the lower sand geologic unit.
- On average, the saturated thickness of the lower aquifer beneath AOI 7 is approximately 25 feet.
- Groundwater flow within the lower aquifer beneath AOI 7 has been contoured utilizing data from AOI 5, 6, and 7 wells, and the resultant potentiometric surfaces are shown on Figure 15 for synoptic well gauging events conducted in May 2016. The groundwater flow direction is to the west under a hydraulic gradient of approximately 0.002 ft./ft.
- GHD evaluated the vertical hydraulic head gradients for May and August 2016 between the unconfined and lower aquifer throughout AOI 7. There is a downward gradient between the unconfined and lower aquifers. These gradients are consistent with previous data collected in AOI 7 (2010 RIR and 2012 RIR).

- Evergreen has conducted slug and pumping tests on the lower aquifer in other AOIs in support off the facility wide fate and transport modeling.

10.3 Hydrogeology and Topography

- LiDAR data collected in 2010 indicates that present-day topography is relatively flat within AOI 7 and proximity, where land surface elevations generally range from approximately 60 feet to just over 75 feet NAVD 88
- Within AOI 7, much of the surface area present is impervious or assumed to be of limited permeability.
- The Schuylkill River is directly adjacent to AOI 7.
- National Weather Service Online Weather Data (NOWData) for Philadelphia, Pennsylvania, indicates that since 1872, mean annual precipitation is approximately 42 inches (ranging from approximately 29 to 64 inches).
- Stormwater runoff within AOI 7 is managed by an onsite storm sewer system that during most storm events is managed by the refinery's Wastewater Treatment Plant. During longer and heavier rain events, stormwater is discharged through stormwater outfalls directly to the Schuylkill River.
- Natural recharge of the unconfined aquifer beneath AOI 7 and proximity is assumed to be spatially variable but limited in overall capacity as a result of: the high percentage of impervious surface coverage present; and, the fine-grained nature and extent of recent alluvial deposits above the water table.

10.4 Anthropogenic Features

10.4.1 Historic Fill

Apparent fill is present beneath the existing land surface at most locations in AOI 7 and has been identified to be approximately 10 feet. The fill is generally heterogeneous in nature and is composed of an admixture of sand and gravel, mud, and anthropogenic debris included cinders, ash, bricks, cinder block, and metal.

10.4.2 Active Remediation Systems

Within AOI 7 there is one active remediation system (3 Separator System). Construction of a ten recovery well hydraulic control system was completed on August 23, 2012. Groundwater and LNAPL are extracted using pneumatic submersible pumps, and total fluids pass through an oil/water separator. Water is discharged to an onsite process sewer, and LNAPL is recovered in a 1,100-gallon holding tank and recycled by the refinery. Since the start-up of the system through December 2016, 17,226,885 gallons of water and 111,648 gallons of LNAPL have been recovered by the system, as presented in Appendix F. Performance of this system is documented in the Semi-Annual, Groundwater Remediation Status Reports submitted to the PADEP. In 2013, PES assumed primary responsibility for the 3 Separator System due to newer PES releases from the sewer system, which connects 137 Unit to the #4 separator, in the vicinity of the #3 separator.

10.5 Groundwater Constituents of Concern

10.5.1 Unconfined (Water Table) Aquifer

Concentrations of the following petroleum short list COCs were detected above the groundwater MSCs in unconfined aquifer groundwater during the 2016 characterization sampling events; benzene, isopropyl benzene, EDB, toluene, 1,2,4-TMB, xylenes, benzo(a)anthracene, beno(a)pyrene, beno(g,h,i)pyrene , benzo(b)fluoranthene, chrysene, naphthalene, and lead which is consistent with historic sampling for COCs that have been previously analyzed in AOI 7.

The areas that are not proposed to be evaluated for remedial action in the Cleanup Plan have very low levels of semi-volatile compounds and are delineated by other monitoring wells or the bulkhead. These compounds have generally not been sampled historically in AOI 7 and will need additional sampling to establish groundwater trends.

10.5.2 Lower Aquifer

No concentrations of any COCs were detected above the groundwater MSCs in lower aquifer groundwater during 2016 characterization sampling events which is consistent with previous sampling events.

10.6 Potential Onsite and Offsite Receptors

Based on the identified impacts to groundwater at AOI 7, GHD has evaluated the following as potential receptors.

- Vapor intrusion effecting potential occupants of buildings in AOI 7 was evaluated. The results did not exceed the PADEP VI screening levels or the EPA RSLs.
- The Schuylkill River could receive AOI 7 groundwater discharging to the river. Remediation systems are operational in AOI 7 to mitigate that potential by exhibiting hydraulic control in the vicinity of the 3 separator.
- Potable consumption of impacted groundwater could affect human health. No known potable supply wells exist at or in proximity to AOI 7.
- The PRM aquifer system is heavily utilized for water supply in New Jersey. The aquifers of that system, chiefly the lower sand unit, receive recharge via vertical leakage through confining units and direct recharge from younger deposits along their subcrop area in south Philadelphia. None of the COCs were above the groundwater MSCs in the lower Aquifer in AOI 7.

10.7 Plans for Quantitative Fate and Transport Analysis

Stantec is presently developing a groundwater flow model, the Philadelphia Refinery Flow Model (PRFM), using the USGS MODFLOW2000 computer code and Groundwater Vistas Version 6 software. The MT3DMS contaminant transport module will be utilized to simulate predictive scenarios of the fate and transport of selected COCs in groundwater. The modeling is being performed to meet and demonstrate compliance with the PADEP Site-Specific Standard for remediation of pre-existing contamination under Act 2, Pennsylvania's Land Recycling Program.

Under Act 2 and in consideration of the One Cleanup Program, an analysis of the fate and transport of petroleum-related constituents is needed, in general, to assess risk to potential receptors, assess plume stability, and estimate time to project closure.

The PRFM will focus on groundwater movement within the Coastal Plain of south Philadelphia, Pennsylvania, near the Philadelphia Refinery. The model domain was adopted from an earlier USGS model developed by Schreffler (2001), later updated by Sloto (2012), and has been updated by Stantec to more-closely simulate site-specific groundwater flow conditions beneath the facility. Updates to the Schreffler (2001) model have included model layer refinement, grid discretization, updates to the model layer hydraulic properties using site-specific testing data, and the inclusion of drains to simulate losses to the sewers and/or localized pumping centers (e.g., Mingo Creek Pump Station). At the time of this report, it is anticipated that Stantec will present the PRFM to PADEP during the spring of 2017 for comment prior to utilization of the model in any fate and transport analyses at the refinery in support of a facility-wide Cleanup Plan, or a site-wide RIR to address cumulative loading of COCs to receptors.

11. Ecological Assessment

The majority of AOI 7 is covered with soil, gravel, and impervious surfaces. The soil and gravel-covered portions of AOI 7 are not likely to serve as a breeding area, migratory stopover, or primary habitat for wildlife. In October 2016, a survey of endangered, threatened, and special concern wildlife and habitat was conducted by submitting a search request through the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Tool. The results of the PNDI search identified no known impacts by the PA Game Commission, the PA Fish and Boat Commission, and the U.S. Fish and Wildlife Service.

The PNDI search identified potential endangered species impacts that required further review by the PA Department of Conservation and Natural Resources (PADCNR). A no effect letter request was submitted to the PADCNR in October 2016. A response was received from the PADCNR on November 3, 2016 indicating that no impact is anticipated to the species of special concern. All ecological assessment documentation is included in Appendix H.

12. Community Relations 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 investigation activities at the Site. This plan incorporates aspects of public involvement under both PADEP's Act 2 program and USEPA's RCRA Corrective Action program. This report and future Act 2 reports will include the appropriate municipal and public notices in accordance with the provisions of Act 2. Notices will be published in the Pennsylvania Bulletin and a summary of the notice will appear in a local newspaper. As part of the CRP, Sunoco held an initial public meeting in the City of Philadelphia to present the strategy

and Evergreen will give status updates of the project at the CRP meeting on an as requested basis. A copy of the original NIR, the 2014 NIR and the Act 2 report notifications for this RIR are included in Appendix A.

13. Conclusions and Recommendations

GHD has prepared this RIR for AOI 7 of the Philadelphia Refining Complex to satisfy the requirements of Act 2, as specified under 25 PA Code §250.408. The documented investigation activities were performed in general accordance with a 2011 revised Work Plan for Sitewide Approach Under the One Cleanup Program, and were conducted in support of Evergreen's commitment to remediate legacy environmental impacts that existed at the facility prior to its conveyance to PES in 2012 (Buyer-Seller Agreement). In support of those stated objectives, this report has described a comprehensive evaluation of available historical data pertaining to AOI 7, and has documented a remedial investigation strategy that included the collection of a significant amount of additional subsurface information in the time since previous AOI 7 Act 2 deliverables were submitted to PADEP (2010 and 2012 SCR/RIR). Investigations performed as a part of this report also considered and where relevant, sought to address PADEP comments directed towards previous RIR submissions for the facility.

The following summarizes the conclusions and recommendations regarding AOI 7.

13.1 Soil

BaP was identified in one sample in AOI 7 surface soil samples at concentrations in excess of the direct-contact MSC. This sample has been delineated horizontally and vertically. Concentrations of COCs in all other collected soil samples (including subsurface soil) were below the non-residential direct contact MSC. Re-sampling this location may eliminate this remaining direct contact exceedance in AOI 7.

13.2 Groundwater

13.2.1 Unconfined (Water-Table) Aquifer

Benzene, isopropyl benzene, EDB, toluene, 1,2,4-TMB, xylenes, benzo(a)anthracene, beno(a)pyrene, beno(g,h,i)pyrene , benzo(b)fluoranthene, chrysene, naphthalene, and lead exceeded the current non-residential MScs in the unconfined aquifer.

The qualitative assessment has indicated that the monitoring wells (C-57, C-62, C-127, C-131 and C-145) have very low levels of semi-volatile compounds and are delineated by other monitoring wells or the bulkhead. The COCs exceeding the groundwater MSC in these wells have generally not been sampled historically in AOI 7 and additional sampling is recommended to establish groundwater trends. The results of this sampling will be submitted in future Act 2 submittals. All of the other monitoring wells with exceedances of the groundwater MSCs are proposed to be evaluated in the Cleanup Plan for potential remedial action.

13.2.2 Lower Aquifer

None of the samples in the lower aquifer exceeded the non-residential MSCs in the Lower Aquifer, which is consistent with historic data in AOI 7 therefore no further assessment was completed for the Lower Aquifer in this RIR. As indicated above for the unconfined aquifer, a MODFLOW model will be utilized during quantitative fate and transport analyses to evaluate the Lower Aquifer for the facility.

13.3 Vapor Intrusion

Concentrations of COCs in indoor and ambient air were evaluated in the eight occupied buildings in AOI 7 and there were no exceedances of the PADEP VI criteria. It is recommended that a second round of indoor air sampling be performed at these buildings to confirm that concentrations of petroleum short list COCs remain below the PADEP I criteria. Results of this sampling event will be reported to PADEP in a future Act 2 deliverable.

13.4 LNAPL

LNAPL within AOI 7 has been delineated. The majority of LNAPL sampled was categorized as heavy distillate or crude. LNAPL recovery is ongoing, and will be further evaluated for optimization and efficiency as part of a Site-wide Cleanup Plan.

14. References

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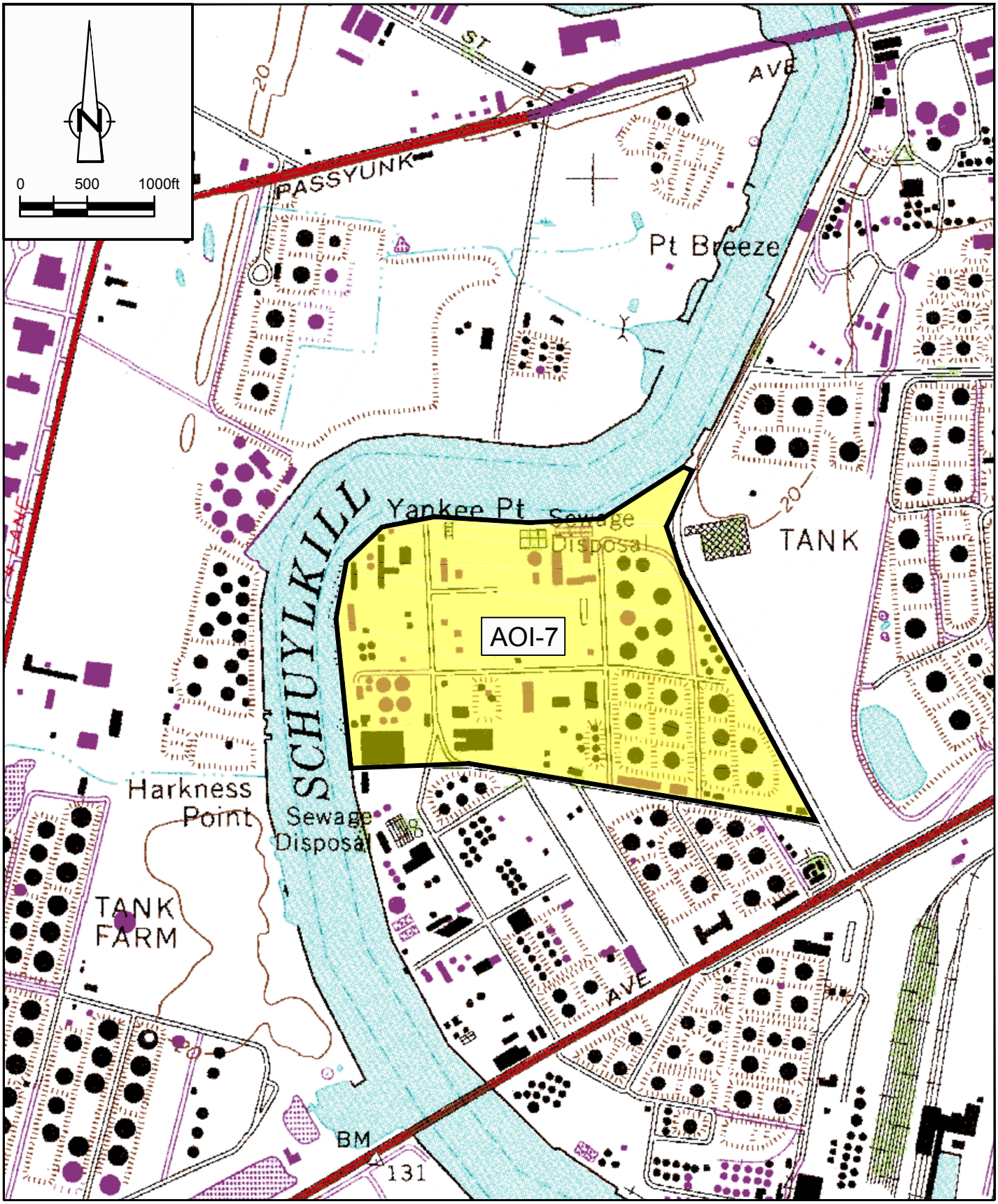

SOURCE: USGS QUADRANGLE MAP, PHILADELPHIA, PENNSYLVANIA, 1995

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REMEDIAL INVESTIGATION REPORT

11109614-01

Jun 1, 2017

AOI 7 SITE LOCATION MAP

FIGURE 1

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA001.dwg



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Source: Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

Legend

- 2016 RI Groundwater Sample
- 2016 RI Soil Sample
- 2016 RI Soil Sample - not completed
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Air Sample
- Historical Soil Sample
- Bulkhead
- 3 Separator Remediation System
- 3 Separator Remediation System
- Existing Tank
- Former Tank
- Features Identified by Evergreen (not PA DEP incidents)
- Solid Waste Management Unit
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

Date: Mar 28, 2017

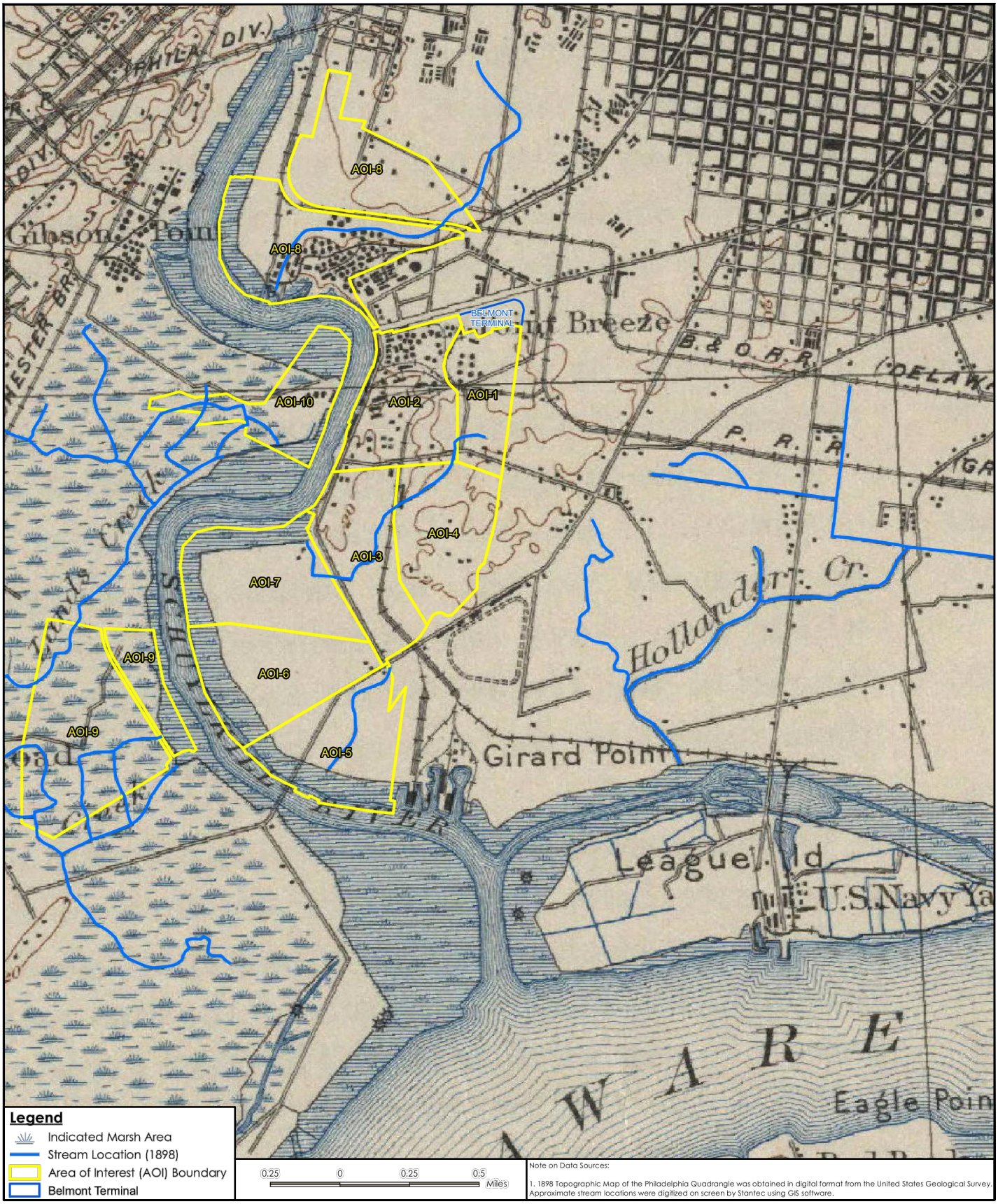
EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA REFINERY OPERATIONS

AOI 7 SITE PLAN

Figure No.

FIGURE 2

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-00(003)GIS-OT002.mxd



SOURCE: REMEDIAL INVESTIGATION REPORT, AREA OF INTEREST 1, PHILADELPHIA REFINERY COMPLEX, STANTEC 2016.

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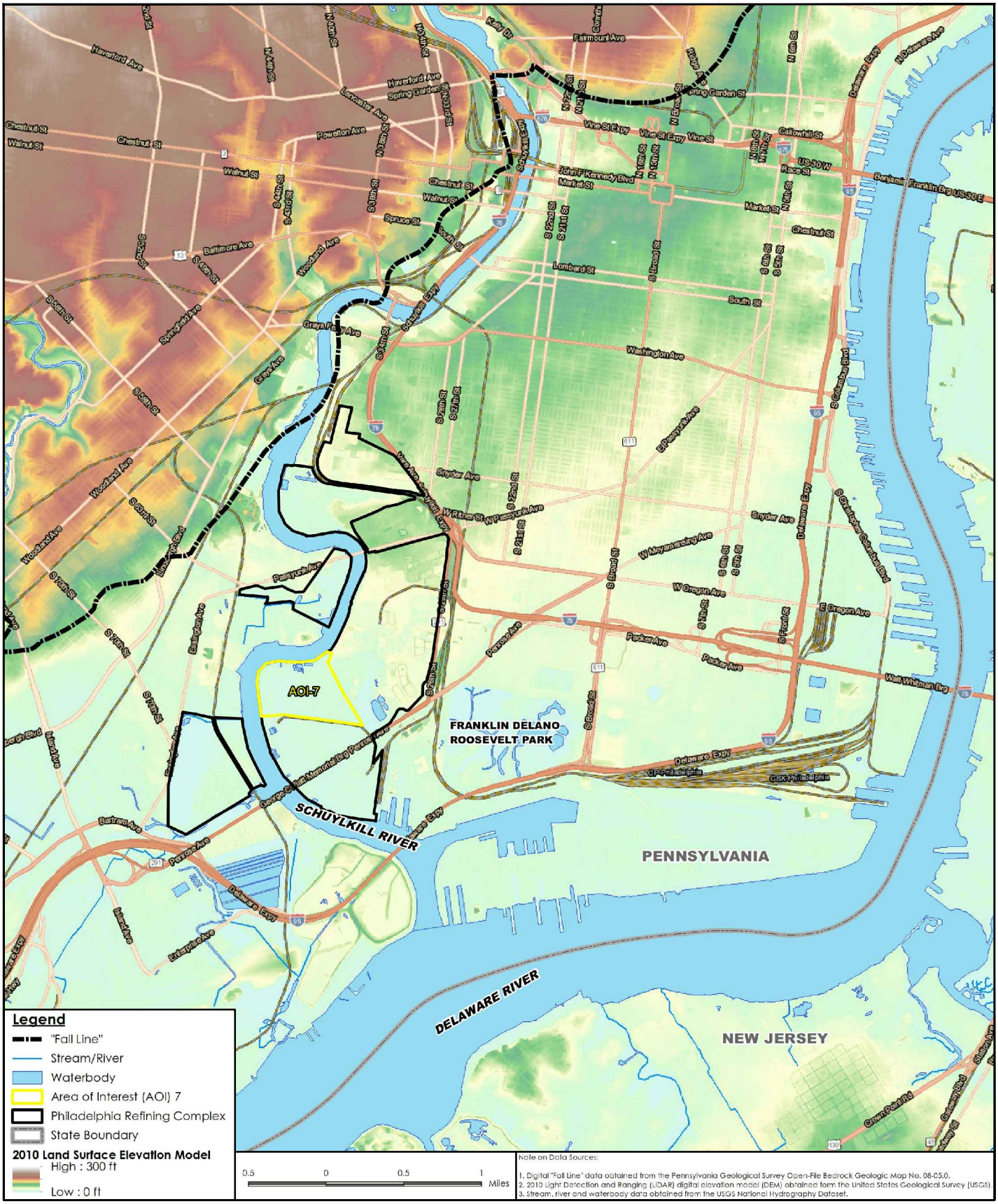
11109614-01

Nov 7, 2016

HISTORIC STREAM AND MARSH LOCATIONS (CIRCA 1898)

FIGURE 3

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA002.dwg



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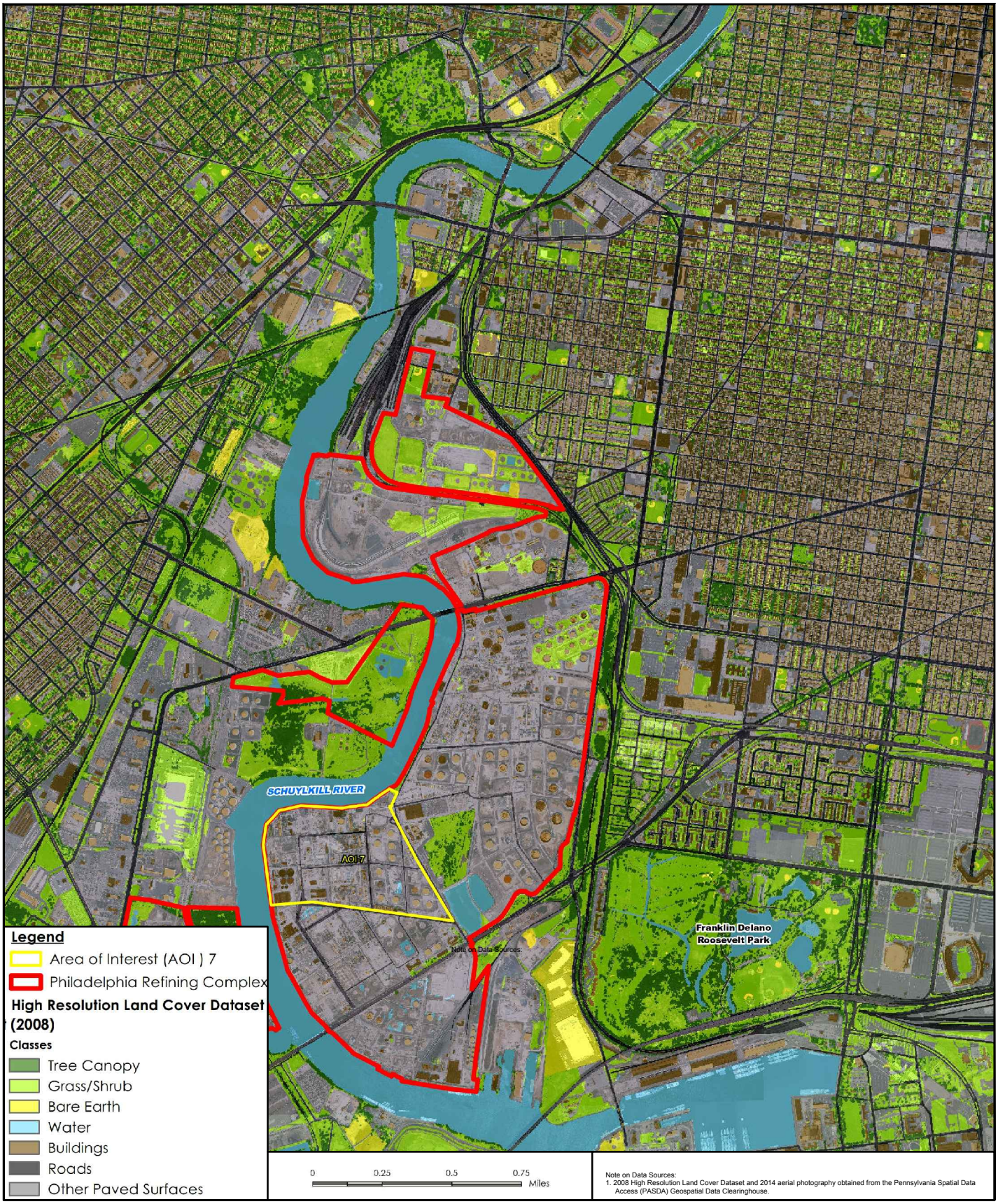
11109614-01
Dec 20, 2016

GEOGRAPHIC SETTING

FIGURE 4

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA003.dwg



SOURCE: REMEDIAL INVESTIGATION REPORT, AREA OF INTEREST 1, PHILADELPHIA REFINERY COMPLEX, STANTEC 2016.

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11109614-01

Dec 20, 2016

HIGH RESOLUTION LAND COVER DATASET (2008) - CITY OF PHILADELPHIA

FIGURE 5

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA004.dwg



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11109614-01

Dec 20, 2016

GENERALIZED BEDROCK GEOLOGIC MAP

FIGURE 6

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA005.dwg



GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-003033GIS-OT007.mxd

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N

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

Legend

- Stratigraphic Profile Boring Location
- 2016 RI Groundwater Sample
- 2016 RI Soil Sample
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Historical Soil Sample
- Stratigraphic Profile Location
- Area Of Interest

Original Size	Bar is one inch on original size drawing
ANSI D	0 — 1"

Project : 11109614

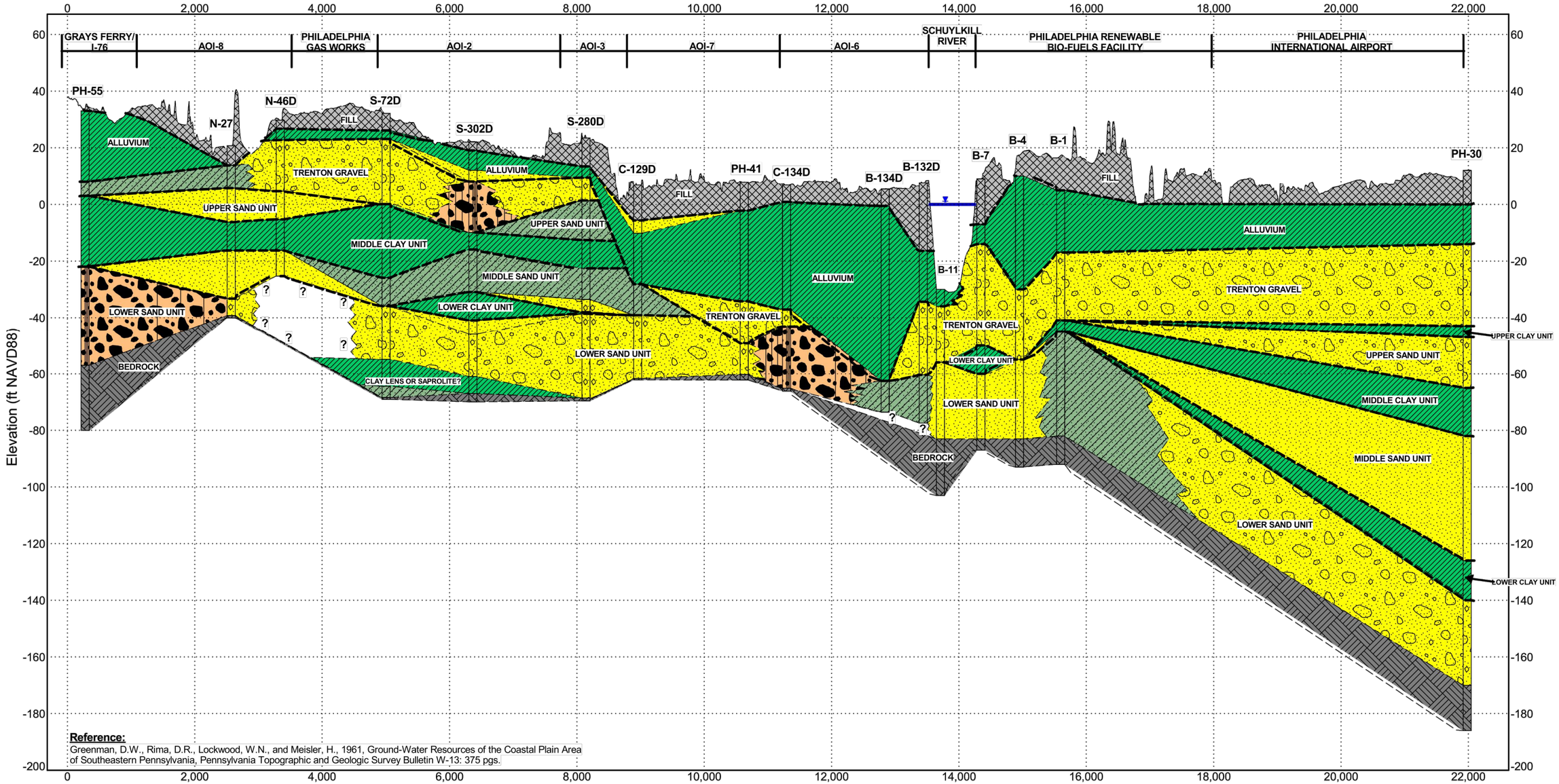
Date: Nov 25, 2016

EVERGREEN RESOURCES MANAGEMENT AOI-7 PHILADELPHIA REFINERY OPERATIONS

STRATIGRAPHIC PROFILE LOCATION MAP

Figure No.

FIGURE 7



SOURCE: PHILADELPHIA REFINERY REMEDIATION PROGRAM GROUNDWATER REMEDIATION STATUS REPORT, FIRST HALF 2016, STANTEC, 2016.

GENERALIZED LITHOLOGY GRAPHICS

- Fill
- Sand (incl. trace to little silt/clay/gravel)
- Mud
- Sandy Gravel
- Muddy Sand
- Bedrock (incl. saprolite where indicated)
- Gravelly Sand
- Sand with Lignite

Notes:

1. Land surface profile obtained from a 2010 light detection and ranging (LIDAR) elevation model available from the United States Geological Survey (USGS).
2. Lithologic logs for borings PH-55, PH-41, B-11, B-7, B-4, B-1 and PH-30 were obtained from Tables 13 and 14 of Greenman et al., 1961. Geographic locations for those historic borings were estimated by Stantec in a GIS using a georeferenced image of Plate 1 of that report. Fill thicknesses interpreted by Stantec
3. PH-55 terminal boring depth deeper than shown.
4. Water depths for the Schuylkill River were estimated using soundings provided on the National Oceanic and Atmospheric Administration (NOAA) navigation chart for the Delaware River, Philadelphia and Camden Waterfronts (Chart 12313). Mean lower low water (MLLW) depths were transformed to the North American Vertical Datum of 1988 (NAVD 88).
5. Stantec generalized lithologic data from available borehole logs into 8 categories as indicated for interpretive purposes.
6. Correlation between lithologies and, where applicable, geologic units is based on the straight-line method. Actual conditions between boreholes may vary from what is shown on this profile. Contacts dashed where inferred.
7. Vertical Exaggeration ~ 45 X

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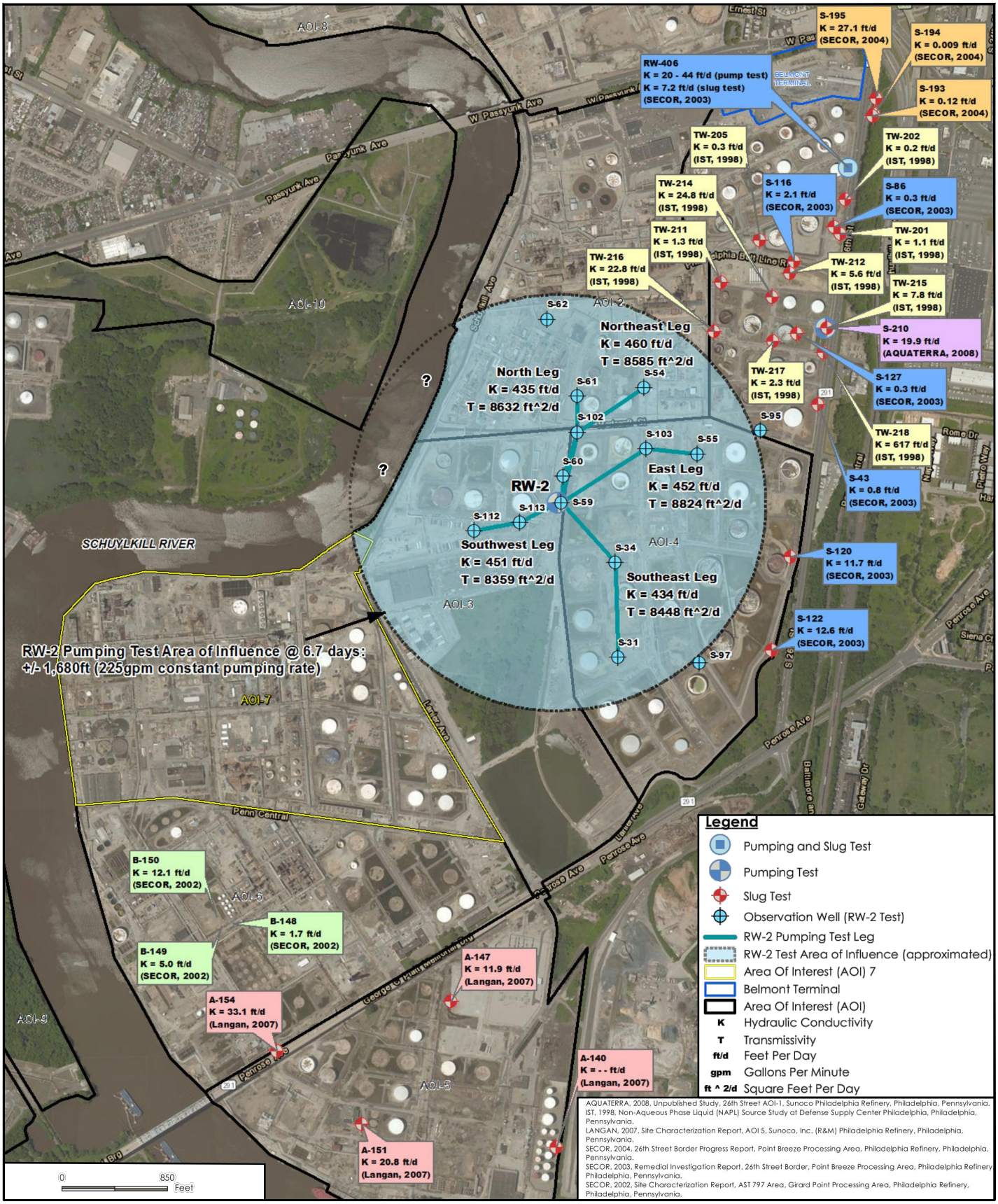
11109614-01

Nov 23, 2016

STRATIGRAPHIC PROFILE

FIGURE 8

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA012.DWG



SOURCE: REMEDIAL INVESTIGATION REPORT, AREA OF INTEREST 1, PHILADELPHIA REFINERY COMPLEX, STANTEC 2016.

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REMEDIAL INVESTIGATION REPORT

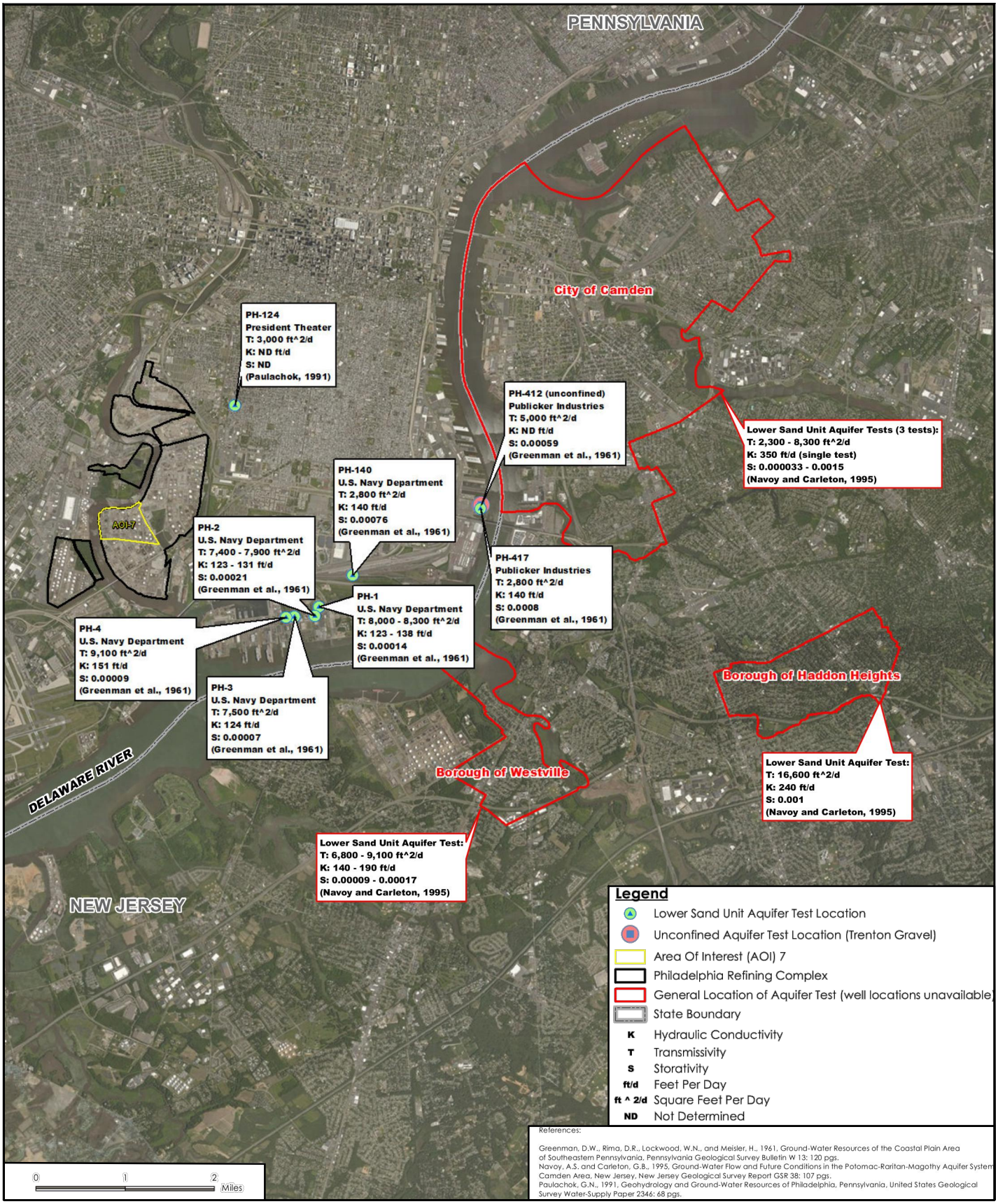
11109614-01

Jan 19, 2017

SUMMARY OF AVAILABLE AQUIFER TESTING DATA FOR THE UNCONFINED AQUIFER

FIGURE 9

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA006.dwg



SOURCE: REMEDIAL INVESTIGATION REPORT, AREA OF INTEREST 1, PHILADELPHIA REFINERY COMPLEX, STANTEC 2016.

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REMEDIAL INVESTIGATION REPORT

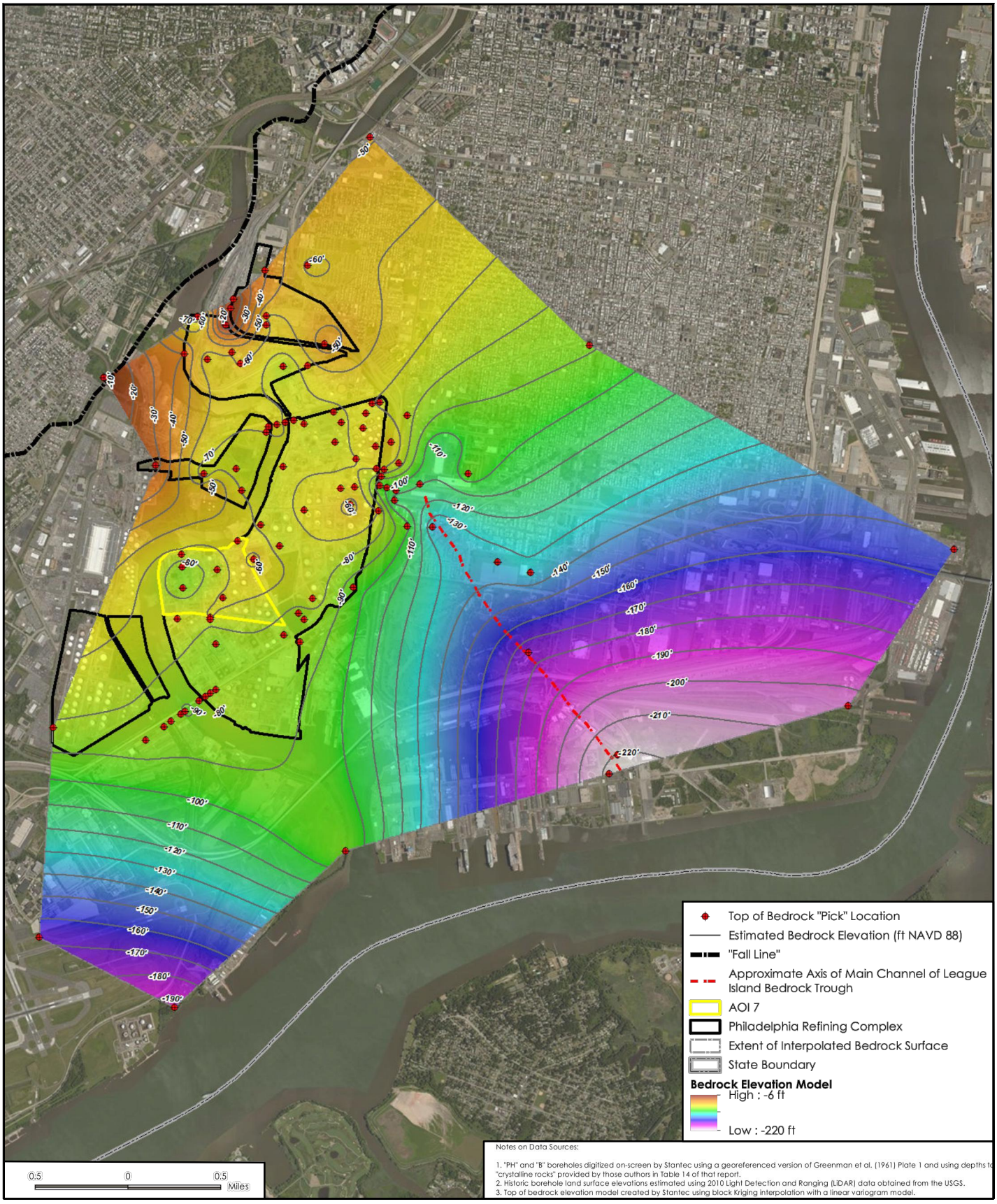
11109614-01

Jan 19, 2017

SUMMARY OF PUBLISHED AQUIFER TESTING DATA FOR THE UNCONFINED AND LOWER AQUIFERS

FIGURE 10

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA007.dwg



SOURCE: REMEDIAL INVESTIGATION REPORT, AREA OF INTEREST 1, PHILADELPHIA REFINERY COMPLEX, STANTEC 2016.

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REMEDIAL INVESTIGATION REPORT

11109614-01

Jan 19, 2017

BEDROCK STRUCTURE CONTOUR MAP - TOP OF BEDROCK

FIGURE 11

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA008.dwg



GHD Limited
651 Colby Drive
Waterloo Ontario N2V 1C2 Canada
T 519 884 0510 F 519 884 0525 W www.ghd.com

Note: Data Box is for sample result that exceeds the Non-Residential Direct Contact MSC

Source: Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

Legend

- 2016 RI Soil Sample (Exceeded MSC)
- 2016 RI Soil Sample (Did Not Exceed MSC)
- Historical Soil Sample (Exceeded Direct Contact)
- Historical Soil Sample (Exceeded MSC)
- Historical Soil Sample (Did Not Exceed MSC)
- 2016 RI Groundwater Sample
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Bulkhead
- 3 Separator Remediation System
- 3 Separator Remediation System
- Existing Tank
- Solid Waste Management Unit
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

Date: Mar 28, 2017

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA REFINERY OPERATIONS
SURFACE SOIL SAMPLING RESULTS

Figure No.

FIGURE 12a

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-00(003)GIS-OT012a.mxd



GHD Limited
651 Colby Drive
Waterloo Ontario N2V 1C2 Canada
T 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

Source: Aerial: Microsoft product screen shot(s) reprinted with permissionfrom Microsoft Corporation

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

Legend

- 2016 RI Soil Sample (Exceeded MSC)
- 2016 RI Soil Sample (Did Not Exceed MSC)
- 2016 RI Groundwater Sample
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Bulkhead
- 3 Separator Remediation System
- 3 Separator Remediation System
- Existing Tank
- Solid Waste Management Unit
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

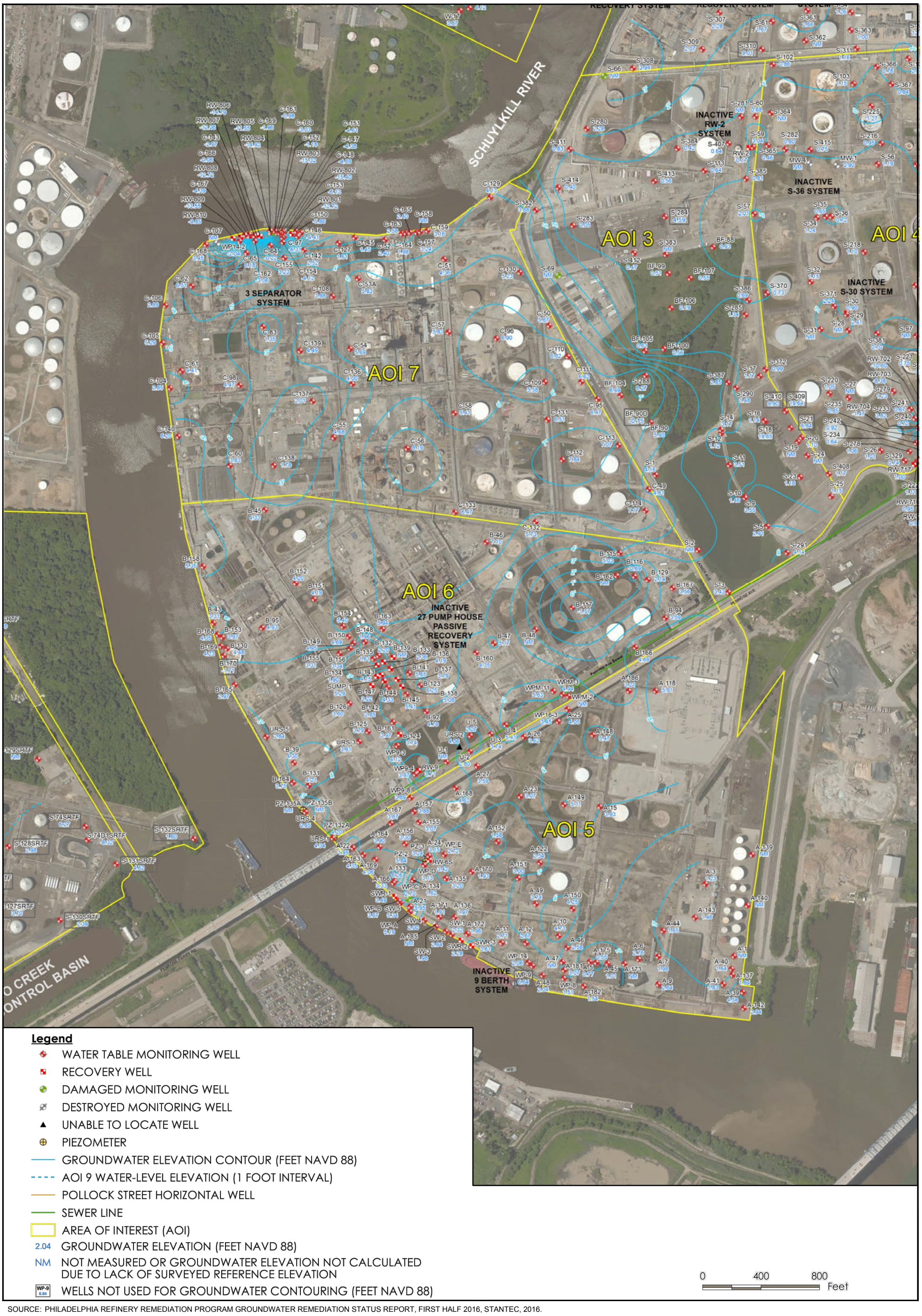
Date: Mar 28, 2017

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA REFINERY OPERATIONS
SUB-SURFACE SOIL SAMPLING RESULTS

Figure No.

FIGURE 12b

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-00(003)GIS-OT012b.mxd



SOURCE: PHILADELPHIA REFINERY REMEDIATION PROGRAM GROUNDWATER REMEDIATION STATUS REPORT, FIRST HALF 2016, STANTEC, 2016.

EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
REMEDIAL INVESTIGATION REPORT

STANTEC WATER TABLE AQUIFER GROUNDWATER ELEVATION MAP - MAY 2016

11109614-01
Nov 24, 2016

FIGURE 13

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA009.dwg


M AVENUE
L AVENUE
PENNY PACKER AVENUE
2nd STREET
3rd STREET
4th STREET
5th STREET
1232 UNIT
433 UNIT
AOI7-BH-16-030
AOI7-BH-16-029
AOI7-BH-16-028
AOI7-BH-16-018
AOI7-BH-16-017
AOI7-BH-16-038
AOI7-BH-16-027
AOI7-BH-16-039
AOI7-BH-16-021
AOI7-BH-16-020
AOI7-BH-16-022
AOI7-BH-16-023
AOI7-BH-16-019
AOI7-BH-16-043
AOI7-BH-16-033
AOI7-BH-16-031
AOI7-BH-16-044
AOI7-BH-16-032
AOI7-BH-16-047
AOI7-BH-16-046
AOI7-BH-16-045
AOI7-BH-16-042
AOI7-BH-16-041
AOI7-BH-16-026
AOI7-BH-16-024
AOI7-BH-16-035
AOI7-BH-16-005
AOI7-BH-16-006
AOI7-BH-16-007
AOI7-BH-16-037
AOI7-BH-16-036
AOI7-BH-16-009
AOI7-BH-16-010
AOI7-BH-16-012
AOI7-BH-16-011
AOI7-BH-16-034
AOI7-BH-16-013
AOI7-BH-16-014
AOI7-BH-16-015
C-106 3.44
C-168 3.71
C-162 -3.02
C-169 4.49
C-170 4.05
C-166 3.36
C-146 4.31
C-145 0.24
C-52 2.75
C-163 2.27
C-158 3.07
C-172
C-58 4.29
C-59 4.22
C-60 4.69
C-61 5.15
C-62 6.59
C-112 7.79
C-113 8.21
C-114 8.09
C-115 8.21
C-116 8.21
C-117 8.21
C-118 8.21
C-119 8.21
C-120 8.21
C-121 8.21
C-122 8.21
C-123 8.21
C-124 8.21
C-125 8.21
C-126 8.21
C-127 8.21
C-128 8.21
C-129 8.21
C-130 8.21
C-131 8.21
C-132 8.21
C-133 8.21
C-134 8.21
C-135 8.21
C-136 8.21
C-137 8.21
C-138 8.21
C-139 8.21
C-140 8.21
C-141 8.21
C-142 8.21
C-143 8.21
C-144 8.21
C-147 8.21
C-148 8.21
C-149 8.21
C-150 8.21
C-151 8.21
C-152 8.21
C-153 8.21
C-154 8.21
C-155 8.21
C-156 8.21
C-157 8.21
C-159 8.21
C-160 8.21
C-161 8.21
C-164 8.21
C-165 8.21
C-167 8.21
C-171 8.21
C-173 8.21
C-174 8.21
C-175 8.21
C-176 8.21
C-177 8.21
C-178 8.21
C-179 8.21
C-180 8.21
C-181 8.21
C-182 8.21
C-183 8.21
C-184 8.21
C-185 8.21
C-186 8.21
C-187 8.21
C-188 8.21
C-189 8.21
C-190 8.21
C-191 8.21
C-192 8.21



SOURCE: PHILADELPHIA REFINERY REMEDIATION PROGRAM GROUNDWATER REMEDIATION STATUS REPORT, FIRST HALF 2016, STANTEC, 2016.

EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
REMEDIAL INVESTIGATION REPORT

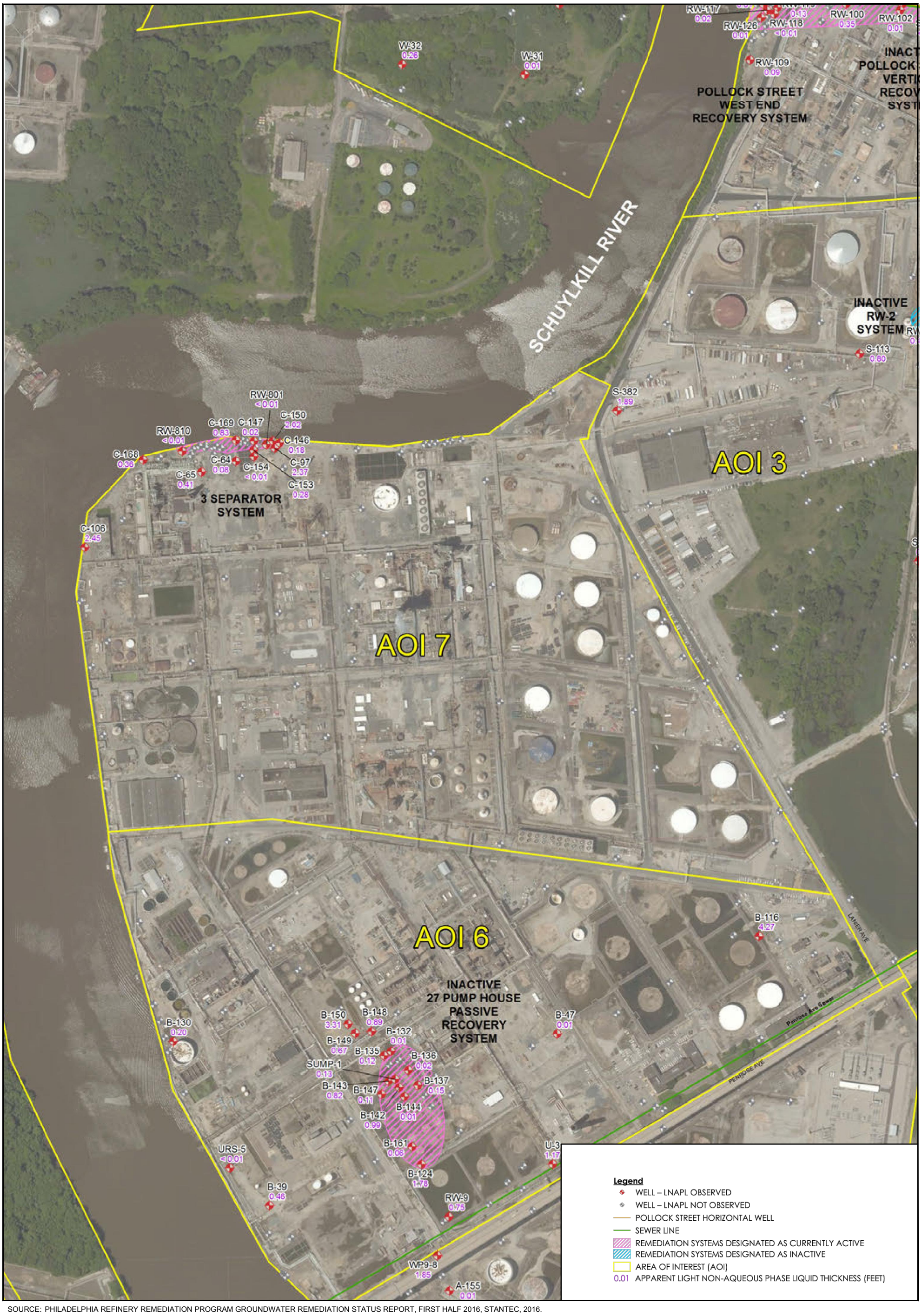
STANTEC SEMI-CONFINED (LOWER) AQUIFER GROUNDWATER ELEVATIONS - MAY 2016

11109614-01

Nov 24, 2016

FIGURE 15

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA010.dwg



SOURCE: PHILADELPHIA REFINERY REMEDIATION PROGRAM GROUNDWATER REMEDIATION STATUS REPORT, FIRST HALF 2016, STANTEC, 2016.

EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
REMEDIAL INVESTIGATION REPORT

LNAPL OCCURENCE AND REMEDIAL SYSTEMS, MAY 2016

11109614-01

Nov 7, 2016

FIGURE 16

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA011.dwg


C-169
0.93
C-162
0.01
C-160
0.01
C-146
0.14
C-163
0.28
C-37
1.29
C-106
2.49
AOI7-BH-16-030
AOI7-BH-16-029
AOI7-BH-16-028
AOI7-BH-16-01b
AOI7-BH-16-017
AOI7-BH-16-033
AOI7-BH-16-031
AOI7-BH-16-027
AOI7-BH-16-039
AOI7-BH-16-038
AOI7-BH-16-021
AOI7-BH-16-023
AOI7-BH-16-020
AOI7-BH-16-022
AOI7-BH-16-043
AOI7-BH-16-040
AOI7-BH-16-044
AOI7-BH-16-032
AOI7-BH-16-047
AOI7-BH-16-046
AOI7-BH-16-045
AOI7-BH-16-042
AOI7-BH-16-041
AOI7-BH-16-035
AOI7-BH-16-024
AOI7-BH-16-005
AOI7-BH-16-006
AOI7-BH-16-007
AOI7-BH-16-037
AOI7-BH-16-036
AOI7-BH-16-026
AOI7-BH-16-025
AOI7-BH-16-009
AOI7-BH-16-010
AOI7-BH-16-01Z
AOI7-BH-16-011
AOI7-BH-16-034
AOI7-BH-16-013
AOI7-BH-16-014
AOI7-BH-16-016
AOI7-BH-16-015
M AVENUE
L AVENUE
PENNY PACKER AVENUE
2nd STREET
3rd STREET
4th STREET
5th STREET
1232 UNIT
433 UNIT
Old Tank Farm
Identified as Tanks
8/9/10/35
Former USTs
M001, M004, M005
GP-1102
GP-1103
GP-1100
GP-1101
GP-1119
GP-1120
GP-1121
GP-1122
GP-1123
GP-1124
GP-1125
GP-1126
GP-1127
GP-1128
GP-1129
GP-1130
GP-1131
GP-1132
GP-1133
GP-1134
GP-1135
GP-1136
GP-1137
GP-1138
GP-1139
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GP-1147
GP-1148
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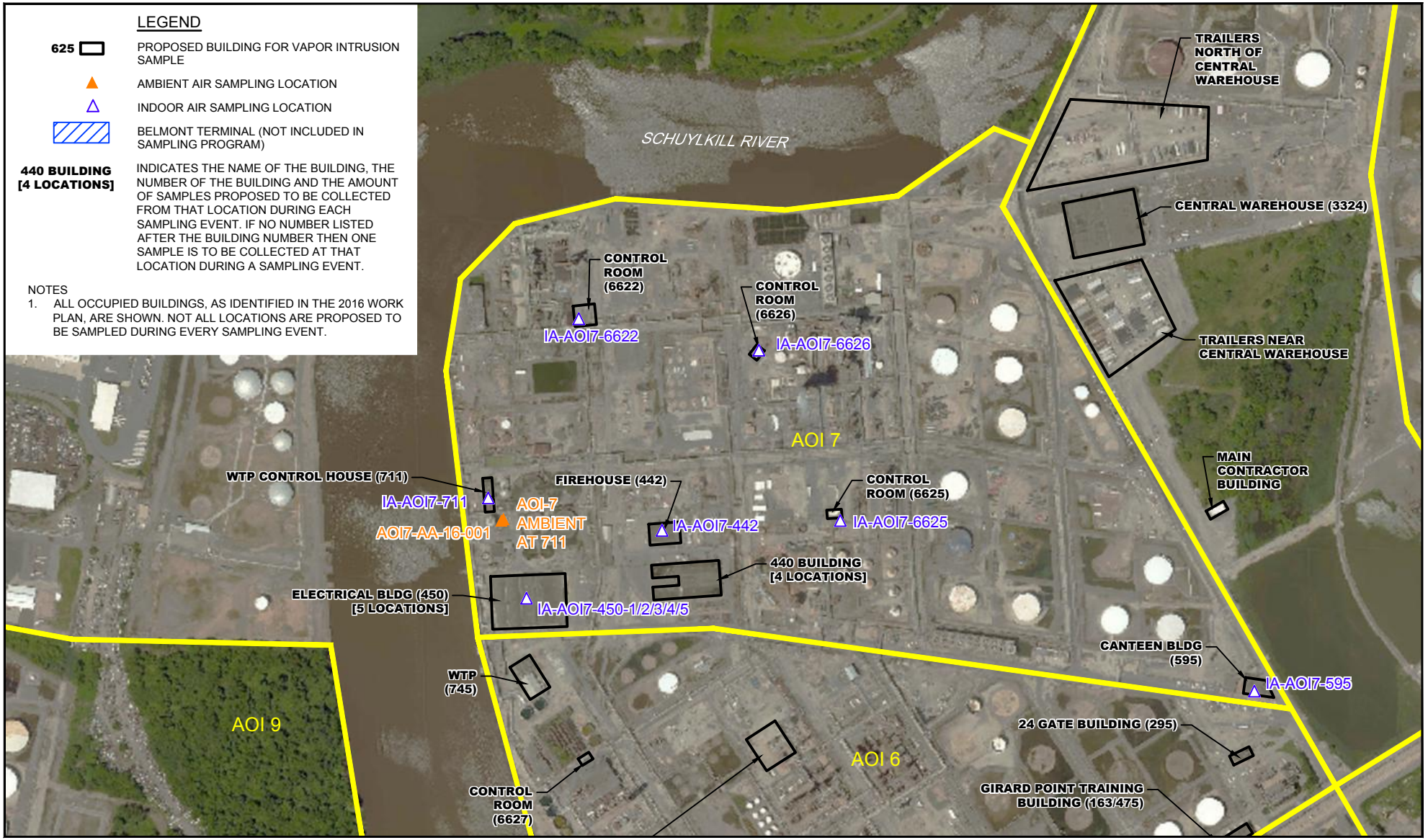
GP-1156
GP-1157
GP-1158



Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date: June 2014, Accessed: 2016.

0 300 600ft

Coordinate System: PENNSYLVANIA SOUTH NAD83

PHILADELPHIA ENERGY SOLUTIONS FACILITY
PHILADELPHIA, PENNSYLVANIA

11109614-01

Nov 24, 2016

INDOOR AIR AND AMBIENT AIR SAMPLING LOCATIONS

FIGURE 18

CAD File: P:\drawings\11109000s\11109614\11109614-reports\11109614-01(003)\11109614-01(003)GN\11109614-01(003)GN-WA014.DWG

C-169	8/2/2016
VOCs	
1,2,4-Trimethylbenzene	250
Benzene	370
SVOCs	
Benzo(a)pyrene	2.9
Benzo(b)fluoranthene	3.1
Benzo(g,h,i)perylene	0.71
Chrysene	19
Naphthalene	360

C-161	8/1/2016
SVOCs	
Benzo(a)pyrene	0.60

C-152	7/29/2016	8/19/2016
VOCs		
Benzene	51	2

C-150	8/1/2016
VOCs	
1,2,4-Trimethylbenzene	130
SVOCs	
Benzo(a)anthracene	10
Benzo(a)pyrene	5.6
Benzo(b)fluoranthene	6.8
Benzo(g,h,i)perylene	1.3
Chrysene	17
Naphthalene	110

C-146	8/1/2016
SVOCs	
Anthracene	220
Benzo(a)anthracene	190
Benzo(a)pyrene	130
Benzo(b)fluoranthene	170
Benzo(g,h,i)perylene	38
Chrysene	210
Naphthalene	830
Pyrene	370

C-127	5/21/2015	5/24/2016	7/26/2016
SVOCs			
Benzo(g,h,i)perylene	ND(0.1)	0.6	0.36

C-145	7/27/2016
SVOCs	
Benzo(a)pyrene	0.40

C-168	7/26/2016
VOCs	
1,2,4-Trimethylbenzene	170
Benzene	600
SVOCs	
Benzo(a)pyrene	1.1
Benzo(b)fluoranthene	1.4
Benzo(g,h,i)perylene	0.53

C-62	7/27/2016
SVOCs	
Benzo(a)pyrene	0.30

C-104	5/21/2015	5/24/2016	7/26/2016
SVOCs			
Benzo(a)pyrene	0.6	ND(0.1)	0.036 J
Benzo(g,h,i)perylene	0.3 J	ND(0.1)	0.014 J

C-57	7/26/2016
SVOCs	
Benzo(a)pyrene	1.1
Benzo(g,h,i)perylene	0.58

C-131	7/26/2016	8/19/2016
SVOCs		
Benzo(a)pyrene	0.43	ND(0.050)

C-169 C-161 C-152 C-150 C-146 C-129 C-127 C-145 C-168 C-163 C-157 C-32 C-165 C-147 C-142 C-62 C-61 C-170 C-130 C-106 C-103 C-171 C-109 C-36 C-51 C-54 C-135 C-194 C-61 C-58 C-131 C-180 C-113 C-50 C-112 C-49 C-172 C-132

AOI7-BH-16-030 AOI7-BH-16-029 AOI7-BH-16-028 AOI7-BH-16-038 AOI7-BH-16-039 AOI7-BH-16-031 AOI7-BH-16-043 AOI7-BH-16-021 AOI7-BH-16-020 AOI7-BH-16-022 AOI7-BH-16-035 AOI7-BH-16-042 AOI7-BH-16-040 AOI7-BH-16-037 AOI7-BH-16-027 AOI7-BH-16-038 AOI7-BH-16-047 AOI7-BH-16-046 AOI7-BH-16-032 AOI7-BH-16-001 AOI7-BH-16-003 AOI7-BH-16-002 AOI7-BH-16-004 AOI7-BH-16-023 AOI7-BH-16-025 AOI7-BH-16-026 AOI7-BH-16-009 AOI7-BH-16-010 AOI7-BH-16-012 AOI7-BH-16-011 AOI7-BH-16-041 AOI7-BH-16-042 AOI7-BH-16-045 AOI7-BH-16-034 AOI7-BH-16-013 AOI7-BH-16-014 AOI7-BH-16-016 AOI7-BH-16-015

M AVENUE L AVENUE PENNY PACKER AVENUE 2nd STREET 3rd STREET 4th STREET 5th STREET 1232 UNIT 433 UNIT

Fraction	Parameter	PADEP Act2 Used Aquifer NR MSC (ug/L)
VOCs	1,2,4-Trimethylbenzene	62
VOCs	1,2-Dibromoethane (Ethylene dibromide)	0.05
VOCs	Benzene	5
VOCs	Isopropyl benzene	3500
VOCs	Toluene	1000
SVOCs	Benzo(a)anthracene	4.9
SVOCs	Benzo(a)pyrene	0.2
SVOCs	Benzo(b)fluoranthene	1.2
SVOCs	Benzo(g,h,i)perylene	0.26
SVOCs	Chrysene	1.9
SVOCs	Naphthalene	100
Metals	Lead (dissolved)	5

GHD Limited
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Waterloo Ontario N2V 1C2 Canada
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Source:Aerial: USDA NAIP August 2015

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

Legend

- 2016 RI Groundwater Sample (Exceeded MSC)
- 2016 RI Groundwater Sample (Did not exceed MSC)
- 2016 RI Soil Sample
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Historical Soil Sample
- Bulkhead
- 3 Separator Remediation System
- 3 Separator Remediation System
- Solid Waste Management Unit
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

Date: Jan 3, 2017

EVERGREEN RESOURCES MANAGEMENT AOI-7 PHILADELPHIA REFINERY OPERATIONS

WATER TABLE GROUNDWATER RESULTS

Figure No.

FIGURE 19

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-00(003)GIS-OT019.mxd



GHD Limited
651 Colby Drive
Waterloo Ontario N2V 1C2 Canada
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Source: Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation

N

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

Legend

- 2016 RI Groundwater Sample (Exceeded MSC)
- 2016 RI Groundwater Sample (Did not exceed MSC)
- 2016 RI Soil Sample
- Water Table Monitoring Well
- Recovery Well
- Deep Monitoring Well
- Damaged Monitoring Well
- Destroyed Monitoring Well
- Monitoring Well (Unable to Locate)
- Historical Soil Sample
- Bulkhead
- 3 Separator Remediation System
- 3 Separator Remediation System
- Solid Waste Management Unit
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

Date: Dec 19, 2016

EVERGREEN RESOURCES MANAGEMENT AOI-7 PHILADELPHIA REFINERY OPERATIONS

DEEP GROUNDWATER RESULTS

Figure No.

FIGURE 20

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\003\11109614-00(003)GIS-OT020.mxd

Table 1

Constituents of Concern
Evergreen Act 2/One Cleanup Program Petroleum Short List
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Volatile Organic Compounds	**CAS No.**
Benzene	71-43-2
Cumene	98-82-8
Dichloroethane, 1,2-	107-06-2
Ethylbenzene	100-41-4
Ethylene Dibromide	106-93-4
Methyl tert butyl ether	1634-04-4
Toluene	108-88-3
Trimethylbenzene, 1,2,4-	95-63-6
Trimethylbenzene, 1,3,5-	108-67-8
Xylenes	1330-20-7
Semi Volatile Organic Compounds	**CAS No.**
Anthracene	120-12-7
Benzo(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(b)fluroranthene	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
Metals	**CAS No.**
Lead	7439-92-1

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

Characterization Activities
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, A Series of Evergreen Resources Group, LLC

Location ID	Location Rationale	Product Type	Media	Surface Soil Sample Collected (0-2 ft. bgs)	Subsurface Soil Sample Collected (>2 ft. bgs)	Groundwater Sample Collection	Analyte List	Used for Evaluation of Regulated Tank Incident
C-104	Dowgradient of GP-1002		GW			X	Evergreen Petr Short List COCs	YES
C-105	SWMU 87 area and side gradient delineation NAPL		GW			X	Evergreen Petr Short List COCs	NO
C-106	SWMU 88 area and groundwater sample under LNAPL	Lube Oil	GW			X	Evergreen Petr Short List COCs	NO
C-108	Downgradient of GP-1108		GW			X	Evergreen Petr Short List COCs	YES - secondary
C-112	Downgradient of AST 277		GW			X	Evergreen Petr Short List COCs	YES
C-113	Downgradient of AST-277		GW			X	Evergreen Petr Short List COCs	YES - secondary
C-127	Side gradient delineation NAPL		GW			X	Evergreen Petr Short List COCs	NO
C-128*	Groundwater sample under LNAPL (WELL DESTROYED)		GW			X	Evergreen Petr Short List COCs	NO
C-129	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		GW			X	Evergreen Petr Short List COCs	NO
C-130	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		GW			X	Evergreen Petr Short List COCs	NO
C-131	Downgradient of AST 275		GW			X	Evergreen Petr Short List COCs	YES
C-132	Downgradient of GP-273 and 277		GW			X	Evergreen Petr Short List COCs	YES
C-136	9th and L Ave between Unit 433 and Tank 1232		GW			X	Evergreen Petr Short List COCs	NO
C-138	Downgradient of former UST M004 and M005		GW			X	Evergreen Petr Short List COCs	YES
C-140	Western AOI 7 Boundary		GW			X	Evergreen Petr Short List COCs	NO
C-142	Side gradient delineation NAPL		GW			X	Evergreen Petr Short List COCs	NO
C-145	Downgradient of NAPL at C-128		GW			X	Evergreen Petr Short List COCs	NO
C-146	Groundwater sample under LNAPL		GW			X	Evergreen Petr Short List COCs	NO
C-150	Groundwater sample under LNAPL	Light Crude Oil	GW			X	Evergreen Petr Short List COCs	NO
C-151	Groundwater sample under LNAPL (WELL DAMAGED)	Light Crude Oil	GW			X	Evergreen Petr Short List COCs	NO
C-158	(WELL DAMAGED, sampled C-157 instead)		GW			X	Evergreen Petr Short List COCs	NO
C-161	Groundwater sample under LNAPL	Light Crude Oil	GW			X	Evergreen Petr Short List COCs	NO
C-162	Delineate C-143	Light Crude Oil	GW			X	Evergreen Petr Short List COCs	NO
C-163	Downgradient of GP-1100		GW			X	Evergreen Petr Short List COCs	YES
C-168	Groundwater sample under LNAPL	Very Light Crude Oil	GW			X	Evergreen Petr Short List COCs	NO
C-49	Downgradient of GP-277		GW			X	Evergreen Petr Short List COCs	YES
C-50	Downgradient of GP-281		GW			X	Evergreen Petr Short List COCs	YES
C-51	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		GW			X	Evergreen Petr Short List COCs	NO
C-52	Site Boundary Well		GW			X	Evergreen Petr Short List COCs	NO
C-54	Characterize downgradient of GP-1100		GW			X	Evergreen Petr Short List COCs	YES
C-57	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		GW			X	Evergreen Petr Short List COCs	NO
C-58	Complete characterization for ASTs 271, 272, 275		GW			X	Evergreen Petr Short List COCs	YES
C-59	Complete characterization for AST 271 (WELL DESTROYED)		GW			X	Evergreen Petr Short List COCs	YES
C-62	Side gradient delineation NAPL		GW			X	Evergreen Petr Short List COCs	NO
C-96	Complete characterization for AST 281		GW			X	Evergreen Petr Short List COCs	YES
C-134D	AOI-11 Characterization		GW			X	Evergreen Petr Short List COCs	NO
C-129D	AOI-11 Characterization		GW			X	Evergreen Petr Short List COCs	NO
C-144D	AOI-11 Characterization; Site Boundary Well		GW			X	Evergreen Petr Short List COCs	NO
C-50D	AOI-11 Characterization		GW			X	Evergreen Petr Short List COCs	NO
C-170	Delineate NAPL southwest of C-168		GW	X	X	X [10]	Evergreen Petr Short List COCs	NO
C-171	Delineate NAPL southeast of C-106		GW	X	X	X [10]	Evergreen Petr Short List COCs	NO
C-172	Investigate potential impacts from M-004 and M-005 USTs; subsurface soil characterization		GW	X	X	X [10]	Evergreen Petr Short List COCs	YES
AOI7-BH-16-001	Delineate by Tank 1108		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-002	Delineate by Tank 1108		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-003	Delineate by Tank 1108		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-005	Delineate by Tank 281		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-006	Delineate by Tank 281		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-007	Delineate by Tank 281		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-008	Delineate by Tank 281		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-009	Delineate by Tank 272		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-010	Delineate by Tank 272		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-011	Delineate by Tank 272		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-012	Delineate by Tank 272		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-013	Delineate by Tank 273		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-014	Delineate by Tank 273		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-015	Delineate by Tank 273		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-016	Delineate by Tank 273		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-017	Delineate to NE at Tank 1100 for direct contact BaP exceedance		Soil	BaP only [6]	BaP only [6]		BAP only	YES
AOI7-BH-16-018	Delineate subsurface soil conditions at GP-1100-1100-CV2 for benzo(a)pyrene		Soil		BaP only [6]		BAP only	YES
AOI7-BH-16-019	Historic Release Charge Line from Tank 284 to Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-020	Historic Release Charge Line from Tank 284 to Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO

Table 2

Characterization Activities
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, A Series of Evergreen Resources Group, LLC

Location ID	Location Rationale	Product Type	Media	Surface Soil Sample Collected (0-2 ft. bgs)	Subsurface Soil Sample Collected (>2 ft. bgs)	Groundwater Sample Collection	Analyte List	Used for Evaluation of Regulated Tank Incident
AOI7-BH-16-021	Historic Release Charge Line from Tank 284 to Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-022	Historic Release Charge Line from Tank 284 to Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-023	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-024	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-025	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-026	Historic Release - 9th and L Ave between Unit 43 and Tank 1232		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-027	Historic Release in M Avenue north of 1132 unit		Soil	X	X (could not collect)		Evergreen Petr Short List COCs	NO
AOI7-BH-16-028	Historic Release sewer backup north of 1332 at bulkhead		Soil	X	X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-029	Delineate subsurface soil conditions at C-143		Soil		X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-030	Delineate subsurface soil conditions at C-169		Soil		X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-031	Delineate subsurface soil conditions at AOI7-BH-10-20		Soil		X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-032	Delineate subsurface soil conditions at AOI7-BH-12-56		Soil		X		Evergreen Petr Short List COCs	NO
AOI7-BH-16-033	Verify Lead concentration at BNA-10 2-4 ft		Soil		Pb [7]		Lead	NO
AOI7-BH-16-034	Investigate conditions at former tank GP-274		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-035	Investigate conditions at former tank GP-279		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-036	Investigate conditions at former tank GP-287		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-037	Investigate conditions at former tank GP-288		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-038	Investigate conditions at former tank GP-1102		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-039	Investigate conditions at former tank GP-1103		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-040	Investigate conditions at former tank GP-1123		Soil	X [9]	X [9]		Evergreen Petr Short List COCs	YES
AOI7-BH-16-041	Investigate conditions at former tank GP-1132		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-042	Investigate conditions at former tank GP-1135		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-043	Investigate conditions at former tank GP-1202		Soil	X [9]	X [9]		Evergreen Petr Short List COCs	YES
AOI7-BH-16-044	Investigate conditions at former historical tank farm		Soil	X	X		Evergreen Petr Short List COCs	YES
AOI7-BH-16-045	Investigate unpaved area adjacent to former incinerator (SW)		Soil	X [8]	X [8]		Evergreen Petr Short List COCs	
AOI7-BH-16-046	Investigate unpaved area adjacent to former sludge basins (W)		Soil	X [8]	X [8] (Could not collect)		Evergreen Petr Short List COCs	
AOI7-BH-16-047	Investigate unpaved area adjacent to former haz waste tanks 1004-1007 (N)		Soil	X [8]	X [8]		Evergreen Petr Short List COCs	
AOI7-AA-16-001	Investigate outdoor air quality in location over NAPL plume - light crude oil plume		Outdoor Air			Note 5	TO-15	NO
AOI7-AA-16-002	Investigate outdoor air quality in location over NAPL plume - light crude oil plume		Outdoor Air			Note 5	TO-15	NO
AOI7-AA-16-003	duplicate sample		Outdoor Air			Note 5	TO-15	NO
AOI7-AI-16-001	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-002	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-003	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-004	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-005	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-006	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-007	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-008	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-009	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-010	Investigate outdoor air quality		Indoor Air				TO-15	NO
AOI7-AI-16-011	Investigate outdoor air quality		Indoor Air				TO-15	NO

Notes:

1. Investigation Area #1
2. Investigation Area #2
3. Investigation Area #3
4. Investigation Area #4
5. Outdoor air samples to be collected for volatile organics by TO-15 analytical method
6. Soil sample analyzed only for benzo(a)pyrene to complete delineation of impact observed in sample GP-1100-1100-CV2
7. Soil sample analyzed only for lead at location to verify concentrations at BNA-10
8. Site specific constituents -hexavalent chromium and mercury
9. Sulfur tank
10. Newly installed wells C-170, C-171, and C-172 were also sampled a second time.
11. ft bgs - feet below ground surface

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007
Sample ID:				AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816
Sample Date:				07/01/2016	07/12/2016	07/12/2016	06/28/2016	06/28/2016	06/28/2016
Sample Depth:				0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b						
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	0.62	ND(0.005)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)[b]	ND(0.24)[b]	ND(0.005)
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	0.13 J	ND(0.005)
Benzene	mg/kg	290	0.5	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
Ethylbenzene	mg/kg	890	70	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
Isopropyl benzene	mg/kg	10000	2500	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
Toluene	mg/kg	10000	100	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	ND(0.24)	ND(0.005)
Xylenes (total)	mg/kg	8000	1000	ND(0.004)	ND(0.005)	ND(0.004)	ND(0.006)	0.20 J	ND(0.005)
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	0.005 J	0.020	ND(0.018)	0.59	0.60	0.067
Benzo(a)anthracene	mg/kg	130	130	0.017 J	0.088	ND(0.018)	0.77	0.83	0.078
Benzo(a)pyrene	mg/kg	12	12	0.017 J	0.062	ND(0.018)	0.66	1.0	0.053
Benzo(b)fluoranthene	mg/kg	76	76	0.026	0.085	ND(0.018)	0.79	1.3	0.094
Benzo(g,h,i)perylene	mg/kg	190000	180	0.019	0.051	0.008 J	0.60	0.42	0.11
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	0.018 J	0.200	ND(0.018)	0.89	4.7	0.086
Fluorene	mg/kg	130000	3800	ND(0.018)	0.015 J	ND(0.018)	0.22	3.1	0.023
Naphthalene	mg/kg	760	25	0.009 J	0.019 J	ND(0.018)	5.2	0.30	0.28
Phenanthrene	mg/kg	190000	10000	0.015 J	0.15	0.005 J	1.7	8.7	0.15
Pyrene	mg/kg	96000	2200	0.025	0.11	0.006 J	0.87	2.8	0.098

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-001** **AOI7-BH-16-001-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-002** **AOI7-BH-16-002-0-2-071216** **07/12/2016** **0.0-2.0 ft**	**AOI7-BH-16-003** **AOI7-BH-16-003-0-2-071216** **07/12/2016** **0.0-2.0 ft**	**AOI7-BH-16-005** **AOI7-BH-16-005-0-2-062816** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-006** **AOI7-BH-16-006-0-2-062816** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-007** **AOI7-BH-16-007-0-2-062816** **06/28/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	10.2	98.3	ND(13.4)	130	63.6	241
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	7.2	10.4	6.6	26.6	12.4	19.0

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: Sample ID: Sample Date: Sample Depth: **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-008** **AOI7-BH-16-008-0-2-062816** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-009** **AOI7-BH-16-009-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-010** **AOI7-BH-16-010-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-011** **AOI7-BH-16-011-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-012** **AOI7-BH-16-012-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-013** **AOI7-BH-16-013-0-2-062916** **06/29/2016** **0.0-2.0 ft**
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	ND(0.640)	ND(0.660)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	ND(0.005)	ND(0.005)	**ND(0.007)[b]**	**ND(0.006)[b]**	**ND(0.640)[b]**	**ND(0.660)[b]**
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	**ND(0.640)[b]**	**ND(0.660)[b]**
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	ND(0.640)	ND(0.660)
Benzene	mg/kg	290	0.5	0.0008 J	0.002 J	ND(0.007)	ND(0.006)	0.079 J	**ND(0.660)[b]**
Ethylbenzene	mg/kg	890	70	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	ND(0.640)	ND(0.660)
Isopropyl benzene	mg/kg	10000	2500	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	ND(0.640)	ND(0.660)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	ND(0.640)	ND(0.660)
Toluene	mg/kg	10000	100	0.002 J	0.002 J	0.001 J	ND(0.006)	0.810	0.280 J
Xylenes (total)	mg/kg	8000	1000	ND(0.005)	ND(0.005)	ND(0.007)	ND(0.006)	0.220 J	ND(0.660)
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	0.10	0.11	1.1	0.91	2.4	2.5
Benzo(a)anthracene	mg/kg	130	130	0.13	0.24	2.7	0.96	2	2.2
Benzo(a)pyrene	mg/kg	12	12	0.20	0.26	2.1	0.81	1.5	1.3
Benzo(b)fluoranthene	mg/kg	76	76	0.17	0.52	2.7	1.2	1.8	1.8
Benzo(g,h,i)perylene	mg/kg	190000	180	0.14	0.51	1.4	0.72	1.1	0.75
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	0.45	0.40	2.9	1.2	2.4	2.8
Fluorene	mg/kg	130000	3800	0.043	0.035	0.54	0.43	2	2.2
Naphthalene	mg/kg	760	25	0.34	0.48	10	9.5	11	8
Phenanthrene	mg/kg	190000	10000	0.25	0.27	3.9	3.0	4.3	5.9
Pyrene	mg/kg	96000	2200	0.23	0.40	3.6	1.2	4.2	6.3

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-008** **AOI7-BH-16-008-0-2-062816** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-009** **AOI7-BH-16-009-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-010** **AOI7-BH-16-010-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-011** **AOI7-BH-16-011-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-012** **AOI7-BH-16-012-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-013** **AOI7-BH-16-013-0-2-062916** **06/29/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	85.4	526	399	321	295	418
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	15.8	20.6	30.9	29.5	44.3	44.1

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: Sample ID: Sample Date: Sample Depth: **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-014** **AOI7-BH-16-014-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-015** **AOI7-BH-16-015-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-016** **AOI7-BH-16-016-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-017** **AOI7-BH-16-017-0-2-071116** **07/11/2016** **0.0-2.0 ft**	**AOI7-BH-16-019** **AOI7-BH-16-019-0-2-070616** **07/06/2016** **0.0-2.0 ft**	**AOI7-BH-16-020** **AOI7-BH-16-020-0-2-062816** **06/28/2016** **0.0-2.0 ft**
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	ND(0.007)	ND(0.008)	ND(0.004)	-	0.002 J	ND(0.009)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	**ND(0.007)**[b]	**ND(0.008)**[b]	ND(0.004)	-	ND(0.004)	**ND(0.009)**[b]
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.007)	ND(0.008)	ND(0.004)	-	ND(0.004)	ND(0.009)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.007)	ND(0.008)	ND(0.004)	-	0.002 J	ND(0.009)
Benzene	mg/kg	290	0.5	ND(0.007)	ND(0.008)	ND(0.004)	-	0.0006 J	ND(0.009)
Ethylbenzene	mg/kg	890	70	ND(0.007)	ND(0.008)	ND(0.004)	-	ND(0.004)	ND(0.009)
Isopropyl benzene	mg/kg	10000	2500	ND(0.007)	ND(0.008)	ND(0.004)	-	0.002 J	ND(0.009)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.007)	ND(0.008)	ND(0.004)	-	ND(0.004)	ND(0.009)
Toluene	mg/kg	10000	100	ND(0.007)	ND(0.008)	ND(0.004)	-	0.0009 J	ND(0.009)
Xylenes (total)	mg/kg	8000	1000	ND(0.007)	ND(0.008)	ND(0.004)	-	0.002 J	ND(0.009)
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	1.6	1.2	0.012 J	-	0.18	0.024
Benzo(a)anthracene	mg/kg	130	130	1.3	1.4	0.025	-	0.27	0.11
Benzo(a)pyrene	mg/kg	12	12	1.2	1.3	0.021	3.2	0.22	0.085
Benzo(b)fluoranthene	mg/kg	76	76	1.9	1.8	0.035	-	0.26	0.13
Benzo(g,h,i)perylene	mg/kg	190000	180	1.2	1.3	0.023	-	0.29	0.076
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	1.7	1.8	0.032	-	0.57	0.14
Fluorene	mg/kg	130000	3800	0.88	0.47	0.006 J	-	0.25	0.008 J
Naphthalene	mg/kg	760	25	22	12	0.017 J	-	0.68	0.025
Phenanthrene	mg/kg	190000	10000	5	3.4	0.028	-	0.83	0.078
Pyrene	mg/kg	96000	2200	1.9	1.6	0.039	-	0.45	0.18

Table 3a

Surface Soil Analytical Results Summary
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Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-014** **AOI7-BH-16-014-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-015** **AOI7-BH-16-015-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-016** **AOI7-BH-16-016-062816-0-2** **06/28/2016** **0.0-2.0 ft**	**AOI7-BH-16-017** **AOI7-BH-16-017-0-2-071116** **07/11/2016** **0.0-2.0 ft**	**AOI7-BH-16-019** **AOI7-BH-16-019-0-2-070616** **07/06/2016** **0.0-2.0 ft**	**AOI7-BH-16-020** **AOI7-BH-16-020-0-2-062816** **06/28/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	566	386	21.4	-	117	13.9
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	35.5	36.3	8.1	32.5	16.0	20.9

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
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Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-020** **AOI7-BH-16-020-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-021** **AOI7-BH-16-021-0-2-063016** **06/30/2016** **0.0-2.0 ft**	**AOI7-BH-16-022** **AOI7-BH-16-022-0-2-070516** **07/05/2016** **0.0-2.0 ft**	**AOI7-BH-16-023** **AOI7-BH-16-023-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-024** **AOI7-BH-16-024-0-2-070716** **07/07/2016** **0.0-2.0 ft**	**AOI7-BH-16-025** **AOI7-BH-16-025-0-2-070116** **07/01/2016** **0.0-2.0 ft**
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	1.0 J
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	**ND(4.1)[b]**
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	**ND(4.1)[b]**
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	ND(4.1)
Benzene	mg/kg	290	0.5	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	**0.82 J[b]**
Ethylbenzene	mg/kg	890	70	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	1.6 J
Isopropyl benzene	mg/kg	10000	2500	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	3.4 J
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	**ND(4.1)[b]**
Toluene	mg/kg	10000	100	ND(0.004)	ND(0.004)	ND(0.005)	0.002 J	ND(0.004)	1.1 J
Xylenes (total)	mg/kg	8000	1000	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.005)	ND(0.004)	2.0 J
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	0.3	0.19	1.3	0.200 J	0.004 J	2.0
Benzo(a)anthracene	mg/kg	130	130	0.53	0.53	2.2	0.46	0.009 J	1.8
Benzo(a)pyrene	mg/kg	12	12	0.48	0.48	2.1	0.38	0.014 J	1.9
Benzo(b)fluoranthene	mg/kg	76	76	0.63	0.61	3.1	0.80	0.017 J	2.3
Benzo(g,h,i)perylene	mg/kg	190000	180	0.59	0.33	1.6	0.43	0.016 J	1.6
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	0.6	0.48	2.3	0.54	0.012 J	2.1
Fluorene	mg/kg	130000	3800	0.15	0.074	0.8	0.063 J	ND(0.018)	1.8
Naphthalene	mg/kg	760	25	1.0	0.15	5.5	1.1	0.009 J	**64[b]**
Phenanthrene	mg/kg	190000	10000	0.9	0.74	3.5	0.72	0.008 J	5.1
Pyrene	mg/kg	96000	2200	0.84	0.95	3.5	0.67	0.016 J	3.4

Table 3a

Surface Soil Analytical Results Summary
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Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-020** **AOI7-BH-16-020-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-021** **AOI7-BH-16-021-0-2-063016** **06/30/2016** **0.0-2.0 ft**	**AOI7-BH-16-022** **AOI7-BH-16-022-0-2-070516** **07/05/2016** **0.0-2.0 ft**	**AOI7-BH-16-023** **AOI7-BH-16-023-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-024** **AOI7-BH-16-024-0-2-070716** **07/07/2016** **0.0-2.0 ft**	**AOI7-BH-16-025** **AOI7-BH-16-025-0-2-070116** **07/01/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	351	77.5	119	268	6.35	533
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	16.7	18.7	20.3	23.3	6.3	27.7

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
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Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035
Sample ID:				AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816
Sample Date:				07/01/2016	07/07/2016	07/12/2016	07/12/2016	07/08/2016	07/08/2016
Sample Depth:				0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b						
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	ND(0.006)	ND(0.004)	ND(0.006)	ND(0.004)	1.0	ND(0.004)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	**ND(0.006)[b]**	ND(0.004)	**ND(0.006)[b]**	ND(0.004)	**ND(0.41)[b]**	ND(0.004)
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.006)	ND(0.004)	ND(0.006)	ND(0.004)	ND(0.41)	ND(0.004)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.006)	ND(0.004)	ND(0.006)	ND(0.004)	ND(0.41)	ND(0.004)
Benzene	mg/kg	290	0.5	0.001 J	ND(0.004)	0.010	ND(0.004)	0.390 J	0.002 J
Ethylbenzene	mg/kg	890	70	ND(0.006)	ND(0.004)	ND(0.006)	ND(0.004)	0.150 J	ND(0.004)
Isopropyl benzene	mg/kg	10000	2500	0.004 J	ND(0.004)	ND(0.006)	ND(0.004)	0.250 J	ND(0.004)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.006)	ND(0.004)	ND(0.006)	ND(0.004)	ND(0.41)	ND(0.004)
Toluene	mg/kg	10000	100	ND(0.006)	ND(0.004)	0.015	ND(0.004)	0.670	0.002 J
Xylenes (total)	mg/kg	8000	1000	0.002 J	ND(0.004)	0.004 J	ND(0.004)	1.500	ND(0.004)
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	0.053 J	0.014 J	1.0	0.010 J	1.0	0.34
Benzo(a)anthracene	mg/kg	130	130	0.26	0.025	2.0	0.03	1.8	0.72
Benzo(a)pyrene	mg/kg	12	12	0.37	0.034	1.7	0.038	1.8	0.55
Benzo(b)fluoranthene	mg/kg	76	76	0.57	0.053	2.2	0.069	2.5	0.69
Benzo(g,h,i)perylene	mg/kg	190000	180	0.39	0.046	1.6	0.046	1.6	0.56
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	0.40	0.034	2.2	0.049	2.8	0.73
Fluorene	mg/kg	130000	3800	ND(0.190)	0.004 J	0.22	ND(0.018)	0.83	0.11
Naphthalene	mg/kg	760	25	0.120 J	0.04	3.3	0.009 J	10	0.20
Phenanthrene	mg/kg	190000	10000	0.23	0.029	2.6	0.031	3.1	1.4
Pyrene	mg/kg	96000	2200	0.61	0.035	2.8	0.062	2.3	1.3

Table 3a

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Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-026** **AOI7-BH-16-026-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-027** **AOI7-BH-16-027-0-2-070716** **07/07/2016** **0.0-2.0 ft**	**AOI7-BH-16-028** **AOI7-BH-16-028-0-2-071216** **07/12/2016** **0.0-2.0 ft**	**AOI7-BH-16-032** **AOI7-BH-16-032-0-2-071216** **07/12/2016** **0.0-2.0 ft**	**AOI7-BH-16-034** **AOI7-BH-16-034-0-2-070816** **07/08/2016** **0.0-2.0 ft**	**AOI7-BH-16-035** **AOI7-BH-16-035-0-2-070816** **07/08/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	50.3	5.12	499	8.24	424	59.9
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	12.8	4.0	24.5	7.1	27.9	12.3

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
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Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039	AOI7-BH-16-040	AOI7-BH-16-041
Sample ID:				AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916	AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616
Sample Date:				06/30/2016	06/29/2016	06/30/2016	06/29/2016	06/29/2016	07/06/2016
Sample Depth:				0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b						
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	0.14 J	ND(2.3)	ND(0.005)	0.001 J	ND(0.004)	ND(0.005)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	**ND(0.49)[b]**	**ND(2.3)[b]**	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.49)	**ND(2.3)[b]**	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.49)	ND(2.3)	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
Benzene	mg/kg	290	0.5	0.089 J	**ND(2.3)[b]**	ND(0.005)	0.004 J	0.001 J	0.002 J
Ethylbenzene	mg/kg	890	70	0.11 J	ND(2.3)	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
Isopropyl benzene	mg/kg	10000	2500	ND(0.49)	ND(2.3)	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.49)	**ND(2.3)[b]**	ND(0.005)	ND(0.004)	ND(0.004)	ND(0.005)
Toluene	mg/kg	10000	100	1.4	0.610 J	0.001 J	0.002 J	0.001 J	ND(0.005)
Xylenes (total)	mg/kg	8000	1000	0.26 J	ND(2.3)	ND(0.005)	0.002 J	0.0008 J	ND(0.005)
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	1.6	1.2	0.16 J	0.009 J	0.21	0.014 J
Benzo(a)anthracene	mg/kg	130	130	1.4	0.89	0.54	0.032	0.33	0.032
Benzo(a)pyrene	mg/kg	12	12	1.5	0.91	0.69	0.027	0.25	0.041
Benzo(b)fluoranthene	mg/kg	76	76	2.3	1.4	0.8	0.037	0.23	0.057
Benzo(g,h,i)perylene	mg/kg	190000	180	1.4	0.99	0.72	0.043	0.28	0.035
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	-	-	-
Chrysene	mg/kg	760	230	1.6	1.2	0.65	0.063	0.72	0.043
Fluorene	mg/kg	130000	3800	1.1	0.77	0.059 J	0.005 J	0.27	0.005 J
Naphthalene	mg/kg	760	25	21	10	1.4	0.02	0.087	0.039
Phenanthrene	mg/kg	190000	10000	4.7	3.9	0.65	0.05	1.1	0.032
Pyrene	mg/kg	96000	2200	2.2	1.5	0.64	0.04	0.78	0.057

Table 3a

Surface Soil Analytical Results Summary
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Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-036** **AOI7-BH-16-036-0-2-063016** **06/30/2016** **0.0-2.0 ft**	**AOI7-BH-16-037** **AOI7-BH-16-037-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-038** **AOI7-BH-16-038-0-2-063016** **06/30/2016** **0.0-2.0 ft**	**AOI7-BH-16-039** **AOI7-BH-16-039-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-040** **AOI7-BH-16-040-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-041** **AOI7-BH-16-041-0-2-070616** **07/06/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	368	313	40.6	42.3	309	26.1
Mercury	mg/kg	510	10	-	-	-	-	-	-
General Chemistry									
Percent moisture	%	-	-	36.9	37.1	22.6	7.0	7.4	7.0

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
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AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047
Sample ID:				AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816
Sample Date:				07/06/2016	06/29/2016	07/12/2016	07/01/2016	07/05/2016	07/08/2016
Sample Depth:				0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft	0.0-2.0 ft
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b						
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	mg/kg	560	35	0.082 J	ND(0.005)	ND(0.005)	ND(0.004)	0.16 J	0.13 J
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	ND(0.39)[b]	ND(0.005)	ND(0.005)	ND(0.004)	ND(0.34)[b]	ND(0.38)[b]
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.39)	ND(0.005)	ND(0.005)	ND(0.004)	ND(0.34)	ND(0.38)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.39)	ND(0.005)	ND(0.005)	ND(0.004)	ND(0.34)	ND(0.38)
Benzene	mg/kg	290	0.5	0.11 J	0.002 J	ND(0.005)	ND(0.004)	0.37	0.12 J
Ethylbenzene	mg/kg	890	70	0.12 J	ND(0.005)	ND(0.005)	ND(0.004)	0.18 J	0.10 J
Isopropyl benzene	mg/kg	10000	2500	ND(0.39)	ND(0.005)	ND(0.005)	ND(0.004)	0.61	ND(0.38)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.39)	ND(0.005)	ND(0.005)	ND(0.004)	ND(0.340)	ND(0.38)
Toluene	mg/kg	10000	100	0.70	0.002 J	ND(0.005)	ND(0.004)	0.50	0.89
Xylenes (total)	mg/kg	8000	1000	0.30 J	ND(0.005)	ND(0.005)	ND(0.004)	0.88	0.21 J
Semi-Volatile Organic Compounds									
Anthracene	mg/kg	190000	350	2.0	1.4	0.006 J	ND(0.019)	3.5	1.9
Benzo(a)anthracene	mg/kg	130	130	2.7	3.4	0.024	0.016 J	5.0	2.1
Benzo(a)pyrene	mg/kg	12	12	3.3	2.4	0.022	0.020	5.1	2.4
Benzo(b)fluoranthene	mg/kg	76	76	4.1	3.1	0.039	0.030	6.4	2.7
Benzo(g,h,i)perylene	mg/kg	190000	180	2.7	1.7	0.024	0.024	3.4	2.1
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-	0.009 J	2.2	1.2
Chrysene	mg/kg	760	230	2.6	3.3	0.030	0.020	5.9	2.7
Fluorene	mg/kg	130000	3800	1.2	0.48	ND(0.018)	ND(0.019)	5.4	1.0
Naphthalene	mg/kg	760	25	8.7	2.5	0.004 J	0.007 J	11	10
Phenanthrene	mg/kg	190000	10000	4.2	3.5	0.018 J	0.012 J	5.7	3.7
Pyrene	mg/kg	96000	2200	3.6	4.5	0.038	0.024	9.0	3.9

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-042** **AOI7-BH-16-042-0-2-070616** **07/06/2016** **0.0-2.0 ft**	**AOI7-BH-16-043** **AOI7-BH-16-043-0-2-062916** **06/29/2016** **0.0-2.0 ft**	**AOI7-BH-16-044** **AOI7-BH-16-044-0-2-071216** **07/12/2016** **0.0-2.0 ft**	**AOI7-BH-16-045** **AOI7-BH-16-045-0-2-070116** **07/01/2016** **0.0-2.0 ft**	**AOI7-BH-16-046** **AOI7-BH-16-046-0-2-070516** **07/05/2016** **0.0-2.0 ft**	**AOI7-BH-16-047** **AOI7-BH-16-047-0-2-070816** **07/08/2016** **0.0-2.0 ft**
Metals - Total									
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-	ND(1.7)	ND(7.4)	ND(1.9)
Lead	mg/kg	2240[SS]	2240[SS]	256	432	ND(29.0)	4.14	509	238
Mercury	mg/kg	510	10	-	-	-	ND(0.105)	**11**[b]	1.15
General Chemistry									
Percent moisture	%	-	-	23.3	15.7	7.6	10.7	18.5	20.8

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**C-170** **AOI7-C-170-0-2-070716** **07/07/2016** **0.0-2.0 ft**	**C-171** **AOI7-C-171-0-2-070516** **07/05/2016** **0.0-2.0 ft**	**C-172** **AOI7-C-172-0-2-070616** **07/06/2016** **0.0-2.0 ft**
Volatile Organic Compounds						
1,2,4-Trimethylbenzene	mg/kg	560	35	1.5	0.11 J	ND(0.006)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	3.7	0.005	**ND(0.38)[b]**	**ND(0.33)[b]**	**ND(0.006)[b]**
1,2-Dichloroethane	mg/kg	86	0.5	ND(0.38)	ND(0.33)	ND(0.006)
1,3,5-Trimethylbenzene	mg/kg	10000	210	0.27 J	ND(0.33)	ND(0.006)
Benzene	mg/kg	290	0.5	0.090 J	0.15 J	ND(0.006)
Ethylbenzene	mg/kg	890	70	0.16 J	0.090 J	ND(0.006)
Isopropyl benzene	mg/kg	10000	2500	0.91	ND(0.33)	ND(0.006)
Methyl tert butyl ether (MTBE)	mg/kg	8600	2.0	ND(0.38)	ND(0.33)	ND(0.006)
Toluene	mg/kg	10000	100	0.41	0.39	ND(0.006)
Xylenes (total)	mg/kg	8000	1000	0.83	0.49	ND(0.006)
Semi-Volatile Organic Compounds						
Anthracene	mg/kg	190000	350	2.2	2.9	0.91
Benzo(a)anthracene	mg/kg	130	130	2.1 J	4.8	2.0
Benzo(a)pyrene	mg/kg	12	12	2.1 J	3.9	2.0
Benzo(b)fluoranthene	mg/kg	76	76	2.7	7.0	2.6
Benzo(g,h,i)perylene	mg/kg	190000	180	2.4	2.7	1.5
Benzo(k)fluoranthene	mg/kg	76	76	-	-	-
Chrysene	mg/kg	760	230	3.6	5.1	1.9
Fluorene	mg/kg	130000	3800	ND(2.1)	1.8	0.47
Naphthalene	mg/kg	760	25	6.2	5.0	3.1
Phenanthrene	mg/kg	190000	10000	6.3	6.6	2.7
Pyrene	mg/kg	96000	2200	5.4	8.5	2.8

Table 3a

Surface Soil Analytical Results Summary
Statewide Health Standards
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Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				**C-170**	**C-171**	**C-172**
Sample ID:				**AOI7-C-170-0-2-070716**	**AOI7-C-171-0-2-070516**	**AOI7-C-172-0-2-070616**
Sample Date:				**07/07/2016**	**07/05/2016**	**07/06/2016**
Sample Depth:				**0.0-2.0 ft**	**0.0-2.0 ft**	**0.0-2.0 ft**
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b			
Metals - Total						
Chromium VI (hexavalent)	mg/kg	220	190	-	-	-
Lead	mg/kg	2240[SS]	2240[SS]	793	324	198
Mercury	mg/kg	510	10	-	-	-
General Chemistry						
Percent moisture	%	-	-	18.7	21.2	18.8

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Surface Soil (0-2 feet), August 27, 2016.
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500, Non-residential, August 27, 2016.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3b

Subsurface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				AOI7-BH-16-001	AOI7-BH-16-001	AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017	AOI7-BH-16-018
Sample ID:				AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116	AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116	AOI7-BH-16-018-2-4-071116
Sample Date:				07/01/2016	07/01/2016	06/28/2016	06/29/2016	06/29/2016	07/11/2016	07/11/2016
Sample Depth:				2.0-4.0 ft	2.0-4.0 ft Duplicate	2.0-4.0 ft	2.0-4.0 ft	2.0-4.0 ft	2.0-4.0 ft	2.0-4.0 ft
Parameters	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b							
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	mg/kg	640	35	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	4.3	0.005	ND(0.005)	**ND(0.006)[b]**	**ND(0.006)[b]**	**ND(0.66)[b]**	**ND(0.66)[b]**	-	-
1,2-Dichloroethane	mg/kg	98	0.5	ND(0.005)	ND(0.006)	ND(0.006)	**ND(0.66)[b]**	**ND(0.66)[b]**	-	-
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
Benzene	mg/kg	330	0.5	ND(0.005)	ND(0.006)	ND(0.006)	0.081 J	**ND(0.66)[b]**	-	-
Ethylbenzene	mg/kg	1000	70	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
Isopropyl benzene	mg/kg	10000	2500	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
Methyl tert butyl ether (MTBE)	mg/kg	9900	2.0	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
Toluene	mg/kg	10000	100	ND(0.005)	ND(0.006)	ND(0.006)	0.280 J	0.43 J	-	-
Xylenes (total)	mg/kg	9100	1000	ND(0.005)	ND(0.006)	ND(0.006)	ND(0.66)	ND(0.66)	-	-
Semi-Volatile Organic Compounds										
Anthracene	mg/kg	190000	350	ND(0.022)	ND(0.022)	2.0	4.300	2.6	-	-
Benzo(a)anthracene	mg/kg	190000	430	0.007 J	0.006 J	1.8	3.500	2.3	-	-
Benzo(a)pyrene	mg/kg	190000	46	0.009 J	0.007 J	1.5	1.800	1.8	2.8	1.2
Benzo(b)fluoranthene	mg/kg	190000	170	0.011 J	0.007 J	1.7	2.300	2.2	-	-
Benzo(g,h,i)perylene	mg/kg	190000	180	0.010 J	ND(0.022)	1.5	1.000	1.3	-	-
Benzo(k)fluoranthene	mg/kg	190000	610	-	-	-	-	-	-	-
Chrysene	mg/kg	190000	230	0.008 J	0.005 J	2.2	4.200	2.9	-	-
Dibenz(a,h)anthracene	mg/kg	190000	270	-	-	-	-	-	-	-
Fluorene	mg/kg	190000	3800	ND(0.022)	ND(0.022)	1.4	3.900	1.9	-	-
Naphthalene	mg/kg	190000	25	ND(0.022)	ND(0.022)	10	10.000	10	-	-
Phenanthrene	mg/kg	190000	10000	0.006 J	ND(0.022)	4.0	15.000	4.4	-	-
Pyrene	mg/kg	190000	2200	0.012 J	0.007 J	3.0	10.000	5.4	-	-
Metals - Total										
Chromium VI (hexavalent)	mg/kg	20000	190	-	-	-	-	-	-	-
Lead	mg/kg	190000	450	2.19	2.23	439	425	**452[b]**	-	-
Mercury	mg/kg	190000	10	-	-	-	-	-	-	-
General Chemistry										
Percent moisture	%	-	-	22.6	22.7	31.6	44.4	44.5	33.1	36.6

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Subsurface Soil (2-15 feet), August 27, 2016
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500,Non-residential, August 27, 2016
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3b

Subsurface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-020** **AOI7-BH-16-020-2-4-070116** **07/01/2016** **2.0-4.0 ft**	**AOI7-BH-16-021** **AOI7-BH-16-021-2-4-063016** **06/30/2016** **2.0-4.0 ft**	**AOI7-BH-16-021** **AOI7-BH-16-021D-2-4-063016** **06/30/2016** **2.0-4.0 ft** **Duplicate**	**AOI7-BH-16-022** **AOI7-BH-16-022-2-4-070516** **07/05/2016** **2.0-4.0 ft**	**AOI7-BH-16-023** **AOI7-BH-16-023-2-4-070116** **07/01/2016** **2.0-4.0 ft**	**AOI7-BH-16-024** **AOI7-BH-16-024-2-4-070716** **07/07/2016** **2.0-4.0 ft**	**AOI7-BH-16-025** **AOI7-BH-16-025-4.75-5.0-070116** **07/01/2016** **4.8-5.0 ft**
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	mg/kg	640	35	0.18 J	ND(0.007)	0.12 J	ND(0.006)	ND(0.008)	ND(0.004)	1.1 J
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	4.3	0.005	ND(0.66)[b]	ND(0.007)[b]	ND(0.47)[b]	ND(0.006)[b]	ND(0.008)[b]	ND(0.004)	ND(4.9)[b]
1,2-Dichloroethane	mg/kg	98	0.5	ND(0.66)[b]	ND(0.007)	ND(0.47)	ND(0.006)	ND(0.008)	ND(0.004)	ND(4.9)[b]
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.66)	ND(0.007)	ND(0.47)	ND(0.006)	ND(0.008)	ND(0.004)	ND(4.9)
Benzene	mg/kg	330	0.5	0.15 J	ND(0.007)	0.079 J	ND(0.006)	0.0009 J	0.0007 J	**1.4 J**[b]
Ethylbenzene	mg/kg	1000	70	0.23 J	ND(0.007)	ND(0.47)	ND(0.006)	ND(0.008)	ND(0.004)	2.0 J
Isopropyl benzene	mg/kg	10000	2500	ND(0.66)	ND(0.007)	ND(0.47)	ND(0.006)	ND(0.008)	ND(0.004)	12
Methyl tert butyl ether (MTBE)	mg/kg	9900	2.0	ND(0.66)	ND(0.007)	ND(0.47)	ND(0.006)	ND(0.008)	ND(0.004)	ND(4.9)[b]
Toluene	mg/kg	10000	100	1.700	ND(0.007)	1.1	0.002 J	0.006 J	ND(0.004)	1.2 J
Xylenes (total)	mg/kg	9100	1000	0.41 J	ND(0.007)	0.17 J	ND(0.006)	ND(0.008)	ND(0.004)	3.8 J
Semi-Volatile Organic Compounds										
Anthracene	mg/kg	190000	350	1.2	1.1	1.9	2.6	1.1	ND(0.018)	2.9
Benzo(a)anthracene	mg/kg	190000	430	1.5	1.9	3.0	3.6	1.2	0.010 J	2.6
Benzo(a)pyrene	mg/kg	190000	46	1.8	1.9	2.7	3.2	1.6	0.012 J	2.5
Benzo(b)fluoranthene	mg/kg	190000	170	2.1	2.3	3.2	4.4	2.2	0.015 J	3.0
Benzo(g,h,i)perylene	mg/kg	190000	180	1.6	1.1	1.6	2.5	2.0	0.016 J	1.8
Benzo(k)fluoranthene	mg/kg	190000	610	-	-	-	-	-	-	-
Chrysene	mg/kg	190000	230	1.8	2.3	3.3	3.8	1.6	0.011 J	3.0
Dibenz(a,h)anthracene	mg/kg	190000	270	-	-	-	-	-	-	-
Fluorene	mg/kg	190000	3800	0.55	1.2	2.4	1.4	0.36	ND(0.018)	2.2
Naphthalene	mg/kg	190000	25	15	5.5	9.3	12	12	0.009 J	**80**[b]
Phenanthrene	mg/kg	190000	10000	3.3	2.4	3.9	7.5	3.1	0.008 J	8.4
Pyrene	mg/kg	190000	2200	1.9	4.1	6.6	5.6	1.6	0.014 J	4.7
Metals - Total										
Chromium VI (hexavalent)	mg/kg	20000	190	-	-	-	-	-	-	-
Lead	mg/kg	190000	450	281	154	111	224	291	8.79	**469**[b]
Mercury	mg/kg	190000	10	-	-	-	-	-	-	-
General Chemistry										
Percent moisture	%	-	-	36.1	39.1	31.2	28.7	40.9	7.0	34.5

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Subsurface Soil (2-15 feet), August 27, 2016
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500,Non-residential, August 27, 2016
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3b

Subsurface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-025** **AOI7-BH-16-025D-4.75-5.0-070116** **07/01/2016** **4.8-5.0 ft** **Duplicate**	**AOI7-BH-16-026** **AOI7-BH-16-026-2-4-070116** **07/01/2016** **2.0-4.0 ft**	**AOI7-BH-16-028** **AOI7-BH-16-028-2-4-071116** **07/11/2016** **2.0-4.0 ft**	**AOI7-BH-16-029** **AOI7-BH-16-029-2-4-070816** **07/08/2016** **2.0-4.0 ft**	**AOI7-BH-16-029** **AOI7-BH-16-029D-2-4-070816** **07/08/2016** **2.0-4.0 ft** **Duplicate**	**AOI7-BH-16-030** **AOI7-BH-16-030-2-4-071116** **07/11/2016** **2.0-4.0 ft**	**AOI7-BH-16-031** **AOI7-BH-16-031-2-4-071216** **07/12/2016** **2.0-4.0 ft**
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	mg/kg	640	35	1.2 J	0.35 J	0.001 J	15	9.6	0.42 J	ND(0.40)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	4.3	0.005	**ND(5.2)[b]**	**ND(0.43)[b]**	**ND(0.006)[b]**	**ND(0.65)[b]**	**ND(0.58)[b]**	**ND(1.3)[b]**	**ND(0.40)[b]**
1,2-Dichloroethane	mg/kg	98	0.5	**ND(5.2)[b]**	ND(0.43)	ND(0.006)	**ND(0.65)[b]**	**ND(0.58)[b]**	**ND(1.3)[b]**	ND(0.40)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(5.2)	0.11 J	ND(0.006)	13	7.7	ND(1.3)	ND(0.40)
Benzene	mg/kg	330	0.5	**0.93 J[b]**	0.17 J	0.014	**6.6[b]**	**7.4[b]**	**1.2 J[b]**	ND(0.40)
Ethylbenzene	mg/kg	1000	70	1.3 J	0.21 J	ND(0.006)	4.8	3.9	0.30 J	ND(0.40)
Isopropyl benzene	mg/kg	10000	2500	12	0.36 J	ND(0.006)	9.3	5.2	11	ND(0.40)
Methyl tert butyl ether (MTBE)	mg/kg	9900	2.0	**ND(5.2)[b]**	ND(0.43)	ND(0.006)	ND(0.65)	ND(0.58)	ND(1.3)	ND(0.40)
Toluene	mg/kg	10000	100	ND(5.2)	0.20 J	0.015	2	2	0.51 J	ND(0.40)
Xylenes (total)	mg/kg	9100	1000	3.1 J	0.37 J	0.007	22	17	0.90 J	ND(0.40)
Semi-Volatile Organic Compounds										
Anthracene	mg/kg	190000	350	1.9	0.83	1.6	0.75	0.59	1.6	0.015 J
Benzo(a)anthracene	mg/kg	190000	430	1.4	0.68	7.4	1.2	0.84	2.2	0.008 J
Benzo(a)pyrene	mg/kg	190000	46	1.4	0.55	3.5	0.87	0.65	1.4	0.008 J
Benzo(b)fluoranthene	mg/kg	190000	170	1.7	0.67	5.1	1.4	1.0	1.8	0.012 J
Benzo(g,h,i)perylene	mg/kg	190000	180	1.1	0.41	1.7	0.74	0.56	0.77	0.005 J
Benzo(k)fluoranthene	mg/kg	190000	610	-	-	-	-	-	-	-
Chrysene	mg/kg	190000	230	1.6	0.8	7.4	1.8	1.4	2.7	0.017 J
Dibenz(a,h)anthracene	mg/kg	190000	270	-	-	-	-	-	-	-
Fluorene	mg/kg	190000	3800	1.6	1.0	0.43	1.3	1.1	2.4	0.015 J
Naphthalene	mg/kg	190000	25	**47[b]**	6.5	3.4	4.8	2.8	0.68	0.027
Phenanthrene	mg/kg	190000	10000	6.4	3.5	5.0	4.1	3.4	8.6	0.034
Pyrene	mg/kg	190000	2200	2.8	1.8	12	2.1	1.4	4.0	0.029
Metals - Total										
Chromium VI (hexavalent)	mg/kg	20000	190	-	-	-	-	-	-	-
Lead	mg/kg	190000	450	306	62.4	276	192	201	140	3.36
Mercury	mg/kg	190000	10	-	-	-	-	-	-	-
General Chemistry										
Percent moisture	%	-	-	36.6	21.8	28.3	7.4	9.7	14.0	28.5

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Subsurface Soil (2-15 feet), August 27, 2016
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500,Non-residential, August 27, 2016
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3b

Subsurface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:** **Parameters**	**Units**	**Act 2 Non-Residential Used Aquifer Direct Contact MSC** a	**Act 2 Non-Residential Used Aquifer Minimum MSC** b	**AOI7-BH-16-033** **AOI7-BH-16-033-2-4-071116** **07/11/2016** **2.0-4.0 ft**	**AOI7-BH-16-034** **AOI7-BH-16-034-2-4-070816** **07/08/2016** **2.0-4.0 ft**	**AOI7-BH-16-036** **AOI7-BH-16-036-2-4-063016** **06/30/2016** **2.0-4.0 ft**	**AOI7-BH-16-037** **AOI7-BH-16-037-2-4-062916** **06/29/2016** **2.0-4.0 ft**	**AOI7-BH-16-038** **AOI7-BH-16-038-2-4-063016** **06/30/2016** **2.0-4.0 ft**	**AOI7-BH-16-038** **AOI7-BH-16-038D-2-4-063016** **06/30/2016** **2.0-4.0 ft** **Duplicate**	**AOI7-BH-16-041** **AOI7-BH-16-041-2-4-070616** **07/06/2016** **2.0-4.0 ft**
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	mg/kg	640	35	-	2.0	0.20 J	ND(2.3)	0.013	0.007	ND(0.007)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	4.3	0.005	-	**ND(0.54)[b]**	**ND(0.58)[b]**	**ND(2.3)[b]**	**ND(0.008)[b]**	**ND(0.007)[b]**	**ND(0.007)[b]**
1,2-Dichloroethane	mg/kg	98	0.5	-	**ND(0.54)[b]**	**ND(0.58)[b]**	**ND(2.3)[b]**	ND(0.008)	ND(0.007)	ND(0.007)
1,3,5-Trimethylbenzene	mg/kg	10000	210	-	0.340 J	ND(0.58)	ND(2.3)	0.013	0.006 J	ND(0.007)
Benzene	mg/kg	330	0.5	-	0.120 J	0.11 J	0.41 J	ND(0.008)	ND(0.007)	0.012
Ethylbenzene	mg/kg	1000	70	-	0.130 J	0.13 J	ND(2.3)	ND(0.008)	0.002 J	ND(0.007)
Isopropyl benzene	mg/kg	10000	2500	-	0.470 J	ND(0.58)	ND(2.3)	0.024	0.011	ND(0.007)
Methyl tert butyl ether (MTBE)	mg/kg	9900	2.0	-	ND(0.54)	ND(0.58)	**ND(2.3)[b]**	ND(0.008)	ND(0.007)	ND(0.007)
Toluene	mg/kg	10000	100	-	1.3	1.5	1.0 J	0.004 J	0.002 J	0.007 J
Xylenes (total)	mg/kg	9100	1000	-	2.8	0.29 J	0.85 J	0.01	0.007	0.003 J
Semi-Volatile Organic Compounds										
Anthracene	mg/kg	190000	350	-	2.1	3.6	0.63	2.1	1.8	3.5
Benzo(a)anthracene	mg/kg	190000	430	-	1.1	2.3	0.73	1.7	1.8	4.1
Benzo(a)pyrene	mg/kg	190000	46	-	0.84	1.8	0.9	1.7	1.9	3.3
Benzo(b)fluoranthene	mg/kg	190000	170	-	1.2	2.3	1.2	2.1	2.3	4.7
Benzo(g,h,i)perylene	mg/kg	190000	180	-	0.81	1.1	0.87	2.3	2.1	1.9
Benzo(k)fluoranthene	mg/kg	190000	610	-	-	-	-	-	-	-
Chrysene	mg/kg	190000	230	-	1.5	2.7	0.93	2.3	2.6	4.3
Dibenz(a,h)anthracene	mg/kg	190000	270	-	-	-	-	-	-	-
Fluorene	mg/kg	190000	3800	-	1.5	4.1	0.45	1.5	1.4	2.4
Naphthalene	mg/kg	190000	25	-	25	17	6.7	17	15	15
Phenanthrene	mg/kg	190000	10000	-	6.4	6.3	2.1	5.8	5.1	6.5
Pyrene	mg/kg	190000	2200	-	1.9	6.9	1.1	3.1	2.9	9.6
Metals - Total										
Chromium VI (hexavalent)	mg/kg	20000	190	-	-	-	-	-	-	-
Lead	mg/kg	190000	450	ND(7.37)	375	272	227	329	360	269
Mercury	mg/kg	190000	10	-	-	-	-	-	-	-
General Chemistry										
Percent moisture	%	-	-	9.9	36.6	42.4	38.9	33.7	34.9	30.8

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Subsurface Soil (2-15 feet), August 27, 2016
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500,Non-residential, August 27, 2016
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 3b

Subsurface Soil Analytical Results Summary
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location: **Sample ID:** **Sample Date:** **Sample Depth:**		**Act 2 Non-Residential Used Aquifer Direct Contact MSC**	**Act 2 Non-Residential Used Aquifer Minimum MSC**	**AOI7-BH-16-042** **AOI7-BH-16-042-2-4-070616** **07/06/2016** **2.0-4.0 ft**	**AOI7-BH-16-043** **AOI7-BH-16-043-2-4-062916** **06/29/2016** **2.0-4.0 ft**	**AOI7-BH-16-046** **AOI7-BH-16-046-2-4-070816** **07/08/2016** **2.0-4.0 ft**	**AOI7-BH-16-047** **AOI7-BH-16-047-2-4-070816** **07/08/2016** **2.0-4.0 ft**	**C-170** **AOI7-C-170-2-4-070716** **07/07/2016** **2.0-4.0 ft**	**C-171** **AOI7-C-171-2-4-070516** **07/05/2016** **2.0-4.0 ft**	**C-172** **AOI7-C-172-2-4-070616** **07/06/2016** **2.0-4.0 ft**
Parameters	**Units**	a	b							
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	mg/kg	640	35	ND(0.54)	ND(0.006)	0.11 J	0.470 J	0.003 J	0.003 J	ND(0.003)
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	4.3	0.005	**ND(0.54)[b]**	**ND(0.006)[b]**	**ND(0.38)[b]**	**ND(1.200)[b]**	**ND(0.008)[b]**	**ND(0.007)[b]**	ND(0.003)
1,2-Dichloroethane	mg/kg	98	0.5	**ND(0.54)[b]**	ND(0.006)	ND(0.38)	**ND(1.200)[b]**	ND(0.008)	ND(0.007)	ND(0.003)
1,3,5-Trimethylbenzene	mg/kg	10000	210	ND(0.54)	0.001 J	ND(0.38)	ND(1.200)	ND(0.008)	ND(0.007)	ND(0.003)
Benzene	mg/kg	330	0.5	**ND(0.54)[b]**	0.005 J	0.14 J	**ND(1.200)[b]**	ND(0.008)	ND(0.007)	ND(0.003)
Ethylbenzene	mg/kg	1000	70	ND(0.54)	0.001 J	0.11 J	ND(1.200)	ND(0.008)	ND(0.007)	ND(0.003)
Isopropyl benzene	mg/kg	10000	2500	ND(0.54)	ND(0.006)	0.48	2.3	ND(0.008)	ND(0.007)	ND(0.003)
Methyl tert butyl ether (MTBE)	mg/kg	9900	2.0	ND(0.54)	ND(0.006)	ND(0.38)	ND(1.200)	ND(0.008)	ND(0.007)	ND(0.003)
Toluene	mg/kg	10000	100	0.22 J	0.005 J	0.40	ND(1.200)	0.003 J	0.003 J	ND(0.003)
Xylenes (total)	mg/kg	9100	1000	ND(0.54)	0.001 J	0.45	ND(1.200)	0.002 J	0.005 J	ND(0.003)
Semi-Volatile Organic Compounds										
Anthracene	mg/kg	190000	350	1.3	1.1	4.1	2.0	0.94 J	2.5	2.5
Benzo(a)anthracene	mg/kg	190000	430	1.8	2.6	7.1	1.8	1.4	4.4	3.7
Benzo(a)pyrene	mg/kg	190000	46	2.0	1.8	5.3	1.0	1.9	4.3	4.0
Benzo(b)fluoranthene	mg/kg	190000	170	2.4	2.2	5.9	1.2	2.4	4.8	4.5
Benzo(g,h,i)perylene	mg/kg	190000	180	1.4	1.1	3.5	0.77	2.0	4.6	2.7
Benzo(k)fluoranthene	mg/kg	190000	610	-	-	3.3	0.49	-	-	-
Chrysene	mg/kg	190000	230	2.0	2.6	7.4	2.7	1.6	3.8	3.6
Dibenz(a,h)anthracene	mg/kg	190000	270	-	-	1.2	0.23 J	-	-	-
Fluorene	mg/kg	190000	3800	0.76 J	0.47	4.3	2.8	0.49 J	1.1 J	2.0
Naphthalene	mg/kg	190000	25	3.8	2.4	7.4	ND(0.48)	9.7	15	7.3
Phenanthrene	mg/kg	190000	10000	3.2	2.2	8.4	9.1	2.8	4.8	7.5
Pyrene	mg/kg	190000	2200	3.4	3.9	10	3.9	1.9	5.2	6.1
Metals - Total										
Chromium VI (hexavalent)	mg/kg	20000	190	-	-	ND(7.8)	ND(1.7)	-	-	-
Lead	mg/kg	190000	450	181	**2590[b]**	408	34.1	343	200	151
Mercury	mg/kg	190000	10	-	-	4.14	0.145	-	-	-
General Chemistry										
Percent moisture	%	-	-	31.6	21.9	23.4	12.5	36.0	34.6	21.0

Notes:

a	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Direct Contact, Non-Residential, Subsurface Soil (2-15 feet), August 27, 2016
b	PADEP Act 2 Medium-Specific Concentration (MSCs) for Organic/Inorganic Regulated Substances in Soil, Minimum of Direct Contact and Soil to Groundwater Max(Generic vs x100), Used Aquifers TDS <= 2500,Non-residential, August 27, 2016
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)[b]	Indicates reporting limit was above the applicable standard.
1.4 J[b]	Indicates detected value was above the applicable standard
SS	Lead value is the site specific standard for lead accepted by the PADEP.
ft	feet

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-55	AOI7 BH-12-56	AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-74	AOI7 BH-12-75		AOI7 BH-12-76
Sample Date				29-Nov-12	29-Nov-12	30-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-46_0.5'	BH-12-47_1.5'	BH-12-55_1.5'	BH-12-56_2'	BH-12-67_2'	BH-12-68_1.5'	BH-12-69_2'	BH-12-70_2'	BH-12-74_1'	BH-12-75_1'	BH-12-75_2'	BH-12-76_1'
Sample Depth				0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL
Laboratory Work Order				JB22561	JB22561	JB22549	1352569	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	JB22561-8	JB22561-9	JB22549-3	6876917	JB22561-4	JB22561-6	JB22561-1	6876924	6876913	6876926	6876914	6876910
Volatile Organic Compounds															
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.00082) (0.00082)	ND (0.092) (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.0005)	ND (0.0014) (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.0005)	0.027 (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.00082) (0.00082)	*ND (0.092)* (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	*ND (0.006)* (0.001)	*ND (0.006)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.00082) (0.00082)	ND (0.092) (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.00082) (0.00082)	ND (0.092) (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.00082) (0.00082)	ND (0.092) (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.0005)	0.0023 (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	-	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.00082) (0.00082)	0.288 (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.00082) (0.00082)	0.111 (0.092)	ND (0.00085) (0.00085)	ND (0.005) (0.001)	0.0025 (0.0014)	ND (0.00099) (0.00099)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)															
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds															
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.032) (0.032)	ND (0.39) (0.39)	0.0370 (0.037)	0.35 (0.003)	0.497 (0.071)	0.0890 (0.033)	5.04 (0.61)	ND (0.018) (0.003)	0.081 (0.003)	0.079 (0.003)	0.88 (0.003)	0.035 (0.003)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.139 (0.032)	3.38 (0.39)	0.118 (0.037)	0.85 (0.003)	0.908 (0.071)	0.214 (0.033)	6.21 (0.61)	0.032 (0.003)	0.27 (0.003)	0.29 (0.003)	2.6 (0.003)	0.11 (0.003)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.129 (0.032)	0.731 (0.39)	0.120 (0.037)	1.0 (0.003)	1.06 (0.071)	0.203 (0.033)	4.06 (0.61)	0.039 (0.003)	0.36 (0.003)	0.32 (0.003)	2.8 (0.003)	0.099 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.177 (0.032)	ND (0.39) (0.39)	0.125 (0.037)	1.3 (0.003)	0.943 (0.071)	0.185 (0.033)	3.28 (0.61)	0.057 (0.003)	0.47 (0.003)	0.44 (0.003)	3.5 (0.003)	0.13 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.166 (0.032)	ND (0.39) (0.39)	0.116 (0.037)	0.88 (0.003)	0.641 (0.071)	0.279 (0.033)	1.69 (0.61)	0.039 (0.003)	0.41 (0.003)	0.29 (0.003)	1.9 (0.003)	0.059 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-55	AOI7 BH-12-56	AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-74	AOI7 BH-12-75		AOI7 BH-12-76
Sample Date				29-Nov-12	29-Nov-12	30-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-46_0.5'	BH-12-47_1.5'	BH-12-55_1.5'	BH-12-56_2'	BH-12-67_2'	BH-12-68_1.5'	BH-12-69_2'	BH-12-70_2'	BH-12-74_1'	BH-12-75_1'	BH-12-75_2'	BH-12-76_1'
Sample Depth				0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL
Laboratory Work Order				JB22561	JB22561	JB22549	1352569	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	JB22561-8	JB22561-9	JB22549-3	6876917	JB22561-4	JB22561-6	JB22561-1	6876924	6876913	6876926	6876914	6876910
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	0.199 (0.032)	1.82 (0.39)	0.124 (0.037)	0.89 (0.003)	1.61 (0.071)	0.201 (0.033)	5.53 (0.61)	0.032 (0.003)	0.45 (0.003)	0.39 (0.003)	2.9 (0.003)	0.14 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	ND (0.032) (0.032)	0.418 (0.39)	ND (0.037) (0.037)	0.076 (0.003)	0.510 (0.071)	ND (0.033) (0.033)	1.74 (0.030)	ND (0.018) (0.003)	ND (0.020) (0.003)	ND (0.019) (0.003)	0.33 (0.003)	ND (0.019) (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{sz}[A]	58_{sz}[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	1.0 (0.003)	-	-	-	0.025 (0.003)	0.13 (0.003)	0.19 (0.003)	0.43 (0.003)	0.027 (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.183 (0.032)	2.95 (0.39)	0.0855 (0.037)	0.64 (0.003)	1.02 (0.071)	0.197 (0.033)	17.9 (0.61)	0.026 (0.003)	0.41 (0.003)	0.32 (0.003)	2.7 (0.003)	0.16 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	0.237 (0.032)	ND (0.39) (0.39)	0.185 (0.037)	0.93 (0.003)	1.99 (0.071)	0.339 (0.033)	14.4 (0.61)	0.039 (0.003)	0.46 (0.003)	0.43 (0.003)	4.3 (0.003)	0.18 (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-55	AOI7 BH-12-56	AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-74	AOI7 BH-12-75		AOI7 BH-12-76
Sample Date				29-Nov-12	29-Nov-12	30-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-46_0.5'	BH-12-47_1.5'	BH-12-55_1.5'	BH-12-56_2'	BH-12-67_2'	BH-12-68_1.5'	BH-12-69_2'	BH-12-70_2'	BH-12-74_1'	BH-12-75_1'	BH-12-75_2'	BH-12-76_1'
Sample Depth				0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL
Laboratory Work Order		**A**	**B**	JB22561	JB22561	JB22549	1352569	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569
Laboratory Sample ID	**Units**	**MSC-PA**	**SHS-PA**	JB22561-8	JB22561-9	JB22549-3	6876917	JB22561-4	JB22561-6	JB22561-1	6876924	6876913	6876926	6876914	6876910
Metals															
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	121 (7.0)	***2060***[B] (2.8)	112 (2.2)	***743***[B] (0.0044)	***583***[B] (2.4)	240 (2.2)	14.7 (2.2)	13.8 (0.0044)	254 (0.0044)	335 (0.0044)	***551***[B] (0.0044)	143 (0.0044)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	16.0 (0.50)	-	-	-	6.5 (0.50)	14.7 (0.50)	12.5 (0.50)	13.8 (0.50)	9.5 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	86.9 ()	72.6 ()	85.7 ()	-	79.6 ()	86.8 ()	94.0 ()	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-78		AOI7 BH-12-79	AOI7 BH-12-82	AOI7 BH-12-83	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-91	AOI7 BH-12-92	AOI7 BH-12-94	AOI7 BH-12-98	AOI7 BH-12-99
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-78_1.0'	BH-12-78_2.0'	BH-12-79_1.0'	BH-12-82_1.0'	BH-12-83_1.0'	BH-12-85_1.5'	BH-12-87_1.0'	BH-12-91_0.5'	BH-12-92_0.5'	BH-12-94_1.0'	BH-12-98_1'	BH-12-99_0.5'
Sample Depth				0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-15	JB22267-16	JB22267-13	JB22267-14	JB22267-9	JB22267-7	JB22267-4	JB22267-1	JB22267-2	JB22267-3	6876922	6876923
Volatile Organic Compounds															
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	***0.53***[B] (0.0005)	ND (0.006) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	*ND (0.076)* (0.001)	*ND (0.006)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	ND (0.076) (0.001)	ND (0.006) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	0.18 J (0.001)	ND (0.006) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)	ND (0.0058) (0.0058)	7.6 (0.001)	ND (0.006) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	ND (0.038) (0.0005)	ND (0.006) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)	ND (0.0058) (0.0058)	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	2.0 (0.001)	ND (0.006) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)	ND (0.0058) (0.0058)	7.3 (0.001)	ND (0.006) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)	ND (0.0058) (0.0058)	ND (0.076) (0.001)	ND (0.006) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.00088) (0.00088)	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.00097)	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.00088)	ND (0.00083) (0.00083)	ND (0.0012) (0.0012)	0.57 (0.001)	ND (0.006) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)															
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds															
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.119 (0.033)	0.0605 (0.039)	0.0638 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.0562 (0.043)	0.223 (0.041)	0.0677 (0.038)	ND (0.034) (0.034)	0.162 (0.036)	0.17 J (0.003)	ND (15) (0.003)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.200 (0.033)	0.180 (0.039)	0.265 (0.037)	0.0384 (0.036)	ND (0.031) (0.031)	0.128 (0.043)	0.670 (0.041)	0.401 (0.038)	ND (0.034) (0.034)	0.816 (0.036)	0.34 (0.003)	ND (15) (0.003)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.150 (0.033)	0.207 (0.039)	0.244 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.183 (0.043)	0.775 (0.041)	0.403 (0.038)	ND (0.034) (0.034)	0.782 (0.036)	0.32 (0.003)	*ND (15)* (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.176 (0.033)	0.235 (0.039)	0.282 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.259 (0.043)	0.815 (0.041)	0.760 (0.038)	ND (0.034) (0.034)	0.952 (0.036)	0.59 (0.003)	ND (15) (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.0889 (0.033)	0.222 (0.039)	0.179 (0.037)	0.106 (0.036)	ND (0.031) (0.031)	0.197 (0.043)	0.617 (0.041)	0.463 (0.038)	ND (0.034) (0.034)	0.538 (0.036)	0.32 (0.003)	ND (15) (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-78		AOI7 BH-12-79	AOI7 BH-12-82	AOI7 BH-12-83	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-91	AOI7 BH-12-92	AOI7 BH-12-94	AOI7 BH-12-98	AOI7 BH-12-99
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-78_1.0'	BH-12-78_2.0'	BH-12-79_1.0'	BH-12-82_1.0'	BH-12-83_1.0'	BH-12-85_1.5'	BH-12-87_1.0'	BH-12-91_0.5'	BH-12-92_0.5'	BH-12-94_1.0'	BH-12-98_1'	BH-12-99_0.5'
Sample Depth				0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-15	JB22267-16	JB22267-13	JB22267-14	JB22267-9	JB22267-7	JB22267-4	JB22267-1	JB22267-2	JB22267-3	6876922	6876923
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	0.205 (0.033)	0.202 (0.039)	0.253 (0.037)	0.0408 (0.036)	ND (0.031) (0.031)	0.159 (0.043)	0.718 (0.041)	0.622 (0.038)	ND (0.034) (0.034)	0.904 (0.036)	0.42 (0.003)	16 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.0695 (0.033)	ND (0.039) (0.039)	ND (0.037) (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	ND (0.043) (0.043)	0.0663 (0.041)	ND (0.038) (0.038)	ND (0.034) (0.034)	ND (0.036) (0.036)	0.077 J (0.003)	400 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	0.79 (0.003)	ND (15) (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.584 (0.033)	0.115 (0.039)	0.243 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.0803 (0.043)	0.737 (0.041)	0.122 (0.038)	ND (0.034) (0.034)	1.03 (0.036)	0.70 (0.003)	180 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	0.350 (0.033)	0.212 (0.039)	0.390 (0.037)	0.0396 (0.036)	ND (0.031) (0.031)	0.111 (0.043)	0.884 (0.041)	0.910 (0.038)	ND (0.034) (0.034)	1.54 (0.036)	0.53 (0.003)	ND (15) (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-78		AOI7 BH-12-79	AOI7 BH-12-82	AOI7 BH-12-83	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-91	AOI7 BH-12-92	AOI7 BH-12-94	AOI7 BH-12-98	AOI7 BH-12-99
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-78_1.0'	BH-12-78_2.0'	BH-12-79_1.0'	BH-12-82_1.0'	BH-12-83_1.0'	BH-12-85_1.5'	BH-12-87_1.0'	BH-12-91_0.5'	BH-12-92_0.5'	BH-12-94_1.0'	BH-12-98_1'	BH-12-99_0.5'
Sample Depth				0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-15	JB22267-16	JB22267-13	JB22267-14	JB22267-9	JB22267-7	JB22267-4	JB22267-1	JB22267-2	JB22267-3	6876922	6876923
Metals															
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220[s1,A]	190[s1,B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	237 (2.2)	128 (2.4)	***498***[B] (2.3)	116 (13)	16.2 (2.2)	145 (2.8)	***870***[B] (2.8)	291 (24)	30.2 (2.1)	***1340***[B] (2.6)	***955***[B] (0.0044)	341 (0.0044)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	22.2 (0.50)	30.9 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	88.9 ()	79.5 ()	83.5 ()	75.8 ()	92.2 ()	68.3 ()	75.1 ()	81.6 ()	86.3 ()	78.7 ()	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-45	AOI7-BH-13-46	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-13-50	AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007	AOI7-BH-16-008	AOI7-BH-16-009
Sample Date				13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13	19-Mar-13	1-Jul-16	12-Jul-16	12-Jul-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16
Sample ID				AOI7-BH-13-45_1.5-2_031313	AOI7-BH-13-46_1.5-2_031313	AOI7-BH-13-47_1.5-2_031313	AOI7-BH-13-48_1.5-2_031313	AOI7-BH-13-50_0-0.5_031913	AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816	AOI7-BH-16-008-0-2-062816	AOI7-BH-16-009-062816-0-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	JB31265	JB31265	JB31794	1679350	1682473	1682473	1678008	1678008	1678008	1678008	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-3	JB31265-7	JB31265-5	JB31265-1	JB31794-2	8460987	8473663	8473664	8455730	8455727	8455729	8455728	8455725
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.14) (0.14)	ND (0.00086) (0.00086)	ND (0.12) (0.12)	***2.66*[B]** (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.240) (0.0005)	ND (0.005) (0.0005)	0.0008 J (0.0005)	0.002 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	*ND (0.14)* (0.14)	ND (0.00086) (0.00086)	*ND (0.12)* (0.12)	*ND (0.088)* (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (0.006)* (0.001)	*ND (0.240)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.14) (0.14)	ND (0.00086) (0.00086)	ND (0.12) (0.12)	ND (0.088) (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.14) (0.14)	ND (0.00086) (0.00086)	ND (0.12) (0.12)	0.643 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	ND (0.44) (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.14) (0.14)	ND (0.00086) (0.00086)	ND (0.12) (0.12)	ND (0.088) (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.240) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.140 (0.14)	ND (0.00086) (0.00086)	0.252 (0.12)	3.45 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	0.002 J (0.001)	0.002 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	0.499 (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.620 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	ND (0.44) (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.130 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	0.474 (0.14)	ND (0.00086) (0.00086)	0.255 (0.12)	4.53 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.200 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.21) (0.21)	0.0831 (0.037)	0.459 (0.042)	0.332 (0.034)	0.110 (0.038)	0.005 J (0.003)	0.020 (0.003)	ND (0.018) (0.003)	0.590 (0.003)	0.600 (0.003)	0.067 (0.003)	0.100 (0.003)	0.110 (0.003)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.482 (0.21)	0.335 (0.037)	1.23 (0.042)	0.797 (0.034)	0.188 (0.038)	0.017 J (0.003)	0.088 (0.003)	ND (0.018) (0.003)	0.770 (0.003)	0.830 (0.003)	0.078 (0.003)	0.130 (0.003)	0.240 (0.003)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.395 (0.21)	0.347 (0.037)	1.25 (0.042)	0.934 (0.034)	0.197 (0.038)	0.017 J (0.003)	0.062 (0.003)	ND (0.018) (0.003)	0.660 (0.003)	1.000 (0.003)	0.053 (0.003)	0.200 (0.003)	0.260 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.425 (0.21)	0.535 (0.037)	1.14 (0.042)	1.10 (0.034)	0.184 (0.038)	0.026 (0.003)	0.085 (0.003)	ND (0.018) (0.003)	0.790 (0.003)	1.300 (0.003)	0.094 (0.003)	0.170 (0.003)	0.520 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.485 (0.21)	0.309 (0.037)	0.818 (0.042)	0.590 (0.034)	0.516 (0.038)	0.019 (0.003)	0.051 (0.003)	0.008 J (0.003)	0.600 (0.003)	0.420 (0.003)	0.110 (0.003)	0.140 (0.003)	0.510 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-45	AOI7-BH-13-46	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-13-50	AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007	AOI7-BH-16-008	AOI7-BH-16-009
Sample Date				13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13	19-Mar-13	1-Jul-16	12-Jul-16	12-Jul-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16
Sample ID				AOI7-BH-13-45_1.5-2_031313	AOI7-BH-13-46_1.5-2_031313	AOI7-BH-13-47_1.5-2_031313	AOI7-BH-13-48_1.5-2_031313	AOI7-BH-13-50_0-0.5_031913	AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816	AOI7-BH-16-008-0-2-062816	AOI7-BH-16-009-062816-0-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	JB31265	JB31265	JB31794	1679350	1682473	1682473	1678008	1678008	1678008	1678008	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-3	JB31265-7	JB31265-5	JB31265-1	JB31794-2	8460987	8473663	8473664	8455730	8455727	8455729	8455728	8455725
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	1.26 (0.21)	0.546 (0.037)	1.40 (0.042)	1.00 (0.034)	0.219 (0.038)	0.018 J (0.003)	0.200 (0.003)	ND (0.018) (0.003)	0.890 (0.003)	4.700 (0.003)	0.086 (0.003)	0.450 (0.003)	0.400 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	ND (0.21) (0.21)	ND (0.037) (0.037)	0.211 (0.042)	0.428 (0.034)	0.0427 (0.038)	ND (0.018) (0.003)	0.015 J (0.003)	ND (0.018) (0.003)	0.220 (0.003)	3.100 (0.003)	0.023 (0.003)	0.043 (0.003)	0.035 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{sz}$[A]	58$_{sz}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	ND (0.21) (0.21)	ND (0.037) (0.037)	0.190 (0.042)	0.120 (0.034)	0.0880 (0.038)	0.009 J (0.003)	0.019 J (0.003)	ND (0.018) (0.003)	5.200 (0.003)	0.300 (0.003)	0.280 (0.003)	0.340 (0.003)	0.480 (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.246 (0.21)	0.266 (0.037)	1.07 (0.042)	0.214 (0.034)	0.269 (0.038)	0.015 J (0.003)	0.150 (0.003)	0.005 J (0.003)	1.700 (0.003)	8.700 (0.003)	0.150 (0.003)	0.250 (0.003)	0.270 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	1.39 (0.21)	0.585 (0.037)	1.46 (0.042)	1.51 (0.034)	0.243 (0.038)	0.025 (0.003)	0.110 (0.003)	0.006 J (0.003)	0.870 (0.003)	2.800 (0.003)	0.098 (0.003)	0.230 (0.003)	0.400 (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-45	AOI7-BH-13-46	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-13-50	AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007	AOI7-BH-16-008	AOI7-BH-16-009
Sample Date				13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13	19-Mar-13	1-Jul-16	12-Jul-16	12-Jul-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16
Sample ID				AOI7-BH-13-45_1.5-2_031313	AOI7-BH-13-46_1.5-2_031313	AOI7-BH-13-47_1.5-2_031313	AOI7-BH-13-48_1.5-2_031313	AOI7-BH-13-50_0-0.5_031913	AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816	AOI7-BH-16-008-0-2-062816	AOI7-BH-16-009-062816-0-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	JB31265	JB31265	JB31794	1679350	1682473	1682473	1678008	1678008	1678008	1678008	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-3	JB31265-7	JB31265-5	JB31265-1	JB31794-2	8460987	8473663	8473664	8455730	8455727	8455729	8455728	8455725
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220[s1,A]	190[s1,B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	***498[B]*** (2.0)	237 (2.2)	***866[B]*** (2.0)	275 (2.2)	281 (2.0)	10.2 (0.550)	98.3 (0.550)	ND (13.4) (0.550)	130 (0.550)	63.6 (0.550)	241 (0.550)	85.4 (0.550)	***526[B]*** (0.550)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	7.2 (0.50)	10.4 (0.50)	6.6 (0.50)	26.6 (0.50)	12.4 (0.50)	19.0 (0.50)	15.8 (0.50)	20.6 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	78.4 ()	85.8 ()	79.4 ()	91.1 ()	80.4 ()	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-010	AOI7-BH-16-011	AOI7-BH-16-012	AOI7-BH-16-013	AOI7-BH-16-014	AOI7-BH-16-015	AOI7-BH-16-016	AOI7-BH-16-017	AOI7-BH-16-019	AOI7-BH-16-020		AOI7-BH-16-021	AOI7-BH-16-022
Sample Date				28-Jun-16	28-Jun-16	28-Jun-16	29-Jun-16	29-Jun-16	29-Jun-16	28-Jun-16	11-Jul-16	6-Jul-16	28-Jun-16	1-Jul-16	30-Jun-16	5-Jul-16
Sample ID				AOI7-BH-16-010-062816-0-2	AOI7-BH-16-011-062816-0-2	AOI7-BH-16-012-062816-0-2	AOI7-BH-16-013-0-2-062916	AOI7-BH-16-014-0-2-062916	AOI7-BH-16-015-0-2-062916	AOI7-BH-16-016-062816-0-2	AOI7-BH-16-017-0-2-071116	AOI7-BH-16-019-0-2-070616	AOI7-BH-16-020-0-2-062816	AOI7-BH-16-020-0-2-070116	AOI7-BH-16-021-0-2-063016	AOI7-BH-16-022-0-2-070516
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1678008	1678008	1678008	1678008	1678008	1678008	1678008	1682473	1680744	1678008	1679350	1679350	1680744
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	8455721	8455723	8455722	8455736	8455739	8455734	8455726	8473658	8466410	8455731	8460999	8460978	8466399
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.007) (0.0005)	ND (0.006) (0.0005)	0.079 J (0.0005)	*ND (0.660)* (0.0005)	ND (0.007) (0.0005)	ND (0.008) (0.0005)	ND (0.004) (0.0005)	-	0.0006 J (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	*ND (0.007)* (0.001)	*ND (0.006)* (0.001)	*ND (0.640)* (0.001)	*ND (0.660)* (0.001)	*ND (0.007)* (0.001)	*ND (0.008)* (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	*ND (0.009)* (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	*ND (0.640)* (0.001)	*ND (0.660)* (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.007) (0.0005)	ND (0.006) (0.0005)	ND (0.640) (0.0005)	ND (0.660) (0.0005)	ND (0.007) (0.0005)	ND (0.008) (0.0005)	ND (0.004) (0.0005)	-	ND (0.004) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.001 J (0.001)	ND (0.006) (0.001)	0.810 (0.001)	0.280 J (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.0009 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.007) (0.001)	ND (0.006) (0.001)	0.220 J (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.100 (0.003)	0.910 (0.003)	2.400 (0.003)	2.500 (0.003)	1.600 (0.003)	1.200 (0.003)	0.012 J (0.003)	-	0.180 (0.003)	0.024 (0.003)	0.300 (0.003)	0.190 (0.003)	1.300 (0.003)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	2.700 (0.003)	0.960 (0.003)	2.000 (0.003)	2.200 (0.003)	1.300 (0.003)	1.400 (0.003)	0.025 (0.003)	-	0.270 (0.003)	0.110 (0.003)	0.530 (0.003)	0.530 (0.003)	2.200 (0.003)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	2.100 (0.003)	0.810 (0.003)	1.500 (0.003)	1.300 (0.003)	1.200 (0.003)	1.300 (0.003)	0.021 (0.003)	3.200 (0.003)	0.220 (0.003)	0.085 (0.003)	0.480 (0.003)	0.480 (0.003)	2.100 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	2.700 (0.003)	1.200 (0.003)	1.800 (0.003)	1.800 (0.003)	1.900 (0.003)	1.800 (0.003)	0.035 (0.003)	-	0.260 (0.003)	0.130 (0.003)	0.630 (0.003)	0.610 (0.003)	3.100 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.400 (0.003)	0.720 (0.003)	1.100 (0.003)	0.750 (0.003)	1.200 (0.003)	1.300 (0.003)	0.023 (0.003)	-	0.290 (0.003)	0.076 (0.003)	0.590 (0.003)	0.330 (0.003)	1.600 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-010	AOI7-BH-16-011	AOI7-BH-16-012	AOI7-BH-16-013	AOI7-BH-16-014	AOI7-BH-16-015	AOI7-BH-16-016	AOI7-BH-16-017	AOI7-BH-16-019	AOI7-BH-16-020		AOI7-BH-16-021	AOI7-BH-16-022
Sample Date				28-Jun-16	28-Jun-16	28-Jun-16	29-Jun-16	29-Jun-16	29-Jun-16	28-Jun-16	11-Jul-16	6-Jul-16	28-Jun-16	1-Jul-16	30-Jun-16	5-Jul-16
Sample ID				AOI7-BH-16-010-062816-0-2	AOI7-BH-16-011-062816-0-2	AOI7-BH-16-012-062816-0-2	AOI7-BH-16-013-0-2-062916	AOI7-BH-16-014-0-2-062916	AOI7-BH-16-015-0-2-062916	AOI7-BH-16-016-062816-0-2	AOI7-BH-16-017-0-2-071116	AOI7-BH-16-019-0-2-070616	AOI7-BH-16-020-0-2-062816	AOI7-BH-16-020-0-2-070116	AOI7-BH-16-021-0-2-063016	AOI7-BH-16-022-0-2-070516
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1678008	1678008	1678008	1678008	1678008	1678008	1678008	1682473	1680744	1678008	1679350	1679350	1680744
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	8455721	8455723	8455722	8455736	8455739	8455734	8455726	8473658	8466410	8455731	8460999	8460978	8466399
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	2.900 (0.003)	1.200 (0.003)	2.400 (0.003)	2.800 (0.003)	1.700 (0.003)	1.800 (0.003)	0.032 (0.003)	-	0.570 (0.003)	0.140 (0.003)	0.600 (0.003)	0.480 (0.003)	2.300 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.540 (0.003)	0.430 (0.003)	2.000 (0.003)	2.200 (0.003)	0.880 (0.003)	0.470 (0.003)	0.006 J (0.003)	-	0.250 (0.003)	0.008 J (0.003)	0.150 (0.003)	0.074 (0.003)	0.800 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{\&2}$[A]	58$_{\&2}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	10.000 (0.003)	9.500 (0.003)	11.000 (0.003)	8.000 (0.003)	22.000 (0.003)	12.000 (0.003)	0.017 J (0.003)	-	0.680 (0.003)	0.025 (0.003)	1.000 (0.003)	0.150 (0.003)	5.500 (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	3.900 (0.003)	3.000 (0.003)	4.300 (0.003)	5.900 (0.003)	5.000 (0.003)	3.400 (0.003)	0.028 (0.003)	-	0.830 (0.003)	0.078 (0.003)	0.900 (0.003)	0.740 (0.003)	3.500 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	3.600 (0.003)	1.200 (0.003)	4.200 (0.003)	6.300 (0.003)	1.900 (0.003)	1.600 (0.003)	0.039 (0.003)	-	0.450 (0.003)	0.180 (0.003)	0.840 (0.003)	0.950 (0.003)	3.500 (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-010	AOI7-BH-16-011	AOI7-BH-16-012	AOI7-BH-16-013	AOI7-BH-16-014	AOI7-BH-16-015	AOI7-BH-16-016	AOI7-BH-16-017	AOI7-BH-16-019	AOI7-BH-16-020		AOI7-BH-16-021	AOI7-BH-16-022
Sample Date				28-Jun-16	28-Jun-16	28-Jun-16	29-Jun-16	29-Jun-16	29-Jun-16	28-Jun-16	11-Jul-16	6-Jul-16	28-Jun-16	1-Jul-16	30-Jun-16	5-Jul-16
Sample ID				AOI7-BH-16-010-062816-0-2	AOI7-BH-16-011-062816-0-2	AOI7-BH-16-012-062816-0-2	AOI7-BH-16-013-0-2-062916	AOI7-BH-16-014-0-2-062916	AOI7-BH-16-015-0-2-062916	AOI7-BH-16-016-062816-0-2	AOI7-BH-16-017-0-2-071116	AOI7-BH-16-019-0-2-070616	AOI7-BH-16-020-0-2-062816	AOI7-BH-16-020-0-2-070116	AOI7-BH-16-021-0-2-063016	AOI7-BH-16-022-0-2-070516
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1682473	1680744	1678008	1679350	1679350	1680744
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455721	8455723	8455722	8455736	8455739	8455734	8455726	8473658	8466410	8455731	8460999	8460978	8466399
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	399 (0.550)	321 (0.550)	295 (0.550)	418 (0.550)	***566***[B] (0.550)	386 (0.550)	21.4 (0.550)	-	117 (0.550)	13.9 (0.550)	351 (0.550)	77.5 (0.550)	119 (0.550)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	30.9 (0.50)	29.5 (0.50)	44.3 (0.50)	44.1 (0.50)	35.5 (0.50)	36.3 (0.50)	8.1 (0.50)	32.5 (0.50)	16.0 (0.50)	20.9 (0.50)	16.7 (0.50)	18.7 (0.50)	20.3 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025	AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039
Sample Date				1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	7-Jul-16	12-Jul-16	12-Jul-16	8-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	29-Jun-16
Sample ID				AOI7-BH-16-023-0-2-070116	AOI7-BH-16-024-0-2-070716	AOI7-BH-16-025-0-2-070116	AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816	AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1679350	1679350	1680744	1682473	1682473	1681418	1681418	1679350	1678008	1679350	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460992	8466411	8460993	8460990	8466408	8473666	8473667	8469170	8469168	8460984	8455741	8460981	8455740
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.005) (0.0005)	ND (0.004) (0.0005)	***0.820 J[B]*** (0.0005)	0.001 J (0.0005)	ND (0.004) (0.0005)	0.010 (0.0005)	ND (0.004) (0.0005)	0.390 J (0.0005)	0.002 J (0.0005)	0.089 J (0.0005)	*ND (2.300)* (0.0005)	ND (0.005) (0.0005)	0.004 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (4.100)* (0.001)	*ND (0.006)* (0.001)	ND (0.004) (0.001)	*ND (0.006)* (0.001)	ND (0.004) (0.001)	*ND (0.410)* (0.001)	ND (0.004) (0.001)	*ND (0.490)* (0.001)	*ND (2.300)* (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (4.100)* (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.410) (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	*ND (2.300)* (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	1.600 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.150 J (0.001)	ND (0.004) (0.001)	0.110 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	3.400 J (0.001)	0.004 J (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.250 J (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.005) (0.0005)	ND (0.004) (0.0005)	*ND (4.100)* (0.0005)	ND (0.006) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.004) (0.0005)	ND (0.410) (0.0005)	ND (0.004) (0.0005)	ND (0.490) (0.0005)	*ND (2.300)* (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.002 J (0.001)	ND (0.004) (0.001)	1.100 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.015 (0.001)	ND (0.004) (0.001)	0.670 (0.001)	0.002 J (0.001)	1.400 (0.001)	0.610 J (0.001)	0.001 J (0.001)	0.002 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	1.000 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	1.000 (0.001)	ND (0.004) (0.001)	0.140 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	0.001 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (4.100) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.410) (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.005) (0.001)	ND (0.004) (0.001)	2.000 J (0.001)	0.002 J (0.001)	ND (0.004) (0.001)	0.004 J (0.001)	ND (0.004) (0.001)	1.500 (0.001)	ND (0.004) (0.001)	0.260 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	0.002 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.200 J (0.003)	0.004 J (0.003)	2.000 (0.003)	0.053 J (0.003)	0.014 J (0.003)	1.000 (0.003)	0.010 J (0.003)	1.000 (0.003)	0.340 (0.003)	1.600 (0.003)	1.200 (0.003)	0.160 J (0.003)	0.009 J (0.003)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.460 (0.003)	0.009 J (0.003)	1.800 (0.003)	0.260 (0.003)	0.025 (0.003)	2.000 (0.003)	0.030 (0.003)	1.800 (0.003)	0.720 (0.003)	1.400 (0.003)	0.890 (0.003)	0.540 (0.003)	0.032 (0.003)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.380 (0.003)	0.014 J (0.003)	1.900 (0.003)	0.370 (0.003)	0.034 (0.003)	1.700 (0.003)	0.038 (0.003)	1.800 (0.003)	0.550 (0.003)	1.500 (0.003)	0.910 (0.003)	0.690 (0.003)	0.027 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.800 (0.003)	0.017 J (0.003)	2.300 (0.003)	0.570 (0.003)	0.053 (0.003)	2.200 (0.003)	0.069 (0.003)	2.500 (0.003)	0.690 (0.003)	2.300 (0.003)	1.400 (0.003)	0.800 (0.003)	0.037 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.430 (0.003)	0.016 J (0.003)	1.600 (0.003)	0.390 (0.003)	0.046 (0.003)	1.600 (0.003)	0.046 (0.003)	1.600 (0.003)	0.560 (0.003)	1.400 (0.003)	0.990 (0.003)	0.720 (0.003)	0.043 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025	AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039
Sample Date				1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	7-Jul-16	12-Jul-16	12-Jul-16	8-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	29-Jun-16
Sample ID				AOI7-BH-16-023-0-2-070116	AOI7-BH-16-024-0-2-070716	AOI7-BH-16-025-0-2-070116	AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816	AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1679350	1679350	1680744	1682473	1682473	1681418	1681418	1679350	1678008	1679350	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460992	8466411	8460993	8460990	8466408	8473666	8473667	8469170	8469168	8460984	8455741	8460981	8455740
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	0.540 (0.003)	0.012 J (0.003)	2.100 (0.003)	0.400 (0.003)	0.034 (0.003)	2.200 (0.003)	0.049 (0.003)	2.800 (0.003)	0.730 (0.003)	1.600 (0.003)	1.200 (0.003)	0.650 (0.003)	0.063 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.063 J (0.003)	ND (0.018) (0.003)	1.800 (0.003)	ND (0.190) (0.003)	0.004 J (0.003)	0.220 (0.003)	ND (0.018) (0.003)	0.830 (0.003)	0.110 (0.003)	1.100 (0.003)	0.770 (0.003)	0.059 J (0.003)	0.005 J (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	$10000_{\&2}$[A]	$58_{\&2}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	1.100 (0.003)	0.009 J (0.003)	***64.000*** [B] (0.003)	0.120 J (0.003)	0.040 (0.003)	3.300 (0.003)	0.009 J (0.003)	10.000 (0.003)	0.200 (0.003)	21.000 (0.003)	10.000 (0.003)	1.400 (0.003)	0.020 (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.720 (0.003)	0.008 J (0.003)	5.100 (0.003)	0.230 (0.003)	0.029 (0.003)	2.600 (0.003)	0.031 (0.003)	3.100 (0.003)	1.400 (0.003)	4.700 (0.003)	3.900 (0.003)	0.650 (0.003)	0.050 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	0.670 (0.003)	0.016 J (0.003)	3.400 (0.003)	0.610 (0.003)	0.035 (0.003)	2.800 (0.003)	0.062 (0.003)	2.300 (0.003)	1.300 (0.003)	2.200 (0.003)	1.500 (0.003)	0.640 (0.003)	0.040 (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025	AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039
Sample Date				1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	7-Jul-16	12-Jul-16	12-Jul-16	8-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	29-Jun-16
Sample ID				AOI7-BH-16-023-0-2-070116	AOI7-BH-16-024-0-2-070716	AOI7-BH-16-025-0-2-070116	AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816	AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1679350	1679350	1680744	1682473	1682473	1681418	1681418	1679350	1678008	1679350	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460992	8466411	8460993	8460990	8466408	8473666	8473667	8469170	8469168	8460984	8455741	8460981	8455740
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	268 (0.550)	6.35 (0.550)	***533***[B] (0.550)	50.3 (0.550)	5.12 (0.550)	***499***[B] (0.550)	8.24 (0.550)	424 (0.550)	59.9 (0.550)	368 (0.550)	313 (0.550)	40.6 (0.550)	42.3 (0.550)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	23.3 (0.50)	6.3 (0.50)	27.7 (0.50)	12.8 (0.50)	4.0 (0.50)	24.5 (0.50)	7.1 (0.50)	27.9 (0.50)	12.3 (0.50)	36.9 (0.50)	37.1 (0.50)	22.6 (0.50)	7.0 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-040	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047	AST 283-CV-1	AST 283-SB-1	AST 283-SB-2	AST 283-SB-3	AST 283-SB-4
Sample Date				29-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16	12-Jul-16	1-Jul-16	5-Jul-16	8-Jul-16	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05
Sample ID				AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616	AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816	CV-1	SB-1	SB-2	SB-3	SB-4
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1680744	1680744	1678008	1682473	1679350	1680744	1681418	950598	950598	950598	950598	950598
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455738	8466406	8466404	8455732	8473665	8460994	8466398	8469172	4559623	4559618	4559619	4559620	4559621
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	0.001 J (0.0005)	0.002 J (0.0005)	0.110 J (0.0005)	0.002 J (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	0.370 (0.0005)	0.120 J (0.0005)	ND (0.027) (0.0005)	ND (0.030) (0.0005)	ND (0.5) (0.5)	0.059 J (0.0005)	0.033 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	*ND (0.390)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (0.340)* (0.001)	*ND (0.380)* (0.001)	*ND (0.054)* (0.001)	*ND (0.059)* (0.001)	-	*ND (0.051)* (0.001)	*ND (0.059)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.340) (0.001)	ND (0.380) (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	*ND (1)* (1)	ND (0.051) (0.001)	ND (0.059) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	0.120 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.180 J (0.001)	0.100 J (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (0.8) (0.8)	ND (0.051) (0.001)	0.064 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.610 (0.001)	ND (0.380) (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (1) (1)	ND (0.051) (0.001)	ND (0.059) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.390) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.340) (0.0005)	ND (0.380) (0.0005)	ND (0.027) (0.0005)	ND (0.030) (0.0005)	ND (0.5) (0.5)	ND (0.026) (0.0005)	ND (0.029) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (1) (1)	ND (0.051) (0.001)	0.260 J (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.001 J (0.001)	ND (0.005) (0.001)	0.700 (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.500 (0.001)	0.890 (0.001)	ND (0.054) (0.001)	0.073 J (0.001)	ND (0.7) (0.7)	0.074 J (0.001)	0.200 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	0.082 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.160 J (0.001)	0.130 J (0.001)	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.340) (0.001)	ND (0.380) (0.001)	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	0.0008 J (0.001)	ND (0.005) (0.001)	0.300 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.880 (0.001)	0.210 J (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (0.8) (0.8)	ND (0.051) (0.001)	0.170 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	*ND (0.0096)* (0.010)	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.210 (0.003)	0.014 J (0.003)	2.000 (0.003)	1.400 (0.003)	0.006 J (0.003)	ND (0.019) (0.003)	3.500 (0.003)	1.900 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.00072 (0.040)	ND (0.190) (0.033)	0.460 J (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.330 (0.003)	0.032 (0.003)	2.700 (0.003)	3.400 (0.003)	0.024 (0.003)	0.016 J (0.003)	5.000 (0.003)	2.100 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0030 (0.020)	0.260 J (0.033)	0.920 J (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.250 (0.003)	0.041 (0.003)	3.300 (0.003)	2.400 (0.003)	0.022 (0.003)	0.020 (0.003)	5.100 (0.003)	2.400 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0046 (0.020)	0.260 J (0.033)	0.900 J (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.230 (0.003)	0.057 (0.003)	4.100 (0.003)	3.100 (0.003)	0.039 (0.003)	0.030 (0.003)	6.400 (0.003)	2.700 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0024 (0.040)	0.320 J (0.033)	0.850 J (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.280 (0.003)	0.035 (0.003)	2.700 (0.003)	1.700 (0.003)	0.024 (0.003)	0.024 (0.003)	3.400 (0.003)	2.100 (0.003)	0.260 J (0.033)	ND (0.960) (0.033)	0.0037 (0.10)	ND (0.190) (0.033)	0.620 J (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	0.009 J (0.003)	2.200 (0.003)	1.200 (0.003)	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-040	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047	AST 283-CV-1	AST 283-SB-1	AST 283-SB-2	AST 283-SB-3	AST 283-SB-4
Sample Date				29-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16	12-Jul-16	1-Jul-16	5-Jul-16	8-Jul-16	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05
Sample ID				AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616	AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816	CV-1	SB-1	SB-2	SB-3	SB-4
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1680744	1680744	1678008	1682473	1679350	1680744	1681418	950598	950598	950598	950598	950598
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455738	8466406	8466404	8455732	8473665	8460994	8466398	8469172	4559623	4559618	4559619	4559620	4559621
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	0.720 (0.003)	0.043 (0.003)	2.600 (0.003)	3.300 (0.003)	0.030 (0.003)	0.020 (0.003)	5.900 (0.003)	2.700 (0.003)	ND (0.190) (0.033)	1.6 J (0.033)	0.0044 (0.080)	0.220 J (0.033)	1.1 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	0.006 J (0.003)	0.970 J (0.003)	0.570 (0.003)	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.270 (0.003)	0.005 J (0.003)	1.200 (0.003)	0.480 (0.003)	ND (0.018) (0.003)	ND (0.019) (0.003)	5.400 (0.003)	1.000 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0013 (0.50)	ND (0.190) (0.033)	0.210 J (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0027 (0.080)	ND (0.190) (0.033)	0.510 J (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{3\&4}$[A]	58$_{3\&4}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	0.087 (0.003)	0.039 (0.003)	8.700 (0.003)	2.500 (0.003)	0.004 J (0.003)	0.007 J (0.003)	11.000 (0.003)	10.000 (0.003)	-	-	-	-	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	1.100 (0.003)	0.032 (0.003)	4.200 (0.003)	3.500 (0.003)	0.018 J (0.003)	0.012 J (0.003)	5.700 (0.003)	3.700 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0035 (0.080)	0.370 J (0.033)	0.790 J (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	0.780 (0.003)	0.057 (0.003)	3.600 (0.003)	4.500 (0.003)	0.038 (0.003)	0.024 (0.003)	9.000 (0.003)	3.900 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.010 (0.18)	0.480 J (0.033)	1.0 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-040	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047	AST 283-CV-1	AST 283-SB-1	AST 283-SB-2	AST 283-SB-3	AST 283-SB-4
Sample Date				29-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16	12-Jul-16	1-Jul-16	5-Jul-16	8-Jul-16	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05
Sample ID				AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616	AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816	CV-1	SB-1	SB-2	SB-3	SB-4
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1680744	1680744	1678008	1682473	1679350	1680744	1681418	950598	950598	950598	950598	950598
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455738	8466406	8466404	8455732	8473665	8460994	8466398	8469172	4559623	4559618	4559619	4559620	4559621
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	ND (1.7) (0.50)	ND (7.4) (0.50)	ND (1.9) (0.50)	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	309 (0.550)	26.1 (0.550)	256 (0.550)	432 (0.550)	ND (29.0) (0.550)	4.14 (0.550)	***509***[B] (0.550)	238 (0.550)	121 (0.780)	317 (0.780)	-	97.9 (0.780)	113 (0.780)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	ND (0.105) (0.0100)	***11.0***[B] (0.0100)	1.15 (0.0100)	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	7.4 (0.50)	7.0 (0.50)	23.3 (0.50)	15.7 (0.50)	7.6 (0.50)	10.7 (0.50)	18.5 (0.50)	20.8 (0.50)	12.1 (0.50)	13.3 (0.50)	-	12.5 (0.50)	13.7 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AST 283-SB-5	B90-1	B90-2	B90-4	B90-7	B90-8	B90-9	B90-13	B90-13DL	B90-16	B91-3	B91-7	B91-8	B91-9	B91-19	BH-10-05
Sample Date				28-Jun-05	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	24-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	26-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	9-Jun-10
Sample ID				SB-5	B090A4	B090A1	B090A6	B090B7	B090A9	B090A8	B090B2	B090B2DL	B090C1	B091A5	B091A3	B091A1	B091B2	B091B5	BH-10-05_1.5-2.0
Sample Depth				1 - 1.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN															UNKNOWN
Laboratory				LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	LL
Laboratory Work Order				950598	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	4559622	P209605	P209602	P209610	P209930	P209880	P209612	P209882	P209882DL	P209933	P210009	P209937	P209935	P210085	P210088	6007722
Volatile Organic Compounds																			
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	ND (7.4) R ()	ND (7.3) R ()	-	-	-	-	ND (0.056) ()	-	ND (0.057) ()	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	*ND (15)* ()	*ND (15)* ()	-	-	-	-	ND (0.11) ()	-	ND (0.11) ()	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	ND (15) ()	ND (15) ()	-	-	-	-	ND (0.11) ()	-	ND (0.11) ()	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.027) (0.0005)	-	-	-	*ND (0.74)* ()	*ND (0.73)* ()	-	-	-	-	0.008 ()	-	ND (0.006) ()	-	-	0.003 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	*ND (0.055)* (0.001)	-	-	-	*ND (1.5)* ()	*ND (1.5)* ()	-	-	-	-	*ND (0.011)* ()	-	*ND (0.011)* ()	-	-	ND (0.002) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.055) (0.001)	-	-	-	*ND (0.74)* ()	*ND (0.73)* ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	ND (0.002) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	ND (22) R ()	ND (22) R ()	-	-	-	-	ND (0.17) R ()	-	ND (0.17) R ()	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.055) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.055) (0.001)	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-	-	-	0.072 ()	-	ND (0.011) ()	-	-	0.004 J (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	0.005 B ()	-	ND (0.006) ()	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.027) (0.0005)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.0008) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	ND (0.055) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.055) (0.001)	-	-	-	1.1 ()	4.8 ()	-	-	-	-	0.007 ()	-	ND (0.006) ()	-	-	0.005 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.007 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006 J (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.055) (0.001)	-	-	-	30 ()	14 ()	-	-	-	-	0.11 ()	-	0.011 ()	-	-	0.017 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	ND (7.4) R ()	ND (7.3) R ()	-	-	-	-	ND (0.056) R ()	-	ND (0.057) R ()	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	ND (1.10) L ()	ND (0.94) L ()	-	-	-	-	ND (0.91) L ()	-	ND (1.10) L ()	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	ND (1.500) ()	0.500 J ()	-	-	-	-	0.036 ()	-	ND (0.011) ()	-	-	-
Volatile Organic Compounds (SW8011)																			
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																			
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.990) (0.033)	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	0.540 (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	*ND (1.9)* ()	*ND (1.8)* ()	-	-	-	-	*ND (1.8)* ()	-	*ND (1.8)* ()	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	ND (0.990) (0.033)	-	-	-	0.2 J ()	0.13 J ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	1.1 (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	ND (0.990) (0.033)	-	-	-	0.22 J ()	0.16 J ()	-	-	-	-	0.12 J ()	-	ND (0.38) ()	-	-	1.0 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	ND (0.990) (0.033)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	ND (0.990) (0.033)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.960 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AST 283-SB-5	B90-1	B90-2	B90-4	B90-7	B90-8	B90-9	B90-13	B90-13DL	B90-16	B91-3	B91-7	B91-8	B91-9	B91-19	BH-10-05
Sample Date				28-Jun-05	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	24-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	26-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	9-Jun-10
Sample ID				SB-5	B090A4	B090A1	B090A6	B090B7	B090A9	B090A8	B090B2	B090B2DL	B090C1	B091A5	B091A3	B091A1	B091B2	B091B5	BH-10-05_1.5-2.0
Sample Depth				1 - 1.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN															UNKNOWN
Laboratory				LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	LL
Laboratory Work Order		A	B	950598	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1198982
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4559622	P209605	P209602	P209610	P209930	P209880	P209612	P209882	P209882DL	P209933	P210009	P209937	P209935	P210085	P210088	6007722
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	0.3 B ()	0.34 J ()	-	-	-	-	0.82 B ()	-	0.57 B ()	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	ND (0.990) (0.033)	-	-	-	0.260 ()	0.200 J ()	-	-	-	-	0.130 J ()	-	0.290 ()	-	-	1.1 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	ND (0.350) ()	ND (0.340) ()	-	-	-	-	ND (0.340) ()	-	ND (0.340) ()	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	ND (1.900) ()	ND (1.800) ()	-	-	-	-	ND (1.800) ()	-	ND (1.800) ()	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	0.26 J ()	0.2 J ()	-	-	-	-	0.16 J ()	-	0.15 J ()	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	ND (0.990) (0.033)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.340 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	ND (0.790) ()	ND (0.760) ()	-	-	-	-	ND (0.750) ()	-	ND (0.770) ()	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	ND (0.990) (0.033)	-	-	-	0.26 J ()	0.24 J ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	0.780 J ()	1.300 ()	-	-	-	-	ND (0.750) ()	-	ND (0.770) ()	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	ND (1.2) ()	ND (1.1) ()	-	-	-	-	ND (1.1) ()	-	ND (1.1) ()	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	0.33 J ()	0.31 J ()	3.2 ()	1.4 ()	2.6 ()	0.32 J ()	13 J ()	12 ()	2.9 ()	0.2 J ()	1.4 ()	ND (0.38) ()	ND (0.36) ()	2.3 ()	1.0 (0.033)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	ND (0.990) (0.033)	-	-	-	0.2 J ()	0.14 J ()	-	-	-	-	0.17 J ()	-	ND (0.38) ()	-	-	1.2 (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	ND (0.990) (0.033)	-	-	-	0.23 J ()	0.19 J ()	-	-	-	-	0.15 J ()	-	ND (0.38) ()	-	-	1.7 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	ND (0.79) ()	ND (0.76) ()	-	-	-	-	ND (0.75) ()	-	ND (0.77) ()	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	*ND (0.79)* ()	*ND (0.76)* ()	-	-	-	-	*ND (0.75)* ()	-	*ND (0.77)* ()	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	ND (0.240) ()	ND (0.230) ()	-	-	-	-	ND (0.220) ()	-	ND (0.230) ()	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	0.42 J ()	0.26 J ()	-	-	-	-	0.23 J ()	-	0.32 J ()	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	ND (0.780) ()	ND (0.750) ()	-	-	-	-	ND (0.740) ()	-	ND (0.760) ()	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	ND (0) ()	ND (0) ()	-	-	-	-	ND (0) ()	-	ND (0) ()	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	ND (2) ()	ND (1.9) ()	-	-	-	-	ND (1.9) ()	-	ND (2) ()	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AST 283-SB-5	B90-1	B90-2	B90-4	B90-7	B90-8	B90-9	B90-13	B90-13DL	B90-16	B91-3	B91-7	B91-8	B91-9	B91-19	BH-10-05
Sample Date				28-Jun-05	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	24-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	26-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	9-Jun-10
Sample ID				SB-5	B090A4	B090A1	B090A6	B090B7	B090A9	B090A8	B090B2	B090B2DL	B090C1	B091A5	B091A3	B091A1	B091B2	B091B5	BH-10-05_1.5-2.0
Sample Depth				1 - 1.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN															UNKNOWN
Laboratory				LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	LL
Laboratory Work Order				950598	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	4559622	P209605	P209602	P209610	P209930	P209880	P209612	P209882	P209882DL	P209933	P210009	P209937	P209935	P210085	P210088	6007722
Metals																			
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	ND (1.20) L ()	ND (1.10) L ()	-	-	-	-	1.3 L ()	-	2.5 L ()	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	5.8 H ()	2.0 H ()	1.3 H ()	3.3 H ()	2.9 H ()	11.5 H ()	6.8 H ()	-	6.9 H ()	1.4 H ()	1.7 H ()	3.2 H ()	1.9 H ()	6.5 H ()	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	88.6 ()	59.5 ()	-	-	-	-	33.9 ()	-	160 ()	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	0.82 ()	ND (0.57) ()	-	-	-	-	ND (0.56) ()	-	0.69 ()	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	ND (0.59) ()	ND (0.57) ()	-	-	-	-	ND (0.56) ()	-	ND (0.57) ()	-	-	-
CHROMIUM	mg/kg	220_{s1}[A]	190_{s1}[B]	-	62.9 L ()	16.3 L ()	27.5 L ()	22.4 ()	16.3 ()	43.1 L ()	8.5 L ()	-	49.4 L ()	15.4 ()	20.7 L ()	***1730*** [AB] ()	23.6 J ()	30.6 J ()	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	11.4 ()	5.1 ()	-	-	-	-	13.3 ()	-	4.8 ()	-	-	-
LEAD	mg/kg	2240[A]	450[B]	81.1 (0.780)	93.8 H ()	16.0 L ()	78.5 H ()	148 ()	233 ()	236 H ()	80.3 H ()	-	310 H ()	19.8 ()	8.1 H ()	306 ()	117 ()	***1110*** [B] ()	411 (0.0050)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	0.22 J ()	0.62 J ()	-	-	-	-	0.13 J ()	-	0.11 J ()	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	17.3 ()	12.6 ()	-	-	-	-	15.0 ()	-	17.9 ()	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	ND (0.47) ()	ND (0.45) ()	-	-	-	-	ND (0.45) ()	-	ND (0.46) ()	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	15.2 ()	15.7 ()	-	-	-	-	15.2 ()	-	195 ()	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																			
Cation Exchange Capacity	meq/100g	n/v	n/v	-	8.3 ()	6.4 ()	7.2 ()	13.2 ()	15.9 ()	15.4 ()	14.0 ()	-	12.1 ()	9.7 ()	0.56 ()	14.1 ()	11.7 J ()	7.7 J ()	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	ND (0.08) ()	ND (0.08) ()	ND (0.08) ()	ND (0.12) ()	ND (0.11) ()	ND (0.11) ()	ND (0.11) ()	-	ND (0.09) ()	ND (0.11) ()	ND (0.08) ()	ND (0.11) ()	ND (0.11) L ()	ND (0.14) L ()	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	92.9 J ()	ND (21.50) J ()	179 J ()	664 J ()	3720 J ()	1040 J ()	1630 J ()	-	983 J ()	ND (32.10) J ()	1580 J ()	1030 J ()	ND (22.10) L ()	945 L ()	-
MOISTURE, PERCENT	%	n/v	n/v	15.6 (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.6 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	ND (0.51) ()	ND (0.54) ()	ND (0.48) ()	ND (0.48) ()	ND (0.54) ()	ND (0.62) ()	1.4 ()	-	1.0 ()	ND (0.48) ()	ND (0.51) ()	ND (0.51) ()	ND (0.55) L ()	0.95 L ()	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	ND (4.40) ()	13.2 H ()	ND (4.40) ()	23.7 J ()	ND (4.50) J ()	ND (6.10) ()	29.7 H ()	-	53.1 ()	8.9 J ()	52.9 ()	18.6 J ()	48.1 ()	ND (5.80) L ()	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	ND (0.28) ()	ND (0.28) ()	ND (0.28) ()	0.54 ()	1.6 ()	2.7 ()	0.97 ()	-	0.80 ()	ND (0.28) ()	ND (0.27) ()	0.39 ()	ND (0.27) ()	0.92 ()	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	4090 J ()	1260 J ()	3560 J ()	7570 L ()	9170 L ()	33500 J ()	24100 J ()	-	43000 J ()	3620 L ()	2440 J ()	5720 L ()	5270 ()	29500 ()	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	ND (21.40) ()	ND (20.40) ()	ND (18.20) ()	ND (20.30) ()	38.5 ()	ND (27.70) ()	ND (24.10) ()	-	ND (24.2) ()	ND (20.70) ()	ND (20.70) ()	ND (20.10) ()	ND (21.30) ()	ND (26.40) ()	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-06	BH-10-07	BH-10-08	BH-10-09		BH-10-10	BH-10-11	BH-10-12	BH-10-13	BH-10-14	BH-10-15	BH-10-16	BH-10-17
Sample Date				9-Jun-10	10-Jun-10	10-Jun-10	6-Apr-09	10-Jun-10	10-Jun-10	10-Jun-10	10-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10
Sample ID				BH-10-06_1.2-1.7	BH-10-07_1.0-1.5	BH-10-08_1.5-2.0	BH-10-09	BH-10-09_1.2-1.7	BH-10-10_1.5-2.0	BH-10-11_1.5-2.0	BH-10-12_1.5-2.0	BH-10-13_1.5-2.0	BH-10-14_1.5-2.0	BH-10-15_1.4-1.9	BH-10-16_1.5-2.0	BH-10-17_1.5-2.0
Sample Depth				1.2 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 2 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.4 - 1.9 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	UNKNOWN	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007721	6007732	6007730	5640517	6007731	6007729	6007728	6007727	6007723	6007724	6007725	6007726	6007720
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	0.0007 J (0.0005)	ND (0.005) (0.0005)	0.370 J (0.0005)	-	0.002 J (0.0005)	0.160 J (0.0005)	0.056 J (0.0005)	0.004 J (0.0005)	0.002 J (0.0005)	0.260 J (0.0005)	0.004 J (0.0005)	***0.850 J*** [B] (0.0005)	0.460 (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	*ND (0.092)* (0.001)	-	ND (0.001) (0.001)	*ND (0.093)* (0.001)	*ND (0.053)* (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	*ND (0.081)* (0.001)	ND (0.001) (0.001)	*ND (0.180)* (0.001)	*ND (0.057)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.092) (0.001)	-	ND (0.001) (0.001)	ND (0.093) (0.001)	ND (0.053) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.081) (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	ND (0.057) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	0.150 J (0.001)	-	ND (0.001) (0.001)	0.180 J (0.001)	0.090 J (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.220 J (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	0.800 (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	27 (0.001)	-	ND (0.001) (0.001)	0.180 J (0.001)	ND (0.053) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.081) (0.001)	ND (0.001) (0.001)	9.1 (0.001)	0.300 (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	ND (0.046) (0.0005)	-	ND (0.0007) (0.0005)	ND (0.047) (0.0005)	ND (0.026) (0.0005)	ND (0.0007) (0.0005)	ND (0.0006) (0.0005)	ND (0.040) (0.0005)	ND (0.0006) (0.0005)	ND (0.088) (0.0005)	ND (0.029) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.002 J (0.001)	ND (0.005) (0.001)	0.120 J (0.001)	-	0.003 J (0.001)	0.700 (0.001)	0.190 J (0.001)	0.007 J (0.001)	0.003 J (0.001)	0.950 (0.001)	0.002 J (0.001)	0.340 J (0.001)	2.3 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	0.002 J (0.001)	ND (0.005) (0.001)	0.210 J (0.001)	-	ND (0.001) (0.001)	0.890 (0.001)	0.430 (0.001)	0.006 J (0.001)	ND (0.001) (0.001)	0.290 J (0.001)	ND (0.001) (0.001)	0.240 J (0.001)	4.4 (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.092) (0.001)	-	ND (0.001) (0.001)	0.099 J (0.001)	0.085 J (0.001)	0.003 J (0.001)	ND (0.001) (0.001)	0.120 J (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	2.4 (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	0.690 (0.001)	-	0.002 J (0.001)	0.570 (0.001)	0.300 (0.001)	0.007 (0.001)	ND (0.001) (0.001)	1.1 (0.001)	ND (0.001) (0.001)	0.690 J (0.001)	7.5 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.870 (0.033)	ND (1.9) (0.033)	2.5 (0.033)	-	1.5 (0.033)	1.2 (0.033)	1.3 (0.033)	1.7 (0.033)	1.6 (0.033)	1.0 (0.033)	0.570 (0.033)	1.9 J (0.033)	0.570 (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	1.9 (0.033)	ND (1.9) (0.033)	2.6 (0.033)	-	2.6 (0.033)	1.4 (0.033)	3.3 (0.033)	2.4 (0.033)	5.0 (0.033)	1.3 (0.033)	1.7 (0.033)	3.5 (0.033)	0.580 (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	1.9 (0.033)	ND (1.9) (0.033)	2.2 J (0.033)	-	2.7 (0.033)	1.4 (0.033)	2.7 (0.033)	2.1 (0.033)	4.2 (0.033)	1.2 (0.033)	1.4 (0.033)	2.8 (0.033)	0.510 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	2.5 (0.033)	ND (1.9) (0.033)	2.1 J (0.033)	-	3.4 (0.033)	1.7 (0.033)	3.6 (0.033)	2.7 (0.033)	5.7 (0.033)	1.6 (0.033)	2.0 (0.033)	3.5 (0.033)	0.540 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.6 (0.033)	ND (1.9) (0.033)	1.6 J (0.033)	-	1.9 (0.033)	1.0 (0.033)	1.4 (0.033)	1.5 (0.033)	2.9 (0.033)	1.1 (0.033)	0.970 (0.033)	2.2 J (0.033)	0.320 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-06	BH-10-07	BH-10-08	BH-10-09		BH-10-10	BH-10-11	BH-10-12	BH-10-13	BH-10-14	BH-10-15	BH-10-16	BH-10-17
Sample Date				9-Jun-10	10-Jun-10	10-Jun-10	6-Apr-09	10-Jun-10	10-Jun-10	10-Jun-10	10-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10
Sample ID				BH-10-06_1.2-1.7	BH-10-07_1.0-1.5	BH-10-08_1.5-2.0	BH-10-09	BH-10-09_1.2-1.7	BH-10-10_1.5-2.0	BH-10-11_1.5-2.0	BH-10-12_1.5-2.0	BH-10-13_1.5-2.0	BH-10-14_1.5-2.0	BH-10-15_1.4-1.9	BH-10-16_1.5-2.0	BH-10-17_1.5-2.0
Sample Depth				1.2 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 2 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.4 - 1.9 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	UNKNOWN	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007721	6007732	6007730	5640517	6007731	6007729	6007728	6007727	6007723	6007724	6007725	6007726	6007720
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	2.0 (0.033)	ND (1.9) (0.033)	8.3 (0.033)	-	2.6 (0.033)	1.8 (0.033)	3.4 (0.033)	2.5 (0.033)	4.6 (0.033)	1.4 (0.033)	1.6 (0.033)	4.7 (0.033)	0.930 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.360 (0.033)	ND (1.9) (0.033)	35 (0.033)	-	0.570 (0.033)	0.930 (0.033)	0.640 (0.033)	1.3 (0.033)	0.530 (0.033)	0.410 (0.033)	0.230 (0.033)	ND (0.440) (0.033)	0.900 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	3.3 (0.033)	ND (1.9) (0.033)	ND (0.460) (0.033)	-	4.6 (0.033)	3.3 (0.033)	1.5 (0.033)	3.8 (0.033)	1.0 (0.033)	4.9 (0.033)	0.310 (0.033)	ND (0.440) (0.033)	1.4 (0.033)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.3 (0.033)	ND (1.9) (0.033)	20 (0.033)	-	3.4 (0.033)	2.0 (0.033)	2.9 (0.033)	3.8 (0.033)	4.5 (0.033)	2.6 (0.033)	2.4 (0.033)	11 (0.033)	2.3 (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	2.8 (0.033)	ND (1.9) (0.033)	8.9 (0.033)	-	3.2 (0.033)	3.0 (0.033)	6.6 (0.033)	4.5 (0.033)	7.3 (0.033)	1.8 (0.033)	2.7 (0.033)	8.0 (0.033)	1.4 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-06	BH-10-07	BH-10-08	BH-10-09		BH-10-10	BH-10-11	BH-10-12	BH-10-13	BH-10-14	BH-10-15	BH-10-16	BH-10-17
Sample Date				9-Jun-10	10-Jun-10	10-Jun-10	6-Apr-09	10-Jun-10	10-Jun-10	10-Jun-10	10-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10
Sample ID				BH-10-06_1.2-1.7	BH-10-07_1.0-1.5	BH-10-08_1.5-2.0	BH-10-09	BH-10-09_1.2-1.7	BH-10-10_1.5-2.0	BH-10-11_1.5-2.0	BH-10-12_1.5-2.0	BH-10-13_1.5-2.0	BH-10-14_1.5-2.0	BH-10-15_1.4-1.9	BH-10-16_1.5-2.0	BH-10-17_1.5-2.0
Sample Depth				1.2 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 2 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.4 - 1.9 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	UNKNOWN	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007721	6007732	6007730	5640517	6007731	6007729	6007728	6007727	6007723	6007724	6007725	6007726	6007720
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	266 (0.0050)	305 (0.0050)	444 (0.0050)	441 (0.015)	***1230***[B] (0.0050)	***725***[B] (0.0050)	184 (0.0050)	414 (0.0050)	320 (0.0050)	***531***[B] (0.0050)	280 (0.0050)	***616***[B] (0.0050)	47.8 (0.0050)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	20.4 (0.50)	13.0 (0.50)	27.3 (0.50)	14.7 (0.5)	20.9 (0.50)	15.7 (0.50)	12.6 (0.50)	15.9 (0.50)	11.8 (0.50)	14.3 (0.50)	11.3 (0.50)	23.9 (0.50)	8.3 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-18	BH-10-19	BH-10-20	BH-10-21	BH-10-22	BH-10-23	BH-10-24	BH-10-25	BH-10-26	BH-10-27	BH-10-28	BH-10-29
Sample Date				9-Jun-10	9-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10
Sample ID				BH-10-18_1.5-2.0	BH-10-19_0.5-1.0	BH-10-20_1.3-1.8	BH-10-21_1.0-1.5	BH-10-22_1.5-2.0	BH-10-23_1.0-1.5	BH-10-24_1.0-1.5	BH-10-25_1.2-1.7	BH-10-26_1.5-2.0	BH-10-27_1.5-2.0	BH-10-28_1.5-2.0	BH-10-29_0.7-1.2
Sample Depth				1.5 - 2 ft	0.5 - 1 ft	1.3 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0.7 - 1.2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6007719	6007718	6007717	6007716	6007715	6007703	6007702	6007704	6007705	6007709	6007708	6007706
Volatile Organic Compounds															
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	0.0008 J (0.0005)	ND (0.005) (0.0005)	0.003 J (0.0005)	ND (0.0007) (0.0005)	0.005 J (0.0005)	0.019 (0.0005)	0.094 J (0.0005)	***31*** [B] (0.0005)	0.003 J (0.0005)	ND (0.460) (0.0005)	***1.6*** [B] (0.0005)	0.010 (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	*ND (0.073)* (0.001)	*ND (0.097)* (0.001)	ND (0.001) (0.001)	*ND (0.920)* (0.001)	*ND (0.075)* (0.001)	ND (0.005) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.073) (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	*ND (0.920)* (0.001)	ND (0.075) (0.001)	ND (0.005) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.780 (0.001)	0.510 (0.001)	ND (0.001) (0.001)	2.4 J (0.001)	27 (0.001)	ND (0.005) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.280 J (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	6.5 (0.001)	2.1 (0.001)	ND (0.005) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.0007) (0.0005)	ND (0.005) (0.0005)	ND (0.0006) (0.0005)	ND (0.0007) (0.0005)	ND (0.0007) (0.0005)	ND (0.0008) (0.0005)	ND (0.036) (0.0005)	ND (0.049) (0.0005)	ND (0.0006) (0.0005)	ND (0.460) (0.0005)	ND (0.037) (0.0005)	ND (0.005) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.002 J (0.001)	ND (0.005) (0.001)	0.001 J (0.001)	ND (0.001) (0.001)	0.014 (0.001)	0.010 (0.001)	0.180 J (0.001)	2.8 (0.001)	0.002 J (0.001)	1.7 J (0.001)	6.5 (0.001)	0.028 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.830 (0.001)	0.200 J (0.001)	ND (0.001) (0.001)	16 (0.001)	***280*** [B] (0.001)	ND (0.005) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.340 J (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	8.0 (0.001)	130 (0.001)	ND (0.005) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	0.001 J (0.001)	0.002 J (0.001)	0.003 J (0.001)	0.890 (0.001)	1.3 (0.001)	ND (0.001) (0.001)	9.0 (0.001)	250 (0.001)	0.006 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)															
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds															
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.0 (0.033)	0.670 (0.033)	0.880 (0.033)	2.9 (0.033)	0.790 (0.033)	0.052 J (0.033)	0.083 J (0.033)	0.450 (0.033)	3.6 (0.033)	2.6 (0.033)	ND (0.410) (0.033)	ND (0.180) (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	1.4 (0.033)	2.1 (0.033)	1.8 (0.033)	4.4 (0.033)	1.1 (0.033)	0.200 (0.033)	0.270 (0.033)	0.360 (0.033)	5.8 (0.033)	3.4 (0.033)	0.610 J (0.033)	0.210 (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	1.5 (0.033)	2.3 (0.033)	1.7 (0.033)	3.8 (0.033)	1.1 (0.033)	0.240 (0.033)	0.310 (0.033)	0.380 (0.033)	4.3 (0.033)	3.8 (0.033)	0.600 J (0.033)	0.230 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	1.7 (0.033)	3.1 (0.033)	2.3 (0.033)	4.5 (0.033)	1.6 (0.033)	0.320 (0.033)	0.430 (0.033)	0.770 (0.033)	6.1 (0.033)	5.5 (0.033)	1.3 J (0.033)	0.360 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.2 (0.033)	2.5 (0.033)	1.4 (0.033)	2.9 (0.033)	1.2 (0.033)	0.140 J (0.033)	0.180 (0.033)	0.270 (0.033)	1.2 (0.033)	3.4 (0.033)	0.640 J (0.033)	ND (0.180) (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-18	BH-10-19	BH-10-20	BH-10-21	BH-10-22	BH-10-23	BH-10-24	BH-10-25	BH-10-26	BH-10-27	BH-10-28	BH-10-29
Sample Date				9-Jun-10	9-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10
Sample ID				BH-10-18_1.5-2.0	BH-10-19_0.5-1.0	BH-10-20_1.3-1.8	BH-10-21_1.0-1.5	BH-10-22_1.5-2.0	BH-10-23_1.0-1.5	BH-10-24_1.0-1.5	BH-10-25_1.2-1.7	BH-10-26_1.5-2.0	BH-10-27_1.5-2.0	BH-10-28_1.5-2.0	BH-10-29_0.7-1.2
Sample Depth				1.5 - 2 ft	0.5 - 1 ft	1.3 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0.7 - 1.2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007719	6007718	6007717	6007716	6007715	6007703	6007702	6007704	6007705	6007709	6007708	6007706
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	1.6 (0.033)	2.2 (0.033)	1.7 (0.033)	4.7 (0.033)	1.3 (0.033)	0.210 (0.033)	0.280 (0.033)	0.440 (0.033)	5.4 (0.033)	4.4 (0.033)	0.680 J (0.033)	0.240 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.530 (0.033)	0.190 (0.033)	0.320 (0.033)	0.970 (0.033)	0.250 (0.033)	ND (0.037) (0.033)	0.080 J (0.033)	0.170 J (0.033)	1.1 (0.033)	1.7 J (0.033)	0.590 J (0.033)	ND (0.180) (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{52}[A]	58_{52}[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	3.1 (0.033)	ND (0.180) (0.033)	1.2 (0.033)	9.2 (0.033)	3.7 (0.033)	0.110 J (0.033)	1.4 (0.033)	5.5 (0.033)	3.3 (0.033)	21 (0.033)	***30*** [B] (0.033)	0.200 (0.033)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.4 (0.033)	2.5 (0.033)	2.6 (0.033)	4.2 (0.033)	2.0 (0.033)	0.170 J (0.033)	0.480 (0.033)	1.6 (0.033)	2.8 (0.033)	8.9 (0.033)	1.8 J (0.033)	0.210 (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	2.4 (0.033)	3.5 (0.033)	2.8 (0.033)	7.7 (0.033)	1.5 (0.033)	0.310 (0.033)	0.440 (0.033)	0.540 (0.033)	8.2 (0.033)	6.5 (0.033)	1.3 J (0.033)	0.290 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-18	BH-10-19	BH-10-20	BH-10-21	BH-10-22	BH-10-23	BH-10-24	BH-10-25	BH-10-26	BH-10-27	BH-10-28	BH-10-29
Sample Date				9-Jun-10	9-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10
Sample ID				BH-10-18_1.5-2.0	BH-10-19_0.5-1.0	BH-10-20_1.3-1.8	BH-10-21_1.0-1.5	BH-10-22_1.5-2.0	BH-10-23_1.0-1.5	BH-10-24_1.0-1.5	BH-10-25_1.2-1.7	BH-10-26_1.5-2.0	BH-10-27_1.5-2.0	BH-10-28_1.5-2.0	BH-10-29_0.7-1.2
Sample Depth				1.5 - 2 ft	0.5 - 1 ft	1.3 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0.7 - 1.2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6007719	6007718	6007717	6007716	6007715	6007703	6007702	6007704	6007705	6007709	6007708	6007706
Metals															
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	***478***[B] (0.0050)	365 (0.0050)	179 (0.0050)	***869***[B] (0.0050)	304 (0.0050)	***623***[B] (0.0050)	411 (0.0050)	79.4 (0.0050)	***2040***[B] (0.0050)	393 (0.0050)	155 (0.0050)	395 (0.0050)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	23.4 (0.50)	9.3 (0.50)	10.7 (0.50)	24.7 (0.50)	12.2 (0.50)	8.8 (0.50)	8.0 (0.50)	32.1 (0.50)	19.3 (0.50)	21.6 (0.50)	19.4 (0.50)	9.2 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-30	BH-10-31	BH-10-32	BH-10-33	BH-10-34	BH-10-35	BNA-3	BNA-11	BNA-12	BNA-14	C-129	C-130	C-131	C-136
Sample Date				7-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	21-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	2-Jun-10	2-Jun-10	3-Jun-10	28-May-10
Sample ID				BH-10-30_1.5-2.0	BH-10-31_1.5-2.0	BH-10-32_0.5-1.0	BH-10-33_1.5-2.0	BH-10-34_1.0-1.5	BH-10-35_1.3-1.7	B087A9	B088A5	B089A2	B089A1	C-129_1-2	C-130_1-2	C-131_1-2	C-136_1-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	1.5 - 2 ft	1 - 1.5 ft	1.3 - 1.7 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical	CCR Historical	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	1198982	1198982	1198982	P209531	P208791	P208744	P208743	1197775	1197775	1197775	1196722
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007707	6007714	6007713	6007710	6007712	6007711					6000420	6000419	6000424	5994015
Volatile Organic Compounds																	
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	0.380 J (0.0005)	0.470 J (0.0005)	0.004 J (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-	-	0.003 J (0.0005)	ND (0.005) (0.0005)	ND (0.0006) (0.0005)	0.007 (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	*ND (0.088)* (0.001)	*ND (0.098)* (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.088) (0.001)	ND (0.098) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	0.290 J (0.001)	0.630 (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.088) (0.001)	0.170 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.044) (0.0005)	ND (0.049) (0.0005)	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-	-	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	0.017 (0.0005)	ND (0.005) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	1.7 (0.001)	1.7 (0.001)	0.007 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	0.012 (0.001)	ND (0.005) (0.001)	0.003 J (0.001)	0.008 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	0.240 J (0.001)	1.1 (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.088) (0.001)	0.450 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	0.810 (0.001)	3.8 (0.001)	0.009 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																	
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																	
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.0 (0.033)	0.820 (0.033)	0.130 J (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.290 (0.033)	-	-	-	-	0.830 (0.033)	2.7 (0.033)	0.940 J (0.033)	ND (0.180) (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	1.3 (0.033)	0.610 (0.033)	0.180 J (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.790 (0.033)	-	-	-	-	1.9 (0.033)	9.6 (0.033)	1.3 (0.033)	0.370 (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	1.5 (0.033)	0.610 (0.033)	0.210 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.820 (0.033)	-	-	-	-	2.3 (0.033)	8.4 (0.033)	1.5 (0.033)	0.380 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	2.3 (0.033)	0.910 (0.033)	0.270 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.840 (0.033)	-	-	-	-	3.1 (0.033)	11 (0.033)	2.2 (0.033)	0.550 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.740 (0.033)	0.660 (0.033)	0.250 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.610 (0.033)	-	-	-	-	0.870 (0.033)	4.9 (0.033)	0.640 J (0.033)	0.390 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-30	BH-10-31	BH-10-32	BH-10-33	BH-10-34	BH-10-35	BNA-3	BNA-11	BNA-12	BNA-14	C-129	C-130	C-131	C-136
Sample Date				7-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	21-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	2-Jun-10	2-Jun-10	3-Jun-10	28-May-10
Sample ID				BH-10-30_1.5-2.0	BH-10-31_1.5-2.0	BH-10-32_0.5-1.0	BH-10-33_1.5-2.0	BH-10-34_1.0-1.5	BH-10-35_1.3-1.7	B087A9	B088A5	B089A2	B089A1	C-129_1-2	C-130_1-2	C-131_1-2	C-136_1-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	1.5 - 2 ft	1 - 1.5 ft	1.3 - 1.7 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical	CCR Historical	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	1198982	1198982	1198982	P209531	P208791	P208744	P208743	1197775	1197775	1197775	1196722
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007707	6007714	6007713	6007710	6007712	6007711					6000420	6000419	6000424	5994015
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	1.6 (0.033)	0.800 (0.033)	0.270 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.850 (0.033)	-	-	-	-	1.8 (0.033)	8.7 (0.033)	1.6 (0.033)	0.410 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.500 (0.033)	0.320 (0.033)	ND (0.040) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	-	-	-	-	0.280 (0.033)	ND (1.9) (0.033)	0.350 J (0.033)	ND (0.180) (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	11 (0.033)	7.3 (0.033)	0.640 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.17 J ()	ND (0.35) ()	ND (0.37) ()	0.31 J ()	4.2 (0.033)	ND (1.9) (0.033)	6.5 (0.033)	0.550 (0.033)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.9 (0.033)	2.5 (0.033)	0.300 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.840 (0.033)	-	-	-	-	2.6 (0.033)	7.3 (0.033)	2.9 (0.033)	0.360 (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	1.7 (0.033)	0.770 (0.033)	0.290 (0.033)	ND (0.180) (0.033)	0.190 (0.033)	1.7 (0.033)	-	-	-	-	3.6 (0.033)	13 (0.033)	1.9 (0.033)	0.440 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-30	BH-10-31	BH-10-32	BH-10-33	BH-10-34	BH-10-35	BNA-3	BNA-11	BNA-12	BNA-14	C-129	C-130	C-131	C-136
Sample Date				7-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	21-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	2-Jun-10	2-Jun-10	3-Jun-10	28-May-10
Sample ID				BH-10-30_1.5-2.0	BH-10-31_1.5-2.0	BH-10-32_0.5-1.0	BH-10-33_1.5-2.0	BH-10-34_1.0-1.5	BH-10-35_1.3-1.7	B087A9	B088A5	B089A2	B089A1	C-129_1-2	C-130_1-2	C-131_1-2	C-136_1-2
Sample Depth				1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	1.5 - 2 ft	1 - 1.5 ft	1.3 - 1.7 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical	CCR Historical	LL	LL	LL	LL
Laboratory Work Order				1198982	1198982	1198982	1198982	1198982	1198982	P209531	P208791	P208744	P208743	1197775	1197775	1197775	1196722
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	6007707	6007714	6007713	6007710	6007712	6007711					6000420	6000419	6000424	5994015
Metals																	
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	13.4 ()	4.9 ()	5.5 ()	10.6 ()	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	150 H ()	30.2 H ()	***264 H***[AB] ()	***972 H***[AB] ()	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	250 (0.0050)	***610***[B] (0.0050)	298 (0.0050)	43.1 (0.0050)	84.2 (0.0050)	92.5 (0.0050)	***650***[B] ()	32.3 ()	88.7 ()	228 ()	252 (0.005)	***814***[B] (0.005)	396 (0.005)	218 (0.02)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																	
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	14.2 J ()	4.9 J ()	10.6 J ()	7.9 J ()	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	ND (0.11) L ()	0.21 L ()	ND (0.08) L ()	ND (0.09) L ()	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	651 ()	ND (10.60) ()	ND (11.00) ()	305 ()	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	21.2 (0.50)	30.6 (0.50)	17.6 (0.50)	9.1 (0.50)	9.4 (0.50)	9.7 (0.50)	-	-	-	-	21.4 (0.5)	14.3 (0.5)	24.2 (0.5)	9.7 (0.5)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	6.2 ()	ND (0.52) ()	ND (0.52) ()	ND (0.53) ()	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (5.80) ()	17.6 ()	27.9 ()	24.6 ()	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	0.44 ()	ND (0.27) ()	0.35 ()	2.2 ()	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	17700 J ()	2440 J ()	2720 J ()	9220 J ()	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (28.60) ()	ND (16.80) ()	ND (23.40) ()	94.6 ()	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-137	C-138	C-139	C-140	C-142	C-143	C-165	C-168	C-169	C-170	C-171	C-172	GP-270-S-6
Sample Date				27-May-10	27-May-10	2-Jun-10	26-May-10	3-Jun-10	3-Jun-10	5-Dec-12	5-Dec-12	5-Dec-12	7-Jul-16	5-Jul-16	6-Jul-16	29-Sep-09
Sample ID				C-137_1-2	C-138_1-2	C-139_1-2	C-140_1-2	C-142_1-2	C-143_1-2	C-165_1.5-2'	C-168_1.5-2'	C-169_1.5-2'	AOI7-C-170-0-2-070716	AOI7-C-171-0-2-070516	AOI7-C-172-0-2-070616	S-6 (1.5-2.0)
Sample Depth				1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL
Laboratory Work Order		A	B	1196722	1196722	1197775	1196722	1197775	1197775	JB23100	JB23100	JB23100	1680744	1680744	1680744	1163948
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5994014	5994013	6000421	5994012	6000423	6000422	JB23100-13	JB23100-14	JB23100-15	8466413	8466396	8466402	5790786
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	ND (0.005) (0.0005)	0.012 J (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	0.100 J (0.0005)	*2.0*[B] (0.0005)	ND (0.25) (0.030)	ND (0.0013) (0.00015)	ND (0.0016) (0.00019)	0.090 J (0.0005)	0.150 J (0.0005)	ND (0.006) (0.0005)	ND (0.053) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	ND (0.005) (0.001)	ND (0.002) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	*ND (0.061)* (0.001)	*ND (0.067)* (0.001)	*ND (0.25)* (0.032)	ND (0.0013) (0.00016)	ND (0.0016) (0.00020)	*ND (0.380)* (0.001)	*ND (0.330)* (0.001)	*ND (0.006)* (0.001)	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	ND (0.005) (0.001)	ND (0.002) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.061) (0.001)	ND (0.067) (0.001)	ND (0.25) (0.034)	ND (0.0013) (0.00017)	ND (0.0016) (0.00022)	ND (0.380) (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.005) (0.001)	0.014 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.072 J (0.001)	0.150 J (0.001)	ND (0.25) (0.066)	ND (0.0013) (0.00034)	ND (0.0016) (0.00042)	0.160 J (0.001)	0.090 J (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.009 (0.001)	0.003 J (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.078 J (0.001)	5.6 (0.001)	0.918 J (0.019)	ND (0.0064) (0.000095)	ND (0.0080) (0.00012)	0.910 (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	ND (0.005) (0.0005)	ND (0.001) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.031) (0.0005)	ND (0.033) (0.0005)	ND (0.25) (0.059)	ND (0.0013) (0.00030)	ND (0.0016) (0.00038)	ND (0.380) (0.0005)	ND (0.330) (0.0005)	ND (0.006) (0.0005)	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	0.410 J (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.005) (0.001)	0.054 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.630 (0.001)	0.220 J (0.001)	0.347 (0.026)	ND (0.0013) (0.00013)	0.00052 J (0.00017)	0.410 (0.001)	0.390 (0.001)	ND (0.006) (0.001)	0.360 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.005) (0.001)	0.014 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.180 J (0.001)	0.250 J (0.001)	0.147 J (0.052)	ND (0.0064) (0.00027)	ND (0.0080) (0.00033)	1.500 (0.001)	0.110 J (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.005) (0.001)	0.007 J (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.090 J (0.001)	0.240 J (0.001)	ND (1.2) (0.040)	ND (0.0064) (0.00020)	ND (0.0080) (0.00026)	0.270 J (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	ND (0.005) (0.001)	0.072 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.220 J (0.001)	0.570 (0.001)	0.445 (0.035)	ND (0.0013) (0.00018)	ND (0.0016) (0.00022)	0.830 (0.001)	0.490 (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.9 (0.033)	0.094 J (0.033)	ND (0.180) (0.033)	0.380 (0.033)	2.0 (0.033)	0.170 J (0.033)	2.64 (0.090)	0.206 (0.013)	0.0691 (0.016)	2.200 (0.003)	2.900 (0.003)	0.910 (0.003)	7.5 (0.033)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	2.3 (0.033)	0.240 J (0.033)	ND (0.180) (0.033)	1.2 (0.033)	3.1 (0.033)	0.420 (0.033)	0.790 (0.084)	0.240 (0.013)	0.0673 (0.015)	2.100 J (0.003)	4.800 (0.003)	2.000 (0.003)	8.8 (0.033)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	1.9 (0.033)	0.200 J (0.033)	ND (0.180) (0.033)	1.2 (0.033)	3.4 (0.033)	0.520 (0.033)	0.576 (0.078)	0.223 (0.012)	0.0624 (0.014)	2.100 J (0.003)	3.900 (0.003)	2.000 (0.003)	7.1 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	2.2 (0.033)	0.320 (0.033)	ND (0.180) (0.033)	1.4 (0.033)	4.8 (0.033)	0.620 (0.033)	0.445 (0.086)	0.206 (0.013)	0.0670 (0.015)	2.700 (0.003)	7.000 (0.003)	2.600 (0.003)	8.6 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.3 (0.033)	0.150 J (0.033)	ND (0.180) (0.033)	1.0 (0.033)	1.3 (0.033)	0.430 (0.033)	0.912 (0.096)	0.612 (0.014)	0.0751 (0.017)	2.400 (0.003)	2.700 (0.003)	1.500 (0.003)	3.7 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-137	C-138	C-139	C-140	C-142	C-143	C-165	C-168	C-169	C-170	C-171	C-172	GP-270-S-6
Sample Date				27-May-10	27-May-10	2-Jun-10	26-May-10	3-Jun-10	3-Jun-10	5-Dec-12	5-Dec-12	5-Dec-12	7-Jul-16	5-Jul-16	6-Jul-16	29-Sep-09
Sample ID				C-137_1-2	C-138_1-2	C-139_1-2	C-140_1-2	C-142_1-2	C-143_1-2	C-165_1.5-2'	C-168_1.5-2'	C-169_1.5-2'	AOI7-C-170-0-2-070716	AOI7-C-171-0-2-070516	AOI7-C-172-0-2-070616	S-6 (1.5-2.0)
Sample Depth				1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL
Laboratory Work Order				1196722	1196722	1197775	1196722	1197775	1197775	JB23100	JB23100	JB23100	1680744	1680744	1680744	1163948
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	5994014	5994013	6000421	5994012	6000423	6000422	JB23100-13	JB23100-14	JB23100-15	8466413	8466396	8466402	5790786
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	2.3 (0.033)	0.300 (0.033)	ND (0.180) (0.033)	1.3 (0.033)	2.9 (0.033)	0.600 (0.033)	1.05 (0.087)	0.276 (0.013)	0.0565 (0.015)	3.600 (0.003)	5.100 (0.003)	1.900 (0.003)	11 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	1.8 (0.033)	ND (0.051) (0.033)	ND (0.180) (0.033)	ND (0.190) (0.033)	1.6 (0.033)	0.062 J (0.033)	7.93 (0.084)	ND (0.038) (0.013)	ND (0.045) (0.015)	ND (2.100) (0.003)	1.800 (0.003)	0.470 (0.003)	7.3 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	3.1 (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{52}[A]	58_{52}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	5.4 (0.033)	0.110 J (0.033)	ND (0.180) (0.033)	0.470 (0.033)	2.0 (0.033)	0.270 (0.033)	ND (0.26) (0.070)	0.0225 J (0.010)	ND (0.045) (0.012)	6.200 (0.003)	5.000 (0.003)	3.100 (0.003)	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	4.4 (0.033)	0.240 J (0.033)	ND (0.180) (0.033)	0.990 (0.033)	7.1 (0.033)	0.490 (0.033)	10.6 (0.12)	0.165 (0.017)	0.0423 J (0.021)	6.300 (0.003)	6.600 (0.003)	2.700 (0.003)	17 (0.033)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	ND (0.210) (0.033)	0.360 (0.033)	0.250 (0.033)	1.9 (0.033)	5.9 (0.033)	0.930 (0.033)	2.05 (0.099)	0.284 (0.015)	0.0751 (0.017)	5.400 (0.003)	8.500 (0.003)	2.800 (0.003)	23 (0.033)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-137	C-138	C-139	C-140	C-142	C-143	C-165	C-168	C-169	C-170	C-171	C-172	GP-270-S-6
Sample Date				27-May-10	27-May-10	2-Jun-10	26-May-10	3-Jun-10	3-Jun-10	5-Dec-12	5-Dec-12	5-Dec-12	7-Jul-16	5-Jul-16	6-Jul-16	29-Sep-09
Sample ID				C-137_1-2	C-138_1-2	C-139_1-2	C-140_1-2	C-142_1-2	C-143_1-2	C-165_1.5-2'	C-168_1.5-2'	C-169_1.5-2'	AOI7-C-170-0-2-070716	AOI7-C-171-0-2-070516	AOI7-C-172-0-2-070616	S-6 (1.5-2.0)
Sample Depth				1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL
Laboratory Work Order				1196722	1196722	1197775	1196722	1197775	1197775	JB23100	JB23100	JB23100	1680744	1680744	1680744	1163948
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	5994014	5994013	6000421	5994012	6000423	6000422	JB23100-13	JB23100-14	JB23100-15	8466413	8466396	8466402	5790786
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	251 (0.02)	103 (0.02)	98.7 (0.02)	98.6 (0.02)	***1370***[B] (0.005)	164 (0.005)	286 (0.17)	273 (0.14)	127 (0.17)	***793***[B] (0.550)	324 (0.550)	198 (0.550)	450 (0.591)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	20.5 (0.5)	35.1 (0.5)	9.5 (0.5)	12.9 (0.5)	10.9 (0.5)	6.2 (0.5)	-	-	-	18.7 (0.50)	21.2 (0.50)	18.8 (0.50)	44.9 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	64.4 ()	81.5 ()	69.4 ()	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-11	GP-270-S-13	GP-270-S-14	GP-270-S-15	GP-271-GP-1	GP-271-GP-2	GP-271-GP-3	GP-271-GP-4		GP-271-GP-5		GP-271-GP-6	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Date				6-Oct-09	6-Oct-09	6-Oct-09	6-Oct-09	4-Jun-02	4-Jun-02	4-Jun-02	4-Jun-02	17-Sep-02	4-Jun-02	17-Sep-02	4-Jun-02	25-May-07	25-May-07	25-May-07	25-May-07
Sample ID				S-11 (1.5-2.0)	S-13 (1.0-1.5)	S-14 (1.0-1.5)	S-15 (1.5-2.0)	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Depth				1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	WGI	WGI	WGI	WGI	WGI	WGI	WGI	WGI	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	1165331	1165331	1165331	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	074100	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799593	5799595	5799596	5799597	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	0705-4569	0705-4570	0705-4571	0705-4572
Volatile Organic Compounds																			
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	38 ()	-	ND (5) ()	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	0.120 J (0.0005)	ND (0.058) (0.0005)	ND (0.057) (0.0005)	0.110 J (0.0005)	ND (0.27) ()	ND (0.22) ()	0.15 J ()	***2.2***[B] ()	-	***1.2***[B] ()	-	0.076 J ()	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)	0.190 J (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)	ND (0.110) (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	0.290 J (0.001)	0.670 (0.001)	0.800 (0.001)	0.430 J (0.001)	-	-	-	-	-	-	-	-	0.230 J D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.400 (0.001)	0.400 J (0.001)	0.280 J (0.001)	0.630 (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	ND (0.064) (0.001)	ND (0.120) (0.001)	0.130 J (0.001)	0.160 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)	ND (0.110) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	0.083 J (0.001)	0.140 J (0.001)	0.190 J (0.001)	0.640 (0.001)	-	-	-	-	-	-	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																			
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																			
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.890 J (0.033)	1.1 J (0.033)	1.1 J (0.033)	4.4 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	1.6 J (0.033)	1.8 J (0.033)	1.9 J (0.033)	5.8 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.25 J ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	1.6 J (0.033)	2.4 J (0.033)	2.5 J (0.033)	6.5 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	*ND (16)* ()	-	0.33 J ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	2.0 (0.033)	2.8 (0.033)	3.0 (0.033)	7.5 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.44 ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.1 J (0.033)	1.9 J (0.033)	2.3 J (0.033)	4.6 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-11	GP-270-S-13	GP-270-S-14	GP-270-S-15	GP-271-GP-1	GP-271-GP-2	GP-271-GP-3	GP-271-GP-4		GP-271-GP-5		GP-271-GP-6	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Date				6-Oct-09	6-Oct-09	6-Oct-09	6-Oct-09	4-Jun-02	4-Jun-02	4-Jun-02	4-Jun-02	17-Sep-02	4-Jun-02	17-Sep-02	4-Jun-02	25-May-07	25-May-07	25-May-07	25-May-07
Sample ID				S-11 (1.5-2.0)	S-13 (1.0-1.5)	S-14 (1.0-1.5)	S-15 (1.5-2.0)	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Depth				1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	WGI	WGI	WGI	WGI	WGI	WGI	WGI	WGI	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	1165331	1165331	1165331	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	074100	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799593	5799595	5799596	5799597	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	0705-4569	0705-4570	0705-4571	0705-4572
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	1.9 J (0.033)	1.9 J (0.033)	1.9 J (0.033)	7.3 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.41 J ()	0.230 J ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.650 J (0.033)	ND (0.520) (0.033)	ND (0.500) (0.033)	3.2 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	0.75 ()	-	120 ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	0.960 J (0.033)	1.6 J (0.033)	1.9 J (0.033)	3.6 (0.033)	-	-	-	-	-	-	-	-	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{52}[A]	58_{52}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	ND (0.27) ()	ND (0.22) ()	1.2 ()	1.5 ()	-	ND (0.54) ()	-	0.19 J ()	-	-	-	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	1.7 J (0.033)	3.0 (0.033)	2.5 J (0.033)	4.9 (0.033)	ND (0.37) ()	ND (0.37) ()	0.29 J ()	0.84 ()	-	110 ()	-	0.39 J ()	0.560 ()	0.210 J ()	ND (0.370) ()	ND (0.350) ()
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	3.5 (0.033)	2.0 J (0.033)	2.3 J (0.033)	15 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	11 J ()	-	0.44 ()	0.330 J ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-11	GP-270-S-13	GP-270-S-14	GP-270-S-15	GP-271-GP-1	GP-271-GP-2	GP-271-GP-3	GP-271-GP-4		GP-271-GP-5		GP-271-GP-6	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Date				6-Oct-09	6-Oct-09	6-Oct-09	6-Oct-09	4-Jun-02	4-Jun-02	4-Jun-02	4-Jun-02	17-Sep-02	4-Jun-02	17-Sep-02	4-Jun-02	25-May-07	25-May-07	25-May-07	25-May-07
Sample ID				S-11 (1.5-2.0)	S-13 (1.0-1.5)	S-14 (1.0-1.5)	S-15 (1.5-2.0)	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4
Sample Depth				1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	WGI	WGI	WGI	WGI	WGI	WGI	WGI	WGI	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	1165331	1165331	1165331	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	074100	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799593	5799595	5799596	5799597	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	0705-4569	0705-4570	0705-4571	0705-4572
Metals																			
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	99.9 (0.591)	330 (0.591)	366 (0.591)	386 (0.591)	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																			
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	15.0 (0.50)	35.9 (0.50)	33.8 (0.50)	35.5 (0.50)	-	-	-	-	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	GP-1002-1002	GP 1002-1002 PIPE-1	GP 1002-1002 PIPE-2	GP 1002-1002-1	GP 1002-1002-2	GP 1002-1002-3	GP 1100-1100-1	GP 1100-1100-2	GP 1100-1100-3	GP 1100-1100-CV-1	
Sample Date				25-May-07	25-May-07	25-May-07	11-May-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	11-May-06	11-May-06	11-May-06	11-May-06	19-Jun-06
Sample ID				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	1002	1002 PIPE-1	1002 PIPE-2	1002-1	1002-2	1002-3	1100-1	1100-2	1100-3	1100-CV-1	1100CV-1
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft											
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				074097	074097	074097	989527	985190	985190	985190	985190	985190	989526	989526	989526	989526	994824
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	0705-4554	0705-4555	0705-4556	4771679	4748119	4748120	4748121	4748122	4748123	4771671	4771672	4771673	4771674	4800867
Volatile Organic Compounds																	
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	2.3 D[B] ()	ND (0.140) D ()	ND (0.160) D ()	U	U	0.16 (0.025)	U	1.4[B] (0.12)	U	1[B] (0.017)	0.097 J (0.017)	0.25 (0.021)	0.017 J (0.015)	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	0.680 D ()	ND (0.140) D ()	ND (0.160) D ()	U	U	0.047 J (0.025)	0.63 (0.12)	1.9 (0.12)	0.56 (0.052)	0.59 (0.035)	0.28 (0.034)	0.33 (0.042)	U	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.120 J D ()	ND (0.140) D ()	ND (0.160) D ()	0.52 (0.034)	U	0.064 J (0.063)	5.8 (0.3)	12 (0.31)	6.2 (0.13)	0.18 (0.035)	0.09 J (0.034)	0.076 J (0.042)	U	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	0.580 D ()	0.130 J D ()	0.130 J D ()	0.043 J (0.034)	4 J (2.6)	2.5 (0.13)	14 (0.59)	30[B] (0.62)	4.5 (0.26)	0.099 J (0.035)	0.35 (0.034)	1.2 (0.042)	0.18 (0.03)	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	1.7 D ()	0.098 J D ()	ND (0.160) D ()	U	U	0.12 (0.025)	0.6 (0.12)	1.2 (0.12)	0.23 (0.052)	U	U	U	U	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	-	-	-	U	U	0.27 (0.063)	2.2 (0.3)	6.8 (0.31)	1.9 (0.13)	0.042 J (0.035)	0.13 J (0.034)	0.11 J (0.042)	U	-
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																	
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																	
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.360) ()	ND (0.360) ()	ND (0.380) ()	4.8 (0.21)	U	0.076 J (0.015)	9.1 (0.17)	5.5 (0.18)	8.9 (0.16)	82 (5.3)	21 (0.26)	32 (0.55)	-	5.6 (0.2)
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	0.730 D ()	ND (0.360) ()	ND (0.380) ()	2.9 (0.21)	0.17 (0.032)	0.31 (0.033)	6.1 (0.39)	3 (0.39)	5.4 (0.36)	16 (0.53)	3.8 (0.26)	8.2 (0.55)	-	10 (0.2)
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	0.760 D ()	ND (0.360) ()	ND (0.380) ()	2.3 (0.21)	1.2 (0.048)	1.2 (0.05)	5.8 (0.58)	2.8 J (0.59)	4.9 (0.54)	9.7 (0.53)	2.6 (0.26)	3.8 (0.55)	-	6.8 (0.2)
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	0.830 D ()	ND (0.360) ()	0.260 J ()	2.6 (0.21)	0.83 (0.064)	1 (0.067)	4.8 (0.77)	2.5 J (0.79)	5.5 (0.72)	9.3 (0.53)	2.6 (0.26)	4 (0.55)	-	7.9 (0.2)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.630 J D ()	ND (0.360) ()	ND (0.380) ()	1.6 (0.21)	13 (0.064)	5.7 (0.067)	6 (0.77)	-	5.5 (0.72)	4.2 (0.53)	1.9 (0.26)	2.4 J (0.55)	-	3.8 (0.2)
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	GP-1002-1002	GP 1002-1002 PIPE-1	GP 1002-1002 PIPE-2	GP 1002-1002-1	GP 1002-1002-2	GP 1002-1002-3	GP 1100-1100-1	GP 1100-1100-2	GP 1100-1100-3	GP 1100-1100-CV-1	
Sample Date				25-May-07	25-May-07	25-May-07	11-May-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	11-May-06	11-May-06	11-May-06	11-May-06	19-Jun-06
Sample ID				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	1002	1002 PIPE-1	1002 PIPE-2	1002-1	1002-2	1002-3	1100-1	1100-2	1100-3	1100-CV-1	1100CV-1
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft											
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				074097	074097	074097	989527	985190	985190	985190	985190	985190	989526	989526	989526	989526	994824
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	0705-4554	0705-4555	0705-4556	4771679	4748119	4748120	4748121	4748122	4748123	4771671	4771672	4771673	4771674	4800867
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	1.7 D ()	ND (0.360) ()	ND (0.380) ()	3.6 (0.21)	0.65 (0.048)	0.33 J (0.05)	11 (0.58)	6.6 (0.59)	11 (0.54)	29 (0.53)	7.1 (0.26)	22 (0.55)	-	16 (0.2)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	ND (0.720) D ()	ND (0.360) ()	ND (0.380) ()	6.3 (0.21)	2 (0.096)	0.47 J (0.1)	22 (1.2)	20 (1.2)	20 (1.1)	210 (5.3)	64 (2.6)	160 (5.5)	-	11 (0.2)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	0.460 J D ()	ND (0.360) ()	ND (0.380) ()	-	-	-	-	-	-	3.2 (0.53)	1.5 (0.26)	1.8 J (0.55)	-	2.7 (0.2)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{52}[A]	58_{52}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.860 D ()	ND (0.360) ()	ND (0.380) ()	13 (0.21)	0.16 J (0.048)	0.85 (0.05)	41 (0.58)	26 (0.59)	36 (0.54)	620 (5.3)	180 (2.6)	440 (5.5)	-	22 (0.2)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	2.5 D ()	ND (0.360) ()	0.300 J ()	7.3 (0.21)	0.53 J (0.11)	1.3 (0.12)	14 (1.4)	34 (1.4)	16 (1.3)	60 (0.53)	17 (0.26)	41 (0.55)	-	31 (0.41)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	GP-1002-1002	GP 1002-1002 PIPE-1	GP 1002-1002 PIPE-2	GP 1002-1002-1	GP 1002-1002-2	GP 1002-1002-3	GP 1100-1100-1	GP 1100-1100-2	GP 1100-1100-3	GP 1100-1100-CV-1	
Sample Date				25-May-07	25-May-07	25-May-07	11-May-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06	11-May-06	11-May-06	11-May-06	11-May-06	19-Jun-06
Sample ID				GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	1002	1002 PIPE-1	1002 PIPE-2	1002-1	1002-2	1002-3	1100-1	1100-2	1100-3	1100-CV-1	1100CV-1
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft											
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order				074097	074097	074097	989527	985190	985190	985190	985190	985190	989526	989526	989526	989526	994824
Laboratory Sample ID	Units	A MSC-PA	B SHS-PA	0705-4554	0705-4555	0705-4556	4771679	4748119	4748120	4748121	4748122	4748123	4771671	4771672	4771673	4771674	4800867
Metals																	
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																	
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	22 (0.5)	16.8 (0.5)	20.3 (0.5)	31.1 (0.5)	32.1 (0.5)	26.2 (0.5)	36.9 (0.5)	35.3 (0.5)	39.3 (0.5)	19.3 (0.5)	18.1 (0.0005)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP 1100-1100-CV-2	GP 1100-1100-CV-3	GP 1100-1100-ELBOW	GP 1100-1100-JOINTS	GP280-08	GP280-09	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Date				11-May-06	11-May-06	11-May-06	11-May-06	29-Aug-16	29-Aug-16	24-Feb-16	24-Feb-16	24-Feb-16	24-Feb-16	30-May-07	30-May-07	30-May-07
Sample ID				1100-CV-2	1100-CV-3	1100-Elbow	1100-Joints	GP280-08-20160829-1.0	GP280-09-20160829-1.0	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Depth								1 ft	1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	989526	989526	989526	989526	1701349	1701349	1634471/1629086	1634471/1629086	1634471/1629086	1634471/1629086	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4771675	4771676	4771677	4771678	8557113	8557114	8256671/8231752	8256672/8231753	8256673/8231754	8256674/8231755	0706-0474	0706-0475	0706-0476
Volatile Organic Compounds																
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	U	U	0.16 J (0.017)	0.33 (0.019)	ND (0.0008) (0.0005)	ND (0.064) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	0.013 (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.003 J (0.001)	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	-	-	-	-	ND (0.002) (0.001)	ND (0.13) (0.001)	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	U	U	U	1.3 (0.038)	0.004 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	U	U	U	2.6 (0.038)	0.004 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	-	-	-	-	ND (0.0008) (0.0005)	ND (0.064) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	0.003 J (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	0.002 J (0.001)	ND (0.001) (0.001)	0.044 (0.001)	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	0.18 (0.031)	0.054 J (0.03)	0.048 J (0.033)	5.6 (0.038)	0.005 J (0.001)	0.50 J (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	0.008 (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	0.005 J (0.001)	ND (0.001) (0.001)	0.002 J (0.001)	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	ND (0.002) (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.0008) (0.001)	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	U	U	0.25 (0.033)	5.6 (0.038)	0.003 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	-	-	-	-	0.16 (0.001)	0.22 J (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	0.006 (0.001)	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	0.026 (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	0.013 (0.001)	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	0.18 (0.031)	0.031 J (0.03)	0.12 J (0.033)	86 (0.38)	0.011 (0.001)	ND (0.13) (0.001)	0.002 J (0.001)	0.022 (0.001)	ND (0.001) (0.001)	0.004 J (0.001)	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	ND (0.0026) (0.00020)	ND (0.0024) (0.00020)	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	0.83 J (0.0033)	0.85 (0.0033)	0.22 J (0.0033)	0.27 (0.0033)	ND (0.021) (0.0033)	ND (0.10) (0.0033)	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	41 (0.42)	0.84 J (0.41)	1.6 J (0.43)	7.4 (0.44)	2.7 (0.0033)	1.4 (0.0033)	0.31 J (0.0033)	0.35 (0.0033)	0.11 (0.0033)	0.11 J (0.0033)	-	-	-
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	26 (0.42)	0.63 J (0.41)	0.89 J (0.43)	5 (0.44)	1.9 (0.0033)	0.99 (0.0033)	0.42 J (0.0033)	0.53 (0.0033)	0.20 (0.0033)	0.32 J (0.0033)	-	-	-
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	***13***[AB] (0.42)	0.79 J (0.41)	1.2 J (0.43)	2.3 (0.44)	1.2 (0.0033)	0.58 (0.0033)	0.44 J (0.0033)	0.46 (0.0033)	0.19 (0.0033)	0.28 J (0.0033)	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	8.5 (0.42)	0.81 J (0.41)	0.87 J (0.43)	1.8 J (0.44)	2.8 (0.0033)	0.88 (0.0033)	0.51 J (0.0033)	0.59 (0.0033)	0.25 (0.0033)	0.42 J (0.0033)	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	6.2 (0.42)	3.4 (0.41)	1.8 J (0.43)	3.3 (0.44)	1.4 (0.0033)	0.67 (0.0033)	0.47 J (0.0033)	0.42 (0.0033)	0.25 (0.0033)	ND (0.10) (0.0033)	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	1.1 J (0.0033)	0.41 J (0.0033)	0.19 J (0.0033)	0.20 (0.0033)	0.077 J (0.0033)	0.12 J (0.0033)	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	ND (1.1) (0.017)	0.96 (0.017)	ND (0.53) (0.017)	0.47 (0.017)	0.13 J (0.017)	ND (0.52) (0.017)	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP 1100-1100-CV-2	GP 1100-1100-CV-3	GP 1100-1100-ELBOW	GP 1100-1100-JOINTS	GP280-08	GP280-09	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Date				11-May-06	11-May-06	11-May-06	11-May-06	29-Aug-16	29-Aug-16	24-Feb-16	24-Feb-16	24-Feb-16	24-Feb-16	30-May-07	30-May-07	30-May-07
Sample ID				1100-CV-2	1100-CV-3	1100-Elbow	1100-Joints	GP280-08-20160829-1.0	GP280-09-20160829-1.0	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Depth								1 ft	1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	989526	989526	989526	989526	1701349	1701349	1634471/1629086	1634471/1629086	1634471/1629086	1634471/1629086	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4771675	4771676	4771677	4771678	8557113	8557114	8256671/8231752	8256672/8231753	8256673/8231754	8256674/8231755	0706-0474	0706-0475	0706-0476
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	41 (0.42)	2.3 (0.41)	3 (0.43)	8.2 (0.44)	8.0 (0.0033)	4.0 (0.0033)	1.9 (0.0033)	1.8 (0.0033)	0.32 (0.0033)	1.5 (0.0033)	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	0.50 J (0.0033)	0.31 J (0.0033)	0.17 J (0.0033)	0.10 J (0.0033)	0.071 J (0.0033)	ND (0.10) (0.0033)	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	ND (20) (0.30)	ND (7.6) (0.30)	ND (9.5) (0.30)	ND (1.9) (0.30)	ND (1.9) (0.30)	ND (9.3) (0.30)	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	5.2 (0.0033)	1.6 (0.0033)	0.66 (0.0033)	0.57 (0.0033)	0.28 (0.0033)	0.42 J (0.0033)	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	59 (2.1)	U	1.1 (0.43)	16 (0.44)	2.0 (0.0033)	2.7 (0.0033)	0.34 J (0.0033)	0.41 (0.0033)	0.069 J (0.0033)	0.16 J (0.0033)	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	4 (0.42)	1.5 J (0.41)	1.2 J (0.43)	1.6 J (0.44)	0.88 J (0.0033)	0.45 (0.0033)	0.39 J (0.0033)	0.31 (0.0033)	0.14 (0.0033)	ND (0.10) (0.0033)	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	2.5 (0.0033)	8.1 (0.0033)	1.1 (0.0033)	2.1 (0.0033)	0.60 (0.0033)	0.12 J (0.0033)	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	0.71 (0.0033)	1.8 (0.0033)	0.54 (0.0033)	0.10 J (0.0033)	-	-	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	*ND (11)* (0.17)	ND (4.2) (0.17)	ND (5.3) (0.17)	ND (1.1) (0.17)	ND (1.1) (0.17)	ND (5.2) (0.17)	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	160 (2.1)	0.63 J (0.41)	2.6 (0.43)	31 (0.44)	7.4 (0.0033)	8.5 (0.0033)	0.88 (0.0033)	0.95 (0.0033)	0.37 (0.0033)	0.22 J (0.0033)	-	-	-
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	78 (2.1)	1 J (0.41)	2.9 (0.43)	13 (0.44)	5.6 (0.0033)	2.3 (0.0033)	1.4 (0.0033)	0.98 (0.0033)	0.28 (0.0033)	1.0 (0.0033)	-	-	-
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	*ND (2.2)* (0.033)	*ND (0.85)* (0.033)	*ND (1.1)* (0.033)	ND (0.21) (0.033)	ND (0.21) (0.033)	*ND (1.0)* (0.033)	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP 1100-1100-CV-2	GP 1100-1100-CV-3	GP 1100-1100-ELBOW	GP 1100-1100-JOINTS	GP280-08	GP280-09	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Date				11-May-06	11-May-06	11-May-06	11-May-06	29-Aug-16	29-Aug-16	24-Feb-16	24-Feb-16	24-Feb-16	24-Feb-16	30-May-07	30-May-07	30-May-07
Sample ID				1100-CV-2	1100-CV-3	1100-Elbow	1100-Joints	GP280-08-20160829-1.0	GP280-09-20160829-1.0	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3
Sample Depth								1 ft	1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	989526	989526	989526	989526	1701349	1701349	1634471/1629086	1634471/1629086	1634471/1629086	1634471/1629086	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4771675	4771676	4771677	4771678	8557113	8557114	8256671/8231752	8256672/8231753	8256673/8231754	8256674/8231755	0706-0474	0706-0475	0706-0476
Metals																
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	10.9 (0.120)	11.9 (0.120)	7.70 (0.0810)	6.50 (0.0810)	5.39 (0.0810)	7.79 (0.0810)	-	-	-
LEAD	mg/kg	2240[A]	450[B]	-	-	-	-	98.5 (0.550)	50.3 (0.550)	-	-	-	-	-	-	-
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	32.9 (0.300)	21.6 (0.300)	34.3 (0.230)	17.9 (0.230)	22.1 (0.230)	53.1 (0.230)	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	65 J ()	820 ()	110 J ()
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	85.0 (0.140)	60.1 (0.140)	119 (0.230)	29.3 (0.230)	28.6 (0.230)	***633*** [AB] (0.230)	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	185 (0.680)	86.7 (0.680)	538 (0.770)	149 (0.770)	94.6 (0.770)	886 (0.770)	-	-	-
General Chemistry																
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	20.8 (0.5)	17.9 (0.5)	23.3 (0.5)	24.7 (0.5)	23.2 (0.50)	21.3 (0.50)	20.9 (0.50)	22.3 (0.50)	23.5 (0.50)	20.2 (0.50)	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	6.33 ()	11.39 ()	5.45 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-LINE-4
Sample Date				30-May-07
Sample ID				LO-1000-LINE-4
Sample Depth				0 - 0.5 ft
Sampling Company				UNKNOWN
Laboratory				PIP
Laboratory Work Order		A	B	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0477
Volatile Organic Compounds				
ACETONITRILE	mg/kg	4800[A]	n/v	-
ACROLEIN	mg/kg	1.6[A]	n/v	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-
BENZENE	µg/L	n/v	n/v	-
BENZENE	mg/kg	290[A]	0.5[B]	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-
CHLOROFORM	mg/kg	97[A]	n/v	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	-
HEXANE	mg/kg	10000[A]	5600[B]	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-
STYRENE	mg/kg	10000[A]	n/v	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-
TOLUENE	mg/kg	10000[A]	100[B]	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	-
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-
Ethylene oxide	mg/kg	n/v	n/v	-
Ethyleneimine	mg/kg	n/v	n/v	-
Formaldehyde	mg/kg	170[A]	n/v	-
Methanethiol	mg/kg	n/v	n/v	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-
Volatile Organic Compounds (SW8011)				
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-
Semi-Volatile Organic Compounds				
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-
BENZENETHIOL	mg/kg	3200[A]	n/v	-
BENZIDINE	mg/kg	0.4[A]	n/v	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	-
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	-
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-LINE-4
Sample Date				30-May-07
Sample ID				LO-1000-LINE-4
Sample Depth				0 - 0.5 ft
Sampling Company				UNKNOWN
Laboratory				PIP
Laboratory Work Order		A	B	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0477
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-
CHRYSENE	mg/kg	760[A]	230[B]	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-
FLUORENE	mg/kg	130000[A]	3800[B]	-
INDENE	mg/kg	n/v	n/v	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{sz}[A]	58_{sz}[B]	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-
NITROBENZENE	mg/kg	6400[A]	n/v	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-
PHENOL	mg/kg	16000[A]	200[B]	-
PYRENE	mg/kg	96000[A]	2200[B]	-
PYRIDINE	mg/kg	3200[A]	12[B]	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-
Aniline	mg/kg	79[A]	n/v	-
Benz(c)acridine	mg/kg	n/v	n/v	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-
Hydroquinone	mg/kg	1500[A]	n/v	-

Table 4a

Historical Soil Analytical Results Summary – AOI 7 (0-2 feet)
AOI 7 Remedial Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-LINE-4
Sample Date				30-May-07
Sample ID				LO-1000-LINE-4
Sample Depth				0 - 0.5 ft
Sampling Company				UNKNOWN
Laboratory				PIP
Laboratory Work Order		A	B	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0477
Metals				
ANTIMONY	mg/kg	1300[A]	n/v	-
ARSENIC	mg/kg	61[A]	29[B]	-
BARIUM	mg/kg	190000[A]	8200[B]	-
BERYLLIUM	mg/kg	11[A]	n/v	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-
CHROMIUM	mg/kg	220$_{s1}$[A]	190$_{s1}$[B]	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-
COBALT	mg/kg	960[A]	160[B]	-
LEAD	mg/kg	2240[A]	450[B]	-
MERCURY	mg/kg	510[A]	10[B]	-
NICKEL	mg/kg	64000[A]	650[B]	-
SELENIUM	mg/kg	16000[A]	26[B]	-
SODIUM	mg/kg	n/v	n/v	46 J ()
VANADIUM	mg/kg	220[A]	220[B]	-
ZINC	mg/kg	190000[A]	12000[B]	-
General Chemistry				
Cation Exchange Capacity	meq/100g	n/v	n/v	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-
MOISTURE, PERCENT	%	n/v	n/v	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	11.44 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-
SOLIDS, PERCENT	%	n/v	n/v	-
SULFIDE	mg/kg	n/v	n/v	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.004) (0.0005)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	0.340 (0.066)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	*ND (0.066)* (0.066)	*ND (0.066)* (0.066)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	ND (0.066) (0.066)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.164 (0.066)	5.98 (0.066)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	ND (0.33) (0.33)	2.24 (0.33)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.004) (0.0005)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	ND (0.066) (0.066)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	0.989 (0.33)	4.58 (0.33)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.148 (0.066)	0.569 (0.066)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	1.86 (0.33)	34.9 (3.3)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	0.474 (0.33)	9.72 (0.33)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.004) (0.001)	0.0021 (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.942 (0.066)	17.2 (0.066)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.59 (0.003)	1.04 (0.040)	0.820 (0.084)	0.0698 (0.036)	0.409 (0.080)	0.932 (0.038)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.8 (0.003)	2.16 (0.040)	0.800 (0.084)	0.260 (0.036)	0.914 (0.080)	1.35 (0.038)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	2.0 (0.003)	2.89 (0.040)	1.02 (0.084)	0.278 (0.036)	0.921 (0.080)	1.04 (0.038)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.6 (0.003)	2.82 (0.040)	0.717 (0.084)	0.263 (0.036)	0.895 (0.080)	1.32 (0.038)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.4 (0.003)	1.93 (0.040)	1.14 (0.084)	0.226 (0.036)	0.839 (0.080)	0.709 (0.038)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	2.0 (0.003)	2.35 (0.040)	1.60 (0.084)	0.305 (0.036)	1.31 (0.080)	1.43 (0.038)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.26 (0.003)	1.14 (0.040)	0.217 (0.084)	ND (0.036) (0.036)	0.297 (0.080)	0.890 (0.038)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.54 (0.003)	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	1.7 (0.003)	1.42 (0.040)	1.25 (0.084)	0.201 (0.036)	1.25 (0.080)	2.73 (0.038)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	3.0 (0.003)	3.39 (0.040)	2.10 (0.084)	0.410 (0.036)	1.81 (0.080)	3.35 (0.038)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	119 (0.0044)	***758***[B] (2.7)	***1530***[B] (2.9)	107 (4.3)	***510***[B] (2.3)	190 (4.9)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	9.4 (0.50)	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	71.6 ()	74.1 ()	89.9 ()	82.9 ()	79.1 ()
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64	
Sample Date				30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12
Sample ID				BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22549	1352569	1352569	JB22561	JB22561	JB22561
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.0011) (0.0011)	ND (0.005) (0.0005)	ND (0.036) (0.0005)	ND (0.00087) (0.00087)	0.135 (0.070)	ND (0.00099) (0.00099)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.0011) (0.0011)	ND (0.005) (0.001)	*ND (0.073)* (0.001)	ND (0.00087) (0.00087)	*ND (0.070)* (0.070)	ND (0.00099) (0.00099)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087)	ND (0.070) (0.070)	ND (0.00099) (0.00099)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087)	0.143 (0.070)	ND (0.00099) (0.00099)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.0011) (0.0011)	ND (0.005) (0.0005)	ND (0.036) (0.0005)	ND (0.00087) (0.00087)	ND (0.070) (0.070)	ND (0.00099) (0.00099)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.0053) (0.0053)	-	-	ND (0.0043) (0.0043)	0.816 (0.35)	ND (0.0049) (0.0049)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.0011) (0.0011)	ND (0.005) (0.001)	0.21 J (0.001)	ND (0.00087) (0.00087)	0.421 (0.070)	ND (0.00099) (0.00099)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087)	0.300 (0.070)	ND (0.00099) (0.00099)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64	
Sample Date				30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12
Sample ID				BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22549	1352569	1352569	JB22561	JB22561	JB22561
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.265 (0.073)	0.13 (0.003)	3.3 (0.003)	0.0828 (0.029)	1.88 (0.072)	0.382 (0.034)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.612 (0.073)	0.27 (0.003)	5.2 (0.003)	0.276 (0.029)	2.13 (0.072)	0.969 (0.034)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.599 (0.073)	0.30 (0.003)	5.3 (0.003)	0.329 (0.029)	2.26 (0.072)	0.916 (0.034)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.701 (0.073)	0.35 (0.003)	6.2 (0.003)	0.415 (0.029)	1.95 (0.072)	0.771 (0.034)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.557 (0.073)	0.28 (0.003)	3.7 (0.003)	0.281 (0.029)	1.52 (0.072)	0.678 (0.034)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.718 (0.073)	0.27 (0.003)	6.3 (0.003)	0.325 (0.029)	2.89 (0.072)	0.987 (0.034)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64	
Sample Date				30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12
Sample ID				BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22549	1352569	1352569	JB22561	JB22561	JB22561
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.100 (0.073)	0.040 (0.003)	2.4 (0.003)	0.0428 (0.029)	1.73 (0.072)	0.141 (0.034)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	0.52 (0.003)	12 (0.003)	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.792 (0.073)	0.34 (0.003)	4.1 (0.003)	0.527 (0.029)	4.08 (0.072)	0.932 (0.034)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.928 (0.073)	0.34 (0.003)	10 (0.003)	0.664 (0.029)	4.06 (0.072)	1.69 (0.034)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64	
Sample Date				30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12
Sample ID				BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22549	1352569	1352569	JB22561	JB22561	JB22561
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	313 (2.5)	350 (0.0044)	***467***[B] (0.0044)	26.1 (2.0)	***594***[B] (2.5)	360 (2.5)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	13.0 (0.50)	26.5 (0.50)	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	82.9 ()	-	-	99.2 ()	79.3 ()	81.7 ()
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73
Sample Date				29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL
Laboratory Work Order		A	B	JB22561	JB22561	JB22561	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.0013) (0.0013)	0.00097 (0.00089)	ND (0.00079) (0.00079)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.0013) (0.0013)	ND (0.00089) (0.00089)	ND (0.00079) (0.00079)	*ND (0.006)* (0.001)	ND (0.005) (0.001)	*ND (0.006)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.0013) (0.0013)	ND (0.00089) (0.00089)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.0013) (0.0013)	ND (0.00089) (0.00089)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.0013) (0.0013)	ND (0.00089) (0.00089)	ND (0.00079) (0.00079)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.0013) (0.0013)	ND (0.00089) (0.00089)	ND (0.00079) (0.00079)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.0024 (0.0013)	ND (0.00089) (0.00089)	0.0020 (0.00079)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73
Sample Date				29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL
Laboratory Work Order		A	B	JB22561	JB22561	JB22561	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.791 (0.039)	0.158 (0.064)	1.54 (0.031)	ND (0.019) (0.003)	0.31 (0.003)	0.12 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.52 (0.039)	0.390 (0.064)	2.77 (0.031)	ND (0.019) (0.003)	0.76 (0.003)	0.24 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.57 (0.039)	0.392 (0.064)	2.38 (0.031)	ND (0.019) (0.003)	0.93 (0.003)	0.22 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.55 (0.039)	0.337 (0.064)	2.64 (0.031)	ND (0.019) (0.003)	1.1 (0.003)	0.32 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.01 (0.039)	0.305 (0.064)	1.71 (0.031)	ND (0.019) (0.003)	0.70 (0.003)	0.21 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.65 (0.039)	0.449 (0.064)	2.67 (0.031)	ND (0.019) (0.003)	0.90 (0.003)	0.25 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73
Sample Date				29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL
Laboratory Work Order		A	B	JB22561	JB22561	JB22561	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.426 (0.039)	ND (0.064) (0.064)	0.459 (0.031)	ND (0.019) (0.003)	0.090 (0.003)	0.045 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	ND (0.019) (0.003)	1.0 (0.003)	0.11 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	1.66 (0.039)	0.433 (0.064)	5.63 (0.15)	ND (0.019) (0.003)	0.88 (0.003)	0.26 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	2.31 (0.039)	0.565 (0.064)	5.68 (0.15)	ND (0.019) (0.003)	1.0 (0.003)	0.36 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73
Sample Date				29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL
Laboratory Work Order		A	B	JB22561	JB22561	JB22561	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	***672***[B] (2.6)	210 (2.4)	43.5 (2.2)	7.46 (0.0044)	185 (0.0044)	27.3 (0.0044)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	8.3 (0.50)	11.6 (0.50)	28.6 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	72.8 ()	87.4 ()	92.2 ()	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77	AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84
Sample Date				28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-74_4'	BH-12-76_3'	BH-12-77_3'	BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'
Sample Depth				3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	1352569	1352569	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876912	6876911	6876920	JB22267-17	JB22267-10	JB22267-11
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.006) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.006)* (0.001)	*ND (0.009)* (0.001)	ND (0.004) (0.001)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.006) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	0.0011 (0.00086)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	0.0012 (0.00086)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77	AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84
Sample Date				28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-74_4'	BH-12-76_3'	BH-12-77_3'	BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'
Sample Depth				3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	1352569	1352569	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876912	6876911	6876920	JB22267-17	JB22267-10	JB22267-11
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.85 (0.003)	1.5 (0.003)	ND (0.018) (0.003)	0.0448 (0.030)	0.362 (0.047)	ND (0.033) (0.033)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.9 (0.003)	0.87 (0.003)	0.026 (0.003)	0.152 (0.030)	0.845 (0.047)	0.0454 (0.033)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.6 (0.003)	0.66 (0.003)	0.028 (0.003)	0.161 (0.030)	0.870 (0.047)	0.0430 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.9 (0.003)	1.1 (0.003)	0.032 (0.003)	0.158 (0.030)	0.973 (0.047)	0.0646 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.1 (0.003)	0.56 (0.003)	0.020 (0.003)	0.106 (0.030)	0.693 (0.047)	0.0338 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	2.2 (0.003)	1.1 (0.003)	0.032 (0.003)	0.151 (0.030)	0.887 (0.047)	0.0657 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77	AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84
Sample Date				28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-74_4'	BH-12-76_3'	BH-12-77_3'	BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'
Sample Depth				3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	1352569	1352569	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876912	6876911	6876920	JB22267-17	JB22267-10	JB22267-11
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.18 (0.003)	0.78 (0.003)	ND (0.018) (0.003)	ND (0.030) (0.030)	0.122 (0.047)	ND (0.033) (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.19 (0.003)	18 (0.003)	ND (0.018) (0.003)	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	3.7 (0.003)	5.2 (0.003)	ND (0.018) (0.003)	0.217 (0.030)	1.01 (0.047)	0.0508 (0.033)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	4.5 (0.003)	1.8 (0.003)	0.035 (0.003)	0.276 (0.030)	1.03 (0.047)	0.0768 (0.033)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77	AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84
Sample Date				28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-74_4'	BH-12-76_3'	BH-12-77_3'	BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'
Sample Depth				3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	1352569	1352569	1352569	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876912	6876911	6876920	JB22267-17	JB22267-10	JB22267-11
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	***538*[B]** (0.0044)	380 (0.0044)	4.40 (0.0044)	104 (2.3)	264 (3.2)	58.0 (2.3)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	15.0 (0.50)	34.7 (0.50)	7.2 (0.50)	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	92.4 ()	64.0 ()	87.8 ()
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13
Sample ID				BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5_031313
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB31265
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4
Volatile Organic Compounds								
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	***2.35***[B] (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.099)* (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	*ND (0.13)* (0.13)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.099) (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	0.382 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.49) (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.099) (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	1.04 (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	1.16 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	1.03 (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.49) (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	1.64 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	0.394 (0.13)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13
Sample ID				BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5_031313
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB31265
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
Volatile Organic Compounds (SW8011)								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-
Semi-Volatile Organic Compounds								
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.256 (0.045)	0.204 (0.047)	ND (0.037) (0.037)	0.159 (0.033)	0.256 (0.21)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.455 (0.045)	0.662 (0.047)	0.0591 (0.037)	0.818 (0.033)	0.550 (0.21)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.524 (0.045)	0.695 (0.047)	0.0748 (0.037)	0.796 (0.033)	0.600 (0.21)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.460 (0.045)	0.593 (0.047)	0.129 (0.037)	0.821 (0.033)	0.643 (0.21)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.494 (0.045)	0.560 (0.047)	0.0754 (0.037)	0.489 (0.033)	0.601 (0.21)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.518 (0.045)	0.687 (0.047)	0.0824 (0.037)	0.768 (0.033)	1.29 (0.21)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13
Sample ID				BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5_031313
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB31265
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.139 (0.045)	0.0573 (0.047)	ND (0.037) (0.037)	0.0385 (0.033)	ND (0.21) (0.21)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	ND (0.21) (0.21)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.613 (0.045)	0.611 (0.047)	ND (0.037) (0.037)	0.469 (0.033)	0.217 (0.21)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.540 (0.045)	0.896 (0.047)	0.0767 (0.037)	0.835 (0.033)	1.95 (0.21)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13
Sample ID				BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5_031313
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB31265
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4
Metals								
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-
CHROMIUM	mg/kg	20000$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	344 (2.8)	***1110***[B] (2.9)	198 (2.4)	135 (2.3)	***753***[B] (2.0)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-
General Chemistry								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	71.7 ()	64.2 ()	80.6 ()	85.6 ()	79.9 ()
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001	
Sample Date				13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16
Sample ID				AOI7-BH-13-47_2.5-3_031313	AOI7-BH-13-48_2.5-3_031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-6	JB31265-2	8460988	8460989
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.16) (0.16)	***0.845***[B] (0.11)	ND (0.005) (0.0005)	ND (0.006) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.16)* (0.16)	*ND (0.11)* (0.11)	ND (0.005) (0.001)	*ND (0.006)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.16) (0.16)	ND (0.11) (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.16) (0.16)	0.401 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.870 (0.79)	1.96 (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.16) (0.16)	ND (0.11) (0.11)	ND (0.005) (0.0005)	ND (0.006) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.475 (0.16)	1.08 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.79) (0.79)	ND (0.56) (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.79) (0.79)	ND (0.56) (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.364 (0.16)	1.58 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001	
Sample Date				13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16
Sample ID				AOI7-BH-13-47_2.5-3_031313	AOI7-BH-13-48_2.5-3_031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-6	JB31265-2	8460988	8460989
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	2.03 (0.24)	1.12 (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	3.13 (0.24)	1.56 (0.077)	0.007 J (0.003)	0.006 J (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	2.50 (0.24)	1.50 (0.077)	0.009 J (0.003)	0.007 J (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.40 (0.24)	1.44 (0.077)	0.011 J (0.003)	0.007 J (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.37 (0.24)	0.986 (0.077)	0.010 J (0.003)	ND (0.022) (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	4.13 (0.24)	2.07 (0.077)	0.008 J (0.003)	0.005 J (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001	
Sample Date				13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16
Sample ID				AOI7-BH-13-47_2.5-3_031313	AOI7-BH-13-48_2.5-3_031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-6	JB31265-2	8460988	8460989
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	3.36 (0.24)	1.58 (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.24) (0.24)	ND (0.077) (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	7.92 (0.24)	2.27 (0.077)	0.006 J (0.003)	ND (0.022) (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	5.58 (0.24)	3.34 (0.077)	0.012 J (0.003)	0.007 J (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001	
Sample Date				13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16
Sample ID				AOI7-BH-13-47_2.5-3_031313	AOI7-BH-13-48_2.5-3_031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	LL	LL
Laboratory Work Order		A	B	JB31265	JB31265	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB31265-6	JB31265-2	8460988	8460989
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	***567***[B] (2.0)	348 (2.5)	2.19 (0.550)	2.23 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	22.6 (0.50)	22.7 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	65.3 ()	81.9 ()	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017
Sample Date				28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16
Sample ID				AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1678008	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455724	8455737	8455735	8473659
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.006) (0.0005)	0.081 J (0.0005)	*ND (0.660)* (0.0005)	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.006)* (0.001)	*ND (0.660)* (0.001)	*ND (0.660)* (0.001)	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.006) (0.001)	*ND (0.660)* (0.001)	*ND (0.660)* (0.001)	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.006) (0.0005)	ND (0.660) (0.0005)	ND (0.660) (0.0005)	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.006) (0.001)	0.280 J (0.001)	0.430 J (0.001)	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017
Sample Date				28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16
Sample ID				AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1678008	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455724	8455737	8455735	8473659
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	2.000 (0.003)	4.300 (0.003)	2.600 (0.003)	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.800 (0.003)	3.500 (0.003)	2.300 (0.003)	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.500 (0.003)	1.800 (0.003)	1.800 (0.003)	2.800 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.700 (0.003)	2.300 (0.003)	2.200 (0.003)	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.500 (0.003)	1.000 (0.003)	1.300 (0.003)	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	2.200 (0.003)	4.200 (0.003)	2.900 (0.003)	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017
Sample Date				28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16
Sample ID				AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1678008	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455724	8455737	8455735	8473659
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.400 (0.003)	3.900 (0.003)	1.900 (0.003)	-
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	10.000 (0.003)	10.000 (0.003)	10.000 (0.003)	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	4.000 (0.003)	15.000 (0.003)	4.400 (0.003)	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	3.000 (0.003)	10.000 (0.003)	5.400 (0.003)	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017
Sample Date				28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16
Sample ID				AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1678008	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455724	8455737	8455735	8473659
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	439 (0.550)	425 (0.550)	***452***[B] (0.550)	-
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	31.6 (0.50)	44.4 (0.50)	44.5 (0.50)	33.1 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-018	AOI7-BH-16-020	AOI7-BH-16-021	
Sample Date				11-Jul-16	1-Jul-16	30-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116	AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1682473	1679350	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8473660	8461000	8460979	8460980
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	-	0.150 J (0.0005)	ND (0.007) (0.0005)	0.079 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	*ND (0.660)* (0.001)	*ND (0.007)* (0.001)	*ND (0.470)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	*ND (0.660)* (0.001)	ND (0.007) (0.001)	ND (0.470) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	0.230 J (0.001)	ND (0.007) (0.001)	ND (0.470) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.470) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	ND (0.660) (0.0005)	ND (0.007) (0.0005)	ND (0.470) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	-	1.700 (0.001)	ND (0.007) (0.001)	1.100 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	0.180 J (0.001)	ND (0.007) (0.001)	0.120 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	ND (0.660) (0.001)	ND (0.007) (0.001)	ND (0.470) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	0.410 J (0.001)	ND (0.007) (0.001)	0.170 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-018	AOI7-BH-16-020	AOI7-BH-16-021	
Sample Date				11-Jul-16	1-Jul-16	30-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116	AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1682473	1679350	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8473660	8461000	8460979	8460980
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	1.200 (0.003)	1.100 (0.003)	1.900 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	1.500 (0.003)	1.900 (0.003)	3.000 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.200 (0.003)	1.800 (0.003)	1.900 (0.003)	2.700 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	2.100 (0.003)	2.300 (0.003)	3.200 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	1.600 (0.003)	1.100 (0.003)	1.600 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	-	1.800 (0.003)	2.300 (0.003)	3.300 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-018	AOI7-BH-16-020	AOI7-BH-16-021	
Sample Date				11-Jul-16	1-Jul-16	30-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116	AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1682473	1679350	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8473660	8461000	8460979	8460980
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	0.550 (0.003)	1.200 (0.003)	2.400 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	15.000 (0.003)	5.500 (0.003)	9.300 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	3.300 (0.003)	2.400 (0.003)	3.900 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	1.900 (0.003)	4.100 (0.003)	6.600 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-018	AOI7-BH-16-020	AOI7-BH-16-021	
Sample Date				11-Jul-16	1-Jul-16	30-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116	AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1682473	1679350	1679350	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8473660	8461000	8460979	8460980
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	-	281 (0.550)	154 (0.550)	111 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	36.6 (0.50)	36.1 (0.50)	39.1 (0.50)	31.2 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-B
Sample Date				5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16
Sample ID				AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1679350	1680744	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466400	8460995	8466412	8460996
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.006) (0.0005)	0.0009 J (0.0005)	0.0007 J (0.0005)	***1.400 J[B]*** (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.006)* (0.001)	*ND (0.008)* (0.001)	ND (0.004) (0.001)	*ND (4.900)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	*ND (4.900)* (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	2.000 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	12.000 (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.006) (0.0005)	ND (0.008) (0.0005)	ND (0.004) (0.0005)	*ND (4.900)* (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.002 J (0.001)	0.006 J (0.001)	ND (0.004) (0.001)	1.200 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	1.100 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	ND (4.900) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	3.800 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-B
Sample Date				5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16
Sample ID				AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1679350	1680744	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466400	8460995	8466412	8460996
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	2.600 (0.003)	1.100 (0.003)	ND (0.018) (0.003)	2.900 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	3.600 (0.003)	1.200 (0.003)	0.010 J (0.003)	2.600 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	3.200 (0.003)	1.600 (0.003)	0.012 J (0.003)	2.500 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	4.400 (0.003)	2.200 (0.003)	0.015 J (0.003)	3.000 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	2.500 (0.003)	2.000 (0.003)	0.016 J (0.003)	1.800 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	3.800 (0.003)	1.600 (0.003)	0.011 J (0.003)	3.000 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-B
Sample Date				5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16
Sample ID				AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1679350	1680744	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466400	8460995	8466412	8460996
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.400 (0.003)	0.360 (0.003)	ND (0.018) (0.003)	2.200 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	12.000 (0.003)	12.000 (0.003)	0.009 J (0.003)	***80.000***[B] (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	7.500 (0.003)	3.100 (0.003)	0.008 J (0.003)	8.400 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	5.600 (0.003)	1.600 (0.003)	0.014 J (0.003)	4.700 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-B
Sample Date				5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16
Sample ID				AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1679350	1680744	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466400	8460995	8466412	8460996
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	224 (0.550)	291 (0.550)	8.79 (0.550)	***469***[B] (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	28.7 (0.50)	40.9 (0.50)	7.0 (0.50)	34.5 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-025	AOI7-BH-16-026	AOI7-BH-16-028	AOI7-B
Sample Date				1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16
Sample ID				AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816
Sample Depth				4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1682473	1681418
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460997	8460991	8473657	8469166
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	***0.930 J[B]*** (0.0005)	0.170 J (0.0005)	0.014 (0.0005)	***6.600[B]*** (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (5.200)* (0.001)	*ND (0.430)* (0.001)	*ND (0.006)* (0.001)	*ND (0.650)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	*ND (5.200)* (0.001)	ND (0.430) (0.001)	ND (0.006) (0.001)	*ND (0.650)* (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	1.300 J (0.001)	0.210 J (0.001)	ND (0.006) (0.001)	4.800 (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	12.000 (0.001)	0.360 J (0.001)	ND (0.006) (0.001)	9.300 (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	*ND (5.200)* (0.0005)	ND (0.430) (0.0005)	ND (0.006) (0.0005)	ND (0.650) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (5.200) (0.001)	0.200 J (0.001)	0.015 (0.001)	2.000 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	1.200 J (0.001)	0.350 J (0.001)	0.001 J (0.001)	15.000 (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (5.200) (0.001)	0.110 J (0.001)	ND (0.006) (0.001)	13.000 (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	3.100 J (0.001)	0.370 J (0.001)	0.007 (0.001)	22.000 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-025	AOI7-BH-16-026	AOI7-BH-16-028	AOI7-B
Sample Date				1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16
Sample ID				AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816
Sample Depth				4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1682473	1681418
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460997	8460991	8473657	8469166
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.900 (0.003)	0.830 (0.003)	1.600 (0.003)	0.750 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.400 (0.003)	0.680 (0.003)	7.400 (0.003)	1.200 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.400 (0.003)	0.550 (0.003)	3.500 (0.003)	0.870 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.700 (0.003)	0.670 (0.003)	5.100 (0.003)	1.400 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.100 (0.003)	0.410 (0.003)	1.700 (0.003)	0.740 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.600 (0.003)	0.800 (0.003)	7.400 (0.003)	1.800 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-025	AOI7-BH-16-026	AOI7-BH-16-028	AOI7-B
Sample Date				1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16
Sample ID				AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816
Sample Depth				4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1682473	1681418
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460997	8460991	8473657	8469166
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.600 (0.003)	1.000 (0.003)	0.430 (0.003)	1.300 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	***47.000*** [B] (0.003)	6.500 (0.003)	3.400 (0.003)	4.800 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	6.400 (0.003)	3.500 (0.003)	5.000 (0.003)	4.100 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	2.800 (0.003)	1.800 (0.003)	12.000 (0.003)	2.100 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-025	AOI7-BH-16-026	AOI7-BH-16-028	AOI7-B
Sample Date				1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16
Sample ID				AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816
Sample Depth				4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1682473	1681418
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460997	8460991	8473657	8469166
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1} [A]	190_{s1} [B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	306 (0.550)	62.4 (0.550)	276 (0.550)	192 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	36.6 (0.50)	21.8 (0.50)	28.3 (0.50)	7.4 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-029	AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033
Sample Date				8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16
Sample ID				AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1682473	1682473	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469167	8473656	8473668	8473661
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	***7.400*** [B] (0.0005)	***1.200 J*** [B] (0.0005)	ND (0.400) (0.0005)	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.580)* (0.001)	*ND (1.300)* (0.001)	*ND (0.400)* (0.001)	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	*ND (0.580)* (0.001)	*ND (1.300)* (0.001)	ND (0.400) (0.001)	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	3.900 (0.001)	0.300 J (0.001)	ND (0.400) (0.001)	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	5.200 (0.001)	11.000 (0.001)	ND (0.400) (0.001)	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.580) (0.0005)	ND (1.300) (0.0005)	ND (0.400) (0.0005)	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	2.000 (0.001)	0.510 J (0.001)	ND (0.400) (0.001)	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	9.600 (0.001)	0.420 J (0.001)	ND (0.400) (0.001)	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	7.700 (0.001)	ND (1.300) (0.001)	ND (0.400) (0.001)	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	17.000 (0.001)	0.900 J (0.001)	ND (0.400) (0.001)	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-029	AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033
Sample Date				8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16
Sample ID				AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1682473	1682473	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469167	8473656	8473668	8473661
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.590 (0.003)	1.600 (0.003)	0.015 J (0.003)	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.840 (0.003)	2.200 (0.003)	0.008 J (0.003)	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.650 (0.003)	1.400 (0.003)	0.008 J (0.003)	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.000 (0.003)	1.800 (0.003)	0.012 J (0.003)	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.560 (0.003)	0.770 (0.003)	0.005 J (0.003)	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.400 (0.003)	2.700 (0.003)	0.017 J (0.003)	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-029	AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033
Sample Date				8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16
Sample ID				AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1682473	1682473	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469167	8473656	8473668	8473661
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.100 (0.003)	2.400 (0.003)	0.015 J (0.003)	-
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	2.800 (0.003)	0.680 (0.003)	0.027 (0.003)	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	3.400 (0.003)	8.600 (0.003)	0.034 (0.003)	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	1.400 (0.003)	4.000 (0.003)	0.029 (0.003)	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-029	AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033
Sample Date				8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16
Sample ID				AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1682473	1682473	1682473
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469167	8473656	8473668	8473661
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	201 (0.550)	140 (0.550)	3.36 (0.550)	ND (7.37) (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	9.7 (0.50)	14.0 (0.50)	28.5 (0.50)	9.9 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-B
Sample Date				8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1679350	1678008	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469171	8460985	8455742	8460982
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	0.120 J (0.0005)	0.110 J (0.0005)	0.410 J (0.0005)	ND (0.008) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.540)* (0.001)	*ND (0.580)* (0.001)	*ND (2.300)* (0.001)	*ND (0.008)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	*ND (0.540)* (0.001)	*ND (0.580)* (0.001)	*ND (2.300)* (0.001)	ND (0.008) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	0.130 J (0.001)	0.130 J (0.001)	ND (2.300) (0.001)	ND (0.008) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.470 J (0.001)	ND (0.580) (0.001)	ND (2.300) (0.001)	0.024 (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.540) (0.0005)	ND (0.580) (0.0005)	*ND (2.300)* (0.0005)	ND (0.008) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	1.300 (0.001)	1.500 (0.001)	1.000 J (0.001)	0.004 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	2.000 (0.001)	0.200 J (0.001)	ND (2.300) (0.001)	0.013 (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	0.340 J (0.001)	ND (0.580) (0.001)	ND (2.300) (0.001)	0.013 (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	2.800 (0.001)	0.290 J (0.001)	0.850 J (0.001)	0.010 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-B
Sample Date				8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1679350	1678008	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469171	8460985	8455742	8460982
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	2.100 (0.003)	3.600 (0.003)	0.630 (0.003)	2.100 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.100 (0.003)	2.300 (0.003)	0.730 (0.003)	1.700 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.840 (0.003)	1.800 (0.003)	0.900 (0.003)	1.700 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.200 (0.003)	2.300 (0.003)	1.200 (0.003)	2.100 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.810 (0.003)	1.100 (0.003)	0.870 (0.003)	2.300 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.500 (0.003)	2.700 (0.003)	0.930 (0.003)	2.300 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-B
Sample Date				8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1679350	1678008	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469171	8460985	8455742	8460982
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.500 (0.003)	4.100 (0.003)	0.450 (0.003)	1.500 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	25.000 (0.003)	17.000 (0.003)	6.700 (0.003)	17.000 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	6.400 (0.003)	6.300 (0.003)	2.100 (0.003)	5.800 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	1.900 (0.003)	6.900 (0.003)	1.100 (0.003)	3.100 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-B
Sample Date				8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16
Sample ID				AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1681418	1679350	1678008	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469171	8460985	8455742	8460982
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	375 (0.550)	272 (0.550)	227 (0.550)	329 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	36.6 (0.50)	42.4 (0.50)	38.9 (0.50)	33.7 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-038	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043
Sample Date				30-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16
Sample ID				AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616	AOI7-BH-16-043-2-4-062916
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1680744	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460983	8466407	8466405	8455733
Volatile Organic Compounds							
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.007) (0.0005)	0.012 (0.0005)	*ND (0.540)* (0.0005)	0.005 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.007)* (0.001)	*ND (0.007)* (0.001)	*ND (0.540)* (0.001)	*ND (0.006)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.007) (0.001)	ND (0.007) (0.001)	*ND (0.540)* (0.001)	ND (0.006) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	0.002 J (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)	0.001 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.011 (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)	ND (0.006) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.007) (0.0005)	ND (0.007) (0.0005)	ND (0.540) (0.0005)	ND (0.006) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.002 J (0.001)	0.007 J (0.001)	0.220 J (0.001)	0.005 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	0.007 (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)	ND (0.006) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	0.006 J (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)	0.001 J (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.007 (0.001)	0.003 J (0.001)	ND (0.540) (0.001)	0.001 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-038	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043
Sample Date				30-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16
Sample ID				AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616	AOI7-BH-16-043-2-4-062916
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1680744	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460983	8466407	8466405	8455733
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
Volatile Organic Compounds (SW8011)							
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-
Semi-Volatile Organic Compounds							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	1.800 (0.003)	3.500 (0.003)	1.300 (0.003)	1.100 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.800 (0.003)	4.100 (0.003)	1.800 (0.003)	2.600 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.900 (0.003)	3.300 (0.003)	2.000 (0.003)	1.800 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.300 (0.003)	4.700 (0.003)	2.400 (0.003)	2.200 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	2.100 (0.003)	1.900 (0.003)	1.400 (0.003)	1.100 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	2.600 (0.003)	4.300 (0.003)	2.000 (0.003)	2.600 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-038	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043
Sample Date				30-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16
Sample ID				AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616	AOI7-BH-16-043-2-4-062916
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1680744	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460983	8466407	8466405	8455733
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	1.400 (0.003)	2.400 (0.003)	0.760 J (0.003)	0.470 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	15.000 (0.003)	15.000 (0.003)	3.800 (0.003)	2.400 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	5.100 (0.003)	6.500 (0.003)	3.200 (0.003)	2.200 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	2.900 (0.003)	9.600 (0.003)	3.400 (0.003)	3.900 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				H-16-038	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043
Sample Date				30-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16
Sample ID				AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616	AOI7-BH-16-043-2-4-062916
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1680744	1680744	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460983	8466407	8466405	8455733
Metals							
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-
CHROMIUM	mg/kg	20000$_{s1}$[A]	190$_{s1}$[B]	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	360 (0.550)	269 (0.550)	181 (0.550)	***2590***[B] (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-
General Chemistry							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	34.9 (0.50)	30.8 (0.50)	31.6 (0.50)	21.9 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5
Sample Date				8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92
Sample ID				AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD				
Laboratory				LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469174	8469173	P209609	P209603	P209604	P209611
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	ND (9.6) R ()
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	*ND (19)* ()
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	ND (19) ()
BENZENE	mg/kg	330[A]	0.5[B]	0.140 J (0.0005)	*ND (1.200)* (0.0005)	-	-	-	*ND (0.96)* ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.96) ()
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	ND (0.96) ()
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	ND (0.96) ()
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	ND (1.9) ()
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.380)* (0.001)	*ND (1.200)* (0.001)	-	-	-	*ND (1.9)* ()
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.380) (0.001)	*ND (1.200)* (0.001)	-	-	-	*ND (0.96)* ()
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.96) ()
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	ND (0.96) ()
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	ND (29) R ()
ETHYLBENZENE	mg/kg	1000[A]	70[B]	0.110 J (0.001)	ND (1.200) (0.001)	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	0.480 (0.001)	2.300 (0.001)	-	-	-	ND (1.9) ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (1.9) ()
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.96) ()
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.380) (0.0005)	ND (1.200) (0.0005)	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.96) ()
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	ND (1.9) ()
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	ND (0.96) ()
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	ND (0.96) ()
TOLUENE	mg/kg	10000[A]	100[B]	0.400 (0.001)	ND (1.200) (0.001)	-	-	-	ND (0.96) ()
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	ND (0.96) ()
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.96) ()
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	ND (0.96) ()
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	ND (0.96) ()
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	0.110 J (0.001)	0.470 J (0.001)	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.380) (0.001)	ND (1.200) (0.001)	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.450 (0.001)	ND (1.200) (0.001)	-	-	-	ND (0.96) ()
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (9.6) R ()
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5
Sample Date				8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92
Sample ID				AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD				
Laboratory				LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469174	8469173	P209609	P209603	P209604	P209611
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	ND (1.50) L ()
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (1.900) ()
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	4.100 (0.003)	2.000 (0.003)	-	-	-	ND (0.51) ()
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.510) ()
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.5) ()
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	7.100 (0.003)	1.800 (0.003)	-	-	-	ND (0.51) ()
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	5.300 (0.003)	1.000 (0.003)	-	-	-	ND (0.51) ()
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	5.900 (0.003)	1.200 (0.003)	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	3.500 (0.003)	0.770 (0.003)	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	3.300 (0.003)	0.490 (0.003)	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	ND (0.51) ()
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.51) ()
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	ND (0.51) ()
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	0.55 ()
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.51) ()
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
CHRYSENE	mg/kg	190000[A]	230[B]	7.400 (0.003)	2.700 (0.003)	-	-	-	ND (0.310) ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.510) ()
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	1.200 (0.003)	0.230 J (0.003)	-	-	-	ND (0.51) ()
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	ND (0.51) ()
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	ND (0.51) ()
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.51) ()
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.460) ()
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	ND (0.51) ()
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.500) ()
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	ND (2.5) ()
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.51) ()
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5
Sample Date				8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92
Sample ID				AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD				
Laboratory				LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469174	8469173	P209609	P209603	P209604	P209611
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.51) ()
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	ND (0.51) ()
FLUORENE	mg/kg	190000[A]	3800[B]	4.300 (0.003)	2.800 (0.003)	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	ND (1.000) ()
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	ND (0.51) ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	ND (1.000) ()
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	ND (0.510) ()
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	ND (0.51) ()
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	ND (1.5) ()
NAPHTHALENE	mg/kg	190000[A]	25[B]	7.400 (0.003)	ND (0.480) (0.003)	***67*** [B] ()	0.31 J ()	0.31 J ()	ND (0.51) ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.5) ()
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	ND (2.5) ()
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.5) ()
PHENANTHRENE	mg/kg	190000[A]	10000[B]	8.400 (0.003)	9.100 (0.003)	-	-	-	ND (0.51) ()
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	ND (0.51) ()
PYRENE	mg/kg	190000[A]	2200[B]	10.000 (0.003)	3.900 (0.003)	-	-	-	ND (0.51) ()
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	ND (1) ()
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	*ND (1)* ()
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.51) ()
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.51) ()
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.51) ()
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.51) ()
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.310) ()
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.510) ()
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	ND (0.51) ()
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	ND (1.8) ()
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	ND (0.51) ()
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	ND (0) ()
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	ND (1.000) ()
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.6) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5
Sample Date				8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92
Sample ID				AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD				
Laboratory				LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8469174	8469173	P209609	P209603	P209604	P209611
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	1.9 L ()
ARSENIC	mg/kg	190000[A]	29[B]	-	-	10.0 H ()	17.9 H ()	***31.1 H*** [B] ()	5.8 H ()
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	159 ()
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	1.2 ()
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	0.93 ()
CHROMIUM	mg/kg	20000_{s1} [A]	190_{s1} [B]	-	-	19.5 L ()	77.1 L ()	63.7 L ()	37.3 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (7.8) (0.50)	ND (1.7) (0.50)	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	16.4 ()
LEAD	mg/kg	190000[A]	450[B]	408 (0.550)	34.1 (0.550)	138 H ()	***464 H*** [B] ()	313 H ()	188 ()
MERCURY	mg/kg	190000[A]	10[B]	4.14 (0.0100)	0.145 (0.0100)	-	-	-	0.78 J ()
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	27.5 ()
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	ND (0.62) ()
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	19.3 ()
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	10.4 ()	12.0 ()	11.1 ()	15.3 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	ND (0.10) ()	ND (0.13) ()	ND (0.12) ()	ND (0.15) ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	3330 J ()	2360 J ()	3830 J ()	3120 J ()
MOISTURE, PERCENT	%	n/v	n/v	23.4 (0.50)	12.5 (0.50)	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	3.0 ()	ND (0.85) ()	ND (0.69) ()	ND (0.80) ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	ND (5.30) ()	ND (6.7) ()	30.5 H ()	ND (6.20) J ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	1.1 ()	3.8 ()	3.7 ()	2.1 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	16000 J ()	45600 J ()	37000 J ()	43400 L ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	ND (25.90) ()	ND (32.40) ()	38.6 ()	ND (29.70) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14
Sample Date				26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92
Sample ID				B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	ND (83) R ()	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	*ND (170)* ()	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	*ND (170)* ()	-
BENZENE	mg/kg	330[A]	0.5[B]	-	-	-	-	-	-	*ND (8.3)* ()	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	ND (17) ()	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	*ND (17)* ()	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-	*ND (8.3)* ()	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	ND (250) R ()	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	-	-	-	-	-	13 J ()	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (17) ()	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	ND (17) ()	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
TOLUENE	mg/kg	10000[A]	100[B]	-	-	-	-	-	-	64 ()	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	ND (8.3) ()	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	-	-	-	-	24 ()	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (83) R ()	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14
Sample Date				26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92
Sample ID				B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	ND (1.20) L ()	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	18.000 ()	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	-	-	-	-	-	ND (0.88) ()	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.880) ()	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (4.3) ()	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	-	-	-	-	-	1.1 ()	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	-	-	-	-	-	-	0.81 J ()	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.88) ()	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	ND (0.88) ()	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	0.73 J ()	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
CHRYSENE	mg/kg	190000[A]	230[B]	-	-	-	-	-	-	0.910 ()	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.880) ()	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	ND (0.88) ()	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	ND (0.88) ()	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.88) ()	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.800) ()	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	ND (0.88) ()	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (4.300) ()	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	ND (4.3) ()	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14
Sample Date				26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92
Sample ID				B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	1.3 ()	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.800) ()	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-	0.67 J ()	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	5.000 ()	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-	ND (0.880) ()	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	ND (0.88) ()	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	ND (2.7) ()	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.75 ()	8 J ()	6.9 ()	1 ()	13 J ()	11 ()	11 ()	***34 J***[B] ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (4.3) ()	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	ND (4.3) ()	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (4.3) ()	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	-	-	-	-	-	0.79 J ()	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	ND (0.88) ()	-
PYRENE	mg/kg	190000[A]	2200[B]	-	-	-	-	-	-	1.1 ()	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	ND (1.8) ()	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	*ND (1.8)* ()	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.88) ()	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.530) ()	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.880) ()	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	1.3 J ()	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	ND (0.88) ()	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	ND (0) ()	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.800) ()	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (4.5) ()	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14
Sample Date				26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92
Sample ID				B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (1.30) L ()	-
ARSENIC	mg/kg	190000[A]	29[B]	20.9 H ()	1.5 H ()	-	15.9 H ()	4.4 H ()	-	5.3 H ()	3.0 H ()
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	88.9 ()	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.66) ()	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	ND (0.66) ()	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	64.9 L ()	4.7 L ()	-	66.3 L ()	29.4 L ()	-	24.1 ()	25.8 L ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	10.2 ()	-
LEAD	mg/kg	190000[A]	450[B]	388 H ()	243 H ()	-	381 H ()	115 H ()	-	148 ()	110 H ()
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	0.43 J ()	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	18.7 ()	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	1.0 ()	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	13.8 ()	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	17.6 ()	0.10 ()	-	11.4 ()	11.5 ()	-	14.1 ()	11.1 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.13) ()	ND (0.08) ()	-	ND (0.12) ()	ND (0.09) ()	-	ND (0.13) ()	ND (0.09) ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	562 J ()	1610 J ()	-	3230 J ()	1810 J ()	-	1820 J ()	507 J ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	1.0 ()	ND (0.34) ()	-	ND (0.66) ()	ND (0.58) ()	-	ND (0.52) ()	ND (0.37) ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	80.2 ()	29.0 ()	-	52.1 ()	14.7 H ()	-	34.4 H ()	20.2 ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	5.6 ()	0.59 ()	-	2.1 ()	0.88 ()	-	1.4 ()	0.60 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	49500 J ()	1870 J ()	-	45200 J ()	5270 J ()	-	14600 L ()	16400 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (29.80) ()	ND (18.20) ()	-	ND (28.80) ()	ND (23.70) ()	-	ND (24.70) ()	ND (25.3) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4	B91-5	B91-6
Sample Date				25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92	26-Aug-92	27-Aug-92
Sample ID				B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9	B091A2	B091A4
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209886DL	P209885	P209934	P210010	P210012	P210013	P209936	P210008
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	ND (6.6) R ()
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	*ND (13)* ()
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	ND (13) ()
BENZENE	mg/kg	330[A]	0.5[B]	-	-	-	-	-	-	-	*ND (0.66)* ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	ND (1.3) ()
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	*ND (1.3)* ()
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-	-	*ND (0.66)* ()
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	ND (20) R ()
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	-	-	-	-	-	-	1.5 ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (1.3) ()
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	ND (1.3) ()
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
TOLUENE	mg/kg	10000[A]	100[B]	-	-	-	-	-	-	-	ND (0.66) ()
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	ND (0.66) ()
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	-	-	-	-	-	9 ()
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (6.6) R ()
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4	B91-5	B91-6
Sample Date				25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92	26-Aug-92	27-Aug-92
Sample ID				B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9	B091A2	B091A4
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209886DL	P209885	P209934	P210010	P210012	P210013	P209936	P210008
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	ND (0.90) L ()
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	1.600 ()
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	-	-	-	-	-	-	ND (0.35) ()
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.350) ()
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (1.7) ()
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	-	-	-	-	-	-	ND (0.35) ()
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	-	-	-	-	-	-	-	ND (0.35) ()
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.35) ()
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	-	ND (0.35) ()
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	0.58 B ()
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
CHRYSENE	mg/kg	190000[A]	230[B]	-	-	-	-	-	-	-	ND (0.210) ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.350) ()
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	-	ND (0.35) ()
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	ND (0.35) ()
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.35) ()
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.320) ()
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	ND (0.35) ()
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (1.700) ()
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	-	ND (1.7) ()
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4	B91-5	B91-6
Sample Date				25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92	26-Aug-92	27-Aug-92
Sample ID				B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9	B091A2	B091A4
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209886DL	P209885	P209934	P210010	P210012	P210013	P209936	P210008
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	-	0.16 J ()
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.710) ()
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-	-	ND (0.35) ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	0.560 J ()
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-	-	ND (0.350) ()
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	-	ND (0.35) ()
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	-	ND (1.1) ()
NAPHTHALENE	mg/kg	190000[A]	25[B]	***35***[B] ()	0.67 ()	2.3 ()	0.53 ()	3.5 ()	1.5 ()	0.45 J ()	0.81 ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (1.7) ()
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	-	ND (1.7) ()
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (1.7) ()
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	-	-	-	-	-	-	0.14 J ()
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	ND (0.35) ()
PYRENE	mg/kg	190000[A]	2200[B]	-	-	-	-	-	-	-	0.14 J ()
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	ND (0.71) ()
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	*ND (0.71)* ()
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.35) ()
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.210) ()
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.350) ()
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	0.15 J ()
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	-	ND (0.35) ()
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	-	ND (0) ()
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0.690) ()
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	ND (0) ()
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	ND (1.8) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4	B91-5	B91-6
Sample Date				25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92	26-Aug-92	27-Aug-92
Sample ID				B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9	B091A2	B091A4
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209886DL	P209885	P209934	P210010	P210012	P210013	P209936	P210008
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	1.7 L ()
ARSENIC	mg/kg	190000[A]	29[B]	-	17.5 H ()	7.5 H ()	13.8 H ()	6.3 H ()	9.6 H ()	4.8 H ()	11.8 H ()
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	151 ()
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	0.53 ()
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	-	ND (0.53) ()
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	31.1 L ()	56.7 L ()	***588 L*** [B] ()	167 J ()	49.9 J ()	83.5 L ()	163 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	-	5.8 ()
LEAD	mg/kg	190000[A]	450[B]	-	198 H ()	321 H ()	257 H ()	195 ()	258 ()	305 H ()	369 ()
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	-	ND (0.08) J ()
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	-	16.0 ()
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	-	ND (0.42) ()
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	-	66.6 ()
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	-	17.1 ()	11.3 ()	0.55 ()	10.5 J ()	8.9 J ()	13.2 ()	8.2 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	ND (0.12) ()	ND (0.11) ()	ND (0.10) ()	ND (0.13) L ()	ND (0.15) L ()	ND (0.12) ()	ND (0.11) ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	4740 J ()	2720 J ()	1410 J ()	4300 L ()	839 L ()	1760 J ()	ND (20.70) J ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	1.0 ()	1.0 ()	ND (0.60) ()	ND (0.58) L ()	ND (0.69) L ()	ND (0.74) ()	0.72 ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	55.4 ()	ND (5.70) ()	41.2 ()	26.7 ()	18.0 ()	43.2 ()	46.8 J ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	2.1 ()	2.7 ()	2.3 ()	1.9 ()	1.3 ()	0.04 ()	0.48 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	44700 J ()	34200 J ()	19100 J ()	40000 ()	39300 ()	40100 J ()	5030 L ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	35.2 ()	ND (26.50) ()	ND (19.20) ()	ND (23.30) ()	ND (26.60) ()	ND (29.90) ()	ND (20.70) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16
Sample Date				28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92
Sample ID				B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	ND (0.075) ()	-	-	-	-	ND (0.071) ()
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	ND (0.15) ()	-	-	-	-	ND (0.14) ()
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	ND (0.15) ()	-	-	-	-	ND (0.14) ()
BENZENE	mg/kg	330[A]	0.5[B]	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
CHLOROFORM	mg/kg	110[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	*ND (0.015)* ()	-	-	-	-	*ND (0.014)* ()
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	ND (0.22) R ()	-	-	-	-	ND (0.12) R ()
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	0.033 ()	-	-	-	-	ND (0.014) ()
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	0.01 B ()	-	-	-	-	ND (0.007) ()
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
TOLUENE	mg/kg	10000[A]	100[B]	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	0.006 J ()	-	-	-	-	ND (0.007) ()
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	ND (0.075) R ()	-	-	-	-	ND (0.071) R ()
Ethylene oxide	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16
Sample Date				28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92
Sample ID				B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092
Ethyleneimine	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) ()
Formaldehyde	mg/kg	200[A]	n/v	-	-	1.9 L ()	-	-	-	-	2.2 L ()
Methanethiol	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) ()
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()
BENZIDINE	mg/kg	190000[A]	n/v	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	-	0.35 J ()	-	-	-	-	0.17 L ()
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	-	-	0.38 J ()	-	-	-	-	0.18 L ()
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	0.63 B ()	-	-	-	-	0.34 B ()
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
CHRYSENE	mg/kg	190000[A]	230[B]	-	-	0.370 ()	-	-	-	-	0.190 L ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	ND (0.450) ()	-	-	-	-	ND (0.430) R ()
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	ND (2.400) ()	-	-	-	-	ND (2.300) R ()
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16
Sample Date				28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92
Sample ID				B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	0.44 J ()	-	-	-	-	0.21 L ()
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	ND (1.000) ()	-	-	-	-	ND (0.960) R ()
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	0.21 J ()	-	-	-	-	ND (0.47) R ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	ND (1.000) ()	-	-	-	-	ND (0.960) R ()
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	ND (1.5) ()	-	-	-	-	ND (1.4) R ()
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.78 ()	2.1 ()	0.31 J ()	ND (0.52) ()	0.33 J ()	0.61 ()	0.77 J ()	ND (0.47) R ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	-	0.32 J ()	-	-	-	-	0.19 L ()
PHENOL	mg/kg	18000[A]	200[B]	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
PYRENE	mg/kg	190000[A]	2200[B]	-	-	0.37 J ()	-	-	-	-	0.2 L ()
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	ND (1) ()	-	-	-	-	ND (0.96) R ()
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	*ND (1)* ()	-	-	-	-	*ND (0.96) R* ()
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	ND (0.300) ()	-	-	-	-	ND (0.290) R ()
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) R ()
Aniline	mg/kg	91[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
Benz(c)acridine	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) R ()
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	0.69 J ()	-	-	-	-	0.32 L ()
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) ()
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) R ()
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	ND (0.990) ()	-	-	-	-	ND (0.940) R ()
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) R ()
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	ND (0) R ()
Hydroquinone	mg/kg	190000[A]	n/v	-	-	ND (2.5) ()	-	-	-	-	ND (2.4) R ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16
Sample Date				28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92
Sample ID				B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	ND (1.50) L ()	-	-	-	-	ND (1.40) L ()
ARSENIC	mg/kg	190000[A]	29[B]	3.0 H ()	10.9 H ()	5.7 H ()	6.4 H ()	5.9 H ()	23.3 H ()	12.2 H ()	8.8 H ()
BARIUM	mg/kg	190000[A]	8200[B]	-	-	208 ()	-	-	-	-	178 ()
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	1.9 ()	-	-	-	-	1.7 ()
CADMIUM	mg/kg	190000[A]	38[B]	-	-	1.5 ()	-	-	-	-	ND (0.72) ()
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	16.8 J ()	45.9 J ()	55.2 ()	35.2 J ()	73.6 J ()	68.4 J ()	54.6 J ()	43.0 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	26.6 ()	-	-	-	-	20.5 ()
LEAD	mg/kg	190000[A]	450[B]	110 ()	299 ()	307 ()	121 ()	304 ()	354 ()	300 ()	222 ()
MERCURY	mg/kg	190000[A]	10[B]	-	-	1.8 J ()	-	-	-	-	2.1 J ()
NICKEL	mg/kg	190000[A]	650[B]	-	-	48.4 ()	-	-	-	-	45.5 ()
SELENIUM	mg/kg	190000[A]	26[B]	-	-	3.8 ()	-	-	-	-	3.3 ()
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	28.8 ()	-	-	-	-	23.8 ()
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	9.3 J ()	12.8 J ()	9.9 ()	14.4 J ()	12.5 J ()	9.2 J ()	17.6 J ()	11.5 ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.11) L ()	ND (0.14) L ()	ND (0.15) ()	ND (0.16) L ()	0.17 L ()	0.16 L ()	ND (0.18) L ()	ND (0.14) ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	2740 L ()	806 L ()	363 J ()	ND (31.40) L ()	ND (29.20) L ()	ND (27.00) L ()	15100 L ()	ND (36.40) J ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.54) L ()	ND (0.70) L ()	ND (0.73) ()	ND (0.79) L ()	ND (0.74) L ()	ND (0.70) L ()	ND (0.88) L ()	ND (0.67) ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	97.2 ()	109 ()	ND (6.00) L ()	ND (6.20) L ()	6.0 L ()	28.0 L ()	ND (7.10) L ()	ND (5.70) L ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	0.49 ()	1.8 ()	1.4 ()	ND (0.39) ()	1.8 ()	1.5 ()	5.2 ()	1.3 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	15300 ()	44800 ()	47000 L ()	18400 ()	52000 ()	48500 ()	65400 ()	28600 L ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (20.70) ()	ND (25.20) ()	ND (25.80) ()	ND (29.40) ()	ND (43.4) ()	ND (26.80) ()	ND (33.50) ()	40.1 ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2
Sample Date				26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	ND (8.7) R ()	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	*ND (17)* ()	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	ND (17) ()	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	-	-	*ND (0.87)* ()	-	-	-	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	ND (1.7) ()	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	*ND (1.7)* ()	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	*ND (0.87)* ()	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	ND (26) R ()	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	-	7.3 ()	-	-	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	ND (1.7) ()	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	0.85 J ()	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	ND (1.7) ()	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	-	-	0.71 J ()	-	-	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	ND (0.87) ()	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	18 ()	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	ND (8.7) R ()	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2
Sample Date				26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881
Ethyleneimine	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	ND (1.10) L ()	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	ND (0) ()	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	7.300 ()	-	-	-	-	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.18 L ()	-	0.65 ()	-	-	-	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.65 L ()	-	1.6 ()	-	-	-	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.45 L ()	-	1.7 ()	-	-	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	0.32 L ()	-	1.1 B ()	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.620 L ()	-	1.700 ()	-	-	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	ND (0.430) R ()	-	ND (0.420) ()	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	ND (2.300) R ()	-	ND (2.200) ()	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2
Sample Date				26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	0.79 L ()	-	3.7 ()	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	ND (0.960) R ()	-	ND (0.930) ()	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	ND (0.47) R ()	-	0.74 ()	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	0.370 L ()	-	2.000 ()	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	ND (1.4) R ()	-	0.2 J ()	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.56 L ()	1.1 ()	3.7 ()	2.4 ()	0.37 J ()	1.8 ()	ND (0.46) J ()	0.19 J ()
4-NITROANILINE	mg/kg	190000[A]	n/v	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.98 L ()	-	2.3 ()	-	-	-	-	-
PHENOL	mg/kg	18000[A]	200[B]	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.71 L ()	-	2.7 ()	-	-	-	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	ND (0.96) R ()	-	ND (0.93) ()	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	*ND (0.96) R* ()	-	*ND (0.93)* ()	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	ND (0.290) R ()	-	ND (0.280) ()	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	ND (0) R ()	-	ND (0) ()	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	ND (0) R ()	-	ND (0) ()	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	0.42 L ()	-	3.4 J ()	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	ND (0) ()	-	ND (0) ()	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	ND (0) R ()	-	ND (0) ()	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	ND (0.940) R ()	-	ND (0.920) ()	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	ND (0) R ()	-	ND (0) ()	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	ND (0) R ()	-	ND (0) ()	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	ND (2.4) R ()	-	ND (2.4) ()	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2
Sample Date				26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	ND (1.40) L ()	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	5.1 H ()	8.0 H ()	6.8 H ()	3.1 H ()	8.5 H ()	2.7 ()	12.7 ()
BARIUM	mg/kg	190000[A]	8200[B]	-	-	141 ()	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	1.2 ()	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	ND (0.69) ()	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	31.5 J ()	46.6 ()	25.4 J ()	71.7 J ()	56.9 J ()	***869 H*** [B] ()	***227 H*** [B] ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	18.3 ()	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	-	197 ()	182 ()	189 ()	191 ()	270 ()	115 ()	***973*** [B] ()
MERCURY	mg/kg	190000[A]	10[B]	-	-	0.95 J ()	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	33.7 ()	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	2.8 ()	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	22.3 ()	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	-	17.1 J ()	20.4 ()	15.2 J ()	14.1 J ()	17.3 J ()	10.8 J ()	23.0 J ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	ND (0.14) L ()	ND (0.14) ()	ND (0.14) L ()	ND (0.12) L ()	ND (0.16) L ()	ND (0.11) L ()	ND (0.09) L ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	ND (54.10) L ()	2290 J ()	3660 L ()	ND (25.60) L ()	6970 L ()	681 ()	26900 ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	ND (0.67) L ()	ND (0.72) ()	ND (0.61) L ()	ND (0.61) L ()	ND (0.81) L ()	6.8 ()	0.75 ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	ND (5.50) L ()	16.8 L ()	87.2 ()	ND (5.00) L ()	73.1 L ()	58.1 ()	25.0 ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	0.54 ()	1.3 ()	1.0 ()	0.34 ()	6.8 ()	0.42 ()	0.46 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	25300 ()	37400 L ()	38100 ()	11200 ()	45900 ()	15500 J ()	55700 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	ND (26.30) ()	ND (26.40) ()	ND (27.60) ()	ND (23.80) ()	ND (28.50) ()	ND (24.20) ()	89.0 ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-3	BNA-4	BNA-5	BNA-6		BNA-7	BNA-8	BNA-9
Sample Date				21-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92
Sample ID				B087B1	B087A4	B087A3	B087A1	B087A2	B088A3	B088A4	B088A2
Sample Depth				4 - 6 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209532	P208880	P208879	P208877	P208878	P208789	P208790	P208788
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	ND (0.058) ()	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	ND (0.12) ()	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	ND (0.12) ()	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	-	0.004 J ()	-	-	-	-	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	0.004 J ()	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	ND (0.12) ()	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	*ND (0.012)* ()	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	ND (0.006) ()	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	ND (0.17) R ()	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	ND (0.012) ()	-	-	-	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	0.055 ()	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	0.013 B ()	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	ND (0.012) ()	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	-	0.004 J ()	-	-	-	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	ND (0.006) ()	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	0.012 ()	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	ND (0.058) R ()	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	ND (0) ()	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-3	BNA-4	BNA-5	BNA-6		BNA-7	BNA-8	BNA-9
Sample Date				21-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92
Sample ID				B087B1	B087A4	B087A3	B087A1	B087A2	B088A3	B088A4	B088A2
Sample Depth				4 - 6 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209532	P208880	P208879	P208877	P208878	P208789	P208790	P208788
Ethyleneimine	mg/kg	n/v	n/v	-	ND (0) ()	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	ND (1.00) L ()	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	ND (0) ()	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	ND (0.012) ()	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	0.27 J ()	-	-	-	-	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	ND (0.380) J ()	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	ND (1.9) J ()	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	1.4 J ()	-	-	-	-	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	-	1.5 J ()	-	-	-	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	ND (0.38) J ()	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	0.69 B ()	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	-	1.400 J ()	-	-	-	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	ND (0.380) J ()	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	ND (0.38) J ()	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	ND (0.38) J ()	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	ND (0.350) J ()	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	ND (0.38) J ()	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	ND (1.900) J ()	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	ND (1.9) J ()	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-3	BNA-4	BNA-5	BNA-6		BNA-7	BNA-8	BNA-9
Sample Date				21-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92
Sample ID				B087B1	B087A4	B087A3	B087A1	B087A2	B088A3	B088A4	B088A2
Sample Depth				4 - 6 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209532	P208880	P208879	P208877	P208878	P208789	P208790	P208788
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	1.4 J ()	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	ND (0.780) J ()	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	0.72 J ()	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	ND (0.780) J ()	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	ND (0.380) J ()	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	ND (0.38) J ()	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	ND (1.2) J ()	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.42) ()	0.25 J ()	2.9 J ()	0.48 ()	0.18 J ()	0.69 ()	0.78 ()	ND (2.4) J ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	ND (1.9) J ()	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	ND (1.9) J ()	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	ND (1.9) J ()	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	0.75 J ()	-	-	-	-	-	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	-	-	-	-	-	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	ND (0.230) J ()	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	ND (0.380) J ()	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	ND (0) J ()	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	ND (0) J ()	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	0.89 J ()	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	ND (0.38) J ()	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	ND (0) J ()	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	ND (0) J ()	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	ND (0.770) J ()	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	ND (0) J ()	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	ND (0) J ()	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	ND (2) J ()	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-3	BNA-4	BNA-5	BNA-6		BNA-7	BNA-8	BNA-9
Sample Date				21-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92
Sample ID				B087B1	B087A4	B087A3	B087A1	B087A2	B088A3	B088A4	B088A2
Sample Depth				4 - 6 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company											
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209532	P208880	P208879	P208877	P208878	P208789	P208790	P208788
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	ND (1.20) L ()	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	12.0 ()	11.2 H ()	7.9 ()	17.3 ()	27.8 ()	18.1 ()	25.4 ()	11.9 ()
BARIUM	mg/kg	190000[A]	8200[B]	-	162 ()	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	0.58 ()	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	0.58 ()	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	62.5 H ()	32.2 ()	52.5 H ()	62.4 H ()	30.3 H ()	68.9 H ()	75.8 H ()	157 H ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	11.4 ()	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	***528***[B] ()	291 ()	450 ()	204 ()	62.0 ()	***513***[B] ()	***540***[B] ()	***887***[B] ()
MERCURY	mg/kg	190000[A]	10[B]	-	3.1 J ()	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	21.1 ()	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	0.70 ()	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	43.6 ()	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	7.5 J ()	9.2 ()	14.3 J ()	11.8 J ()	10.2 J ()	9.9 J ()	10.7 J ()	14.5 J ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.10) L ()	ND (0.12) ()	ND (0.09) L ()	ND (0.10) L ()	ND (0.12) L ()	ND (0.10) L ()	ND (0.10) L ()	0.23 L ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	14500 ()	372 J ()	8020 ()	4530 ()	7460 ()	1240 ()	1540 ()	96800 ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.64) ()	ND (0.58) ()	ND (0.62) ()	ND (0.66) ()	ND (0.85) ()	ND (0.69) ()	ND (0.63) ()	1.1 ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	ND (5.20) ()	ND (4.60) J ()	ND (5.00) ()	121 ()	40.7 ()	ND (5.50) ()	22.1 ()	25.4 ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	0.36 ()	0.41 ()	0.62 ()	2.5 ()	2.1 ()	4.8 ()	1.9 ()	0.74 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	17200 J ()	14100 L ()	37800 J ()	35100 J ()	40700 J ()	41100 J ()	44700 J ()	93200 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (25.70) ()	ND (20.70) ()	ND (22.70) ()	ND (24.20) ()	33.5 ()	32.0 ()	ND (26.30) ()	144 ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13	
Sample Date				17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92
Sample ID				B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft
Sampling Company										
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747
Volatile Organic Compounds										
ACETONITRILE	mg/kg	5500[A]	n/v	ND (0.062) J ()	-	ND (0.062) ()	ND (9.5) ()	ND (0.071) ()	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	ND (0.12) J ()	-	ND (0.12) ()	*ND (19)* ()	ND (0.14) ()	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	ND (0.12) J ()	-	ND (0.12) ()	ND (19) ()	ND (0.14) ()	-	-
BENZENE	mg/kg	330[A]	0.5[B]	0.005 J ()	-	0.006 J ()	*ND (0.95)* ()	ND (0.007) ()	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	0.005 J ()	-	0.01 J ()	ND (0.95) ()	ND (0.007) ()	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
CHLOROFORM	mg/kg	110[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	ND (0.012) J ()	-	ND (0.012) ()	ND (1.9) ()	ND (0.014) ()	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.012) J* ()	-	*ND (0.012)* ()	*ND (1.9)* ()	*ND (0.014)* ()	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.006) J ()	-	ND (0.006) ()	*ND (0.95)* ()	ND (0.007) ()	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	ND (0.19) R ()	-	ND (0.19) J ()	ND (28) R ()	ND (0.21) R ()	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.012) J ()	-	0.005 J ()	3 ()	0.014 J ()	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	0.048 J ()	-	0.041 ()	ND (1.9) ()	0.17 ()	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	0.012 B ()	-	0.015 B ()	0.9 J ()	0.011 B ()	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	ND (0.012) J ()	-	ND (0.012) ()	ND (1.9) ()	ND (0.014) ()	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	ND (0.006) ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.006) ()	-	0.009 ()	ND (0.95) ()	ND (0.007) ()	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.018 J ()	-	0.045 ()	ND (0.95) ()	ND (0.007) ()	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	ND (0.062) R ()	-	ND (0.062) J ()	ND (9.5) R ()	ND (0.071) R ()	-	-
Ethylene oxide	mg/kg	n/v	n/v	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13	
Sample Date				17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92
Sample ID				B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft
Sampling Company										
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747
Ethyleneimine	mg/kg	n/v	n/v	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-
Formaldehyde	mg/kg	200[A]	n/v	ND (1.20) L ()	-	NT	1.5 L ()	ND (1.40) L ()	-	-
Methanethiol	mg/kg	n/v	n/v	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	ND (0.012) J ()	-	ND (0.012) ()	1.000 J ()	ND (0.014) J ()	-	-
Volatile Organic Compounds (SW8011)										
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds										
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	3.6 ()	3.6 J ()	-	1 ()	0.38 J ()	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-
BENZIDINE	mg/kg	190000[A]	n/v	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	4.9 ()	5.1 J ()	-	ND (1) ()	0.53 ()	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	3.8 ()	4.8 J ()	-	ND (1) ()	0.59 ()	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	1.1 B ()	1.1 B ()	-	ND (1) ()	1.1 B ()	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	4.800 ()	5.300 J ()	-	0.720 ()	0.630 ()	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	0.13 J ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	ND (0.380) ()	ND (1.200) J ()	-	ND (0.910) ()	ND (0.430) ()	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	ND (2.000) ()	ND (6.700) J ()	-	ND (4.800) ()	ND (2.300) ()	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13	
Sample Date				17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92
Sample ID				B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft
Sampling Company										
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	12 J ()	11 J ()	-	0.64 J ()	0.82 ()	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	ND (0.840) ()	ND (2.800) J ()	-	ND (2.000) ()	ND (0.960) ()	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	1.6 ()	2.1 J ()	-	ND (1) ()	0.39 J ()	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	0.750 J ()	0.660 J ()	-	1.500 J ()	0.240 J ()	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{s2}$[A]	58$_{s2}$[B]	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	ND (1.2) ()	ND (4.2) J ()	-	ND (3) ()	ND (1.4) ()	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.68 ()	0.69 J ()	-	ND (1) ()	0.63 ()	0.52 ()	1.7 ()
4-NITROANILINE	mg/kg	190000[A]	n/v	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	ND (2) ()	*ND (6.7) J* ()	-	ND (4.8) ()	ND (2.3) ()	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	9.2 J ()	9.4 J ()	-	1.5 ()	0.84 ()	-	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	-	-	-	-	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	ND (0.250) ()	ND (0.830) J ()	-	ND (0.610) ()	ND (0.290) ()	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Aniline	mg/kg	91[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
Benz(c)acridine	mg/kg	n/v	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	7 J ()	3.3 J ()	-	ND (3.6) ()	1 J ()	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	ND (0.820) ()	ND (2.700) J ()	-	ND (2.000) ()	ND (0.940) ()	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-
Hydroquinone	mg/kg	190000[A]	n/v	ND (2.1) ()	ND (7.1) J ()	-	ND (5.2) ()	ND (2.4) ()	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13	
Sample Date				17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92
Sample ID				B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft
Sampling Company										
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747
Metals										
ANTIMONY	mg/kg	190000[A]	n/v	104 L ()	-	-	ND (1.50) L ()	ND (1.40) L ()	-	-
ARSENIC	mg/kg	190000[A]	29[B]	22.0 H ()	-	-	23.7 H ()	22.7 H ()	15.2 ()	17.9 ()
BARIUM	mg/kg	190000[A]	8200[B]	830 ()	-	-	445 ()	370 ()	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	ND (0.69) ()	-	-	2.4 ()	1.9 ()	-	-
CADMIUM	mg/kg	190000[A]	38[B]	2.2 ()	-	-	ND (0.76) ()	1.6 ()	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	77.8 ()	-	-	91.7 ()	97.9 ()	180 H ()	108 H ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	11.6 ()	-	-	24.7 ()	17.3 ()	-	-
LEAD	mg/kg	190000[A]	450[B]	***5200***[B] ()	-	-	***576***[B] ()	421 ()	388 ()	***1140***[B] ()
MERCURY	mg/kg	190000[A]	10[B]	3.7 J ()	-	-	***25.2 J***[B] ()	2.0 J ()	-	-
NICKEL	mg/kg	190000[A]	650[B]	66.6 ()	-	-	58.1 ()	40.8 ()	-	-
SELENIUM	mg/kg	190000[A]	26[B]	1.1 ()	-	-	1.7 ()	2.6 ()	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	43.1 ()	-	-	41.0 ()	39.8 ()	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-
General Chemistry										
Cation Exchange Capacity	meq/100g	n/v	n/v	14.2 ()	-	-	12.9 ()	11.6 ()	10.4 J ()	12.5 J ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.12) ()	-	-	ND (0.15) ()	ND (0.14) ()	ND (0.09) L ()	ND (0.10) L ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	3690 J ()	-	-	58800 J ()	3890 J ()	2340 ()	16800 ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.60) ()	-	-	1.2 ()	ND (0.68) ()	ND (0.61) ()	0.93 ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	ND (51.2) ()	-	-	50.1 J ()	35.5 J ()	20.0 ()	57.1 ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	2.4 ()	-	-	1.9 ()	2.4 ()	1.0 ()	2.5 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	32900 L ()	-	-	69100 L ()	61300 L ()	18300 J ()	62600 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (23.90) ()	-	-	ND (28.70) ()	64.3 ()	76.7 ()	167 ()

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3
Sample Date				7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09
Sample ID				AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft
Sampling Company				GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1680744	1680744	1163143	1163143	1163143
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466414	8466397	8466403	5784781	5784782	5784783
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.008) (0.0005)	ND (0.007) (0.0005)	ND (0.003) (0.0005)	ND (0.029) (0.0005)	ND (0.025) (0.0005)	ND (0.041) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	*ND (0.008)* (0.001)	*ND (0.007)* (0.001)	ND (0.003) (0.001)	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.008) (0.0005)	ND (0.007) (0.0005)	ND (0.003) (0.0005)	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	0.180 J (0.001)	ND (0.051) (0.001)	0.410 J (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.003 J (0.001)	0.003 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	0.410 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	0.003 J (0.001)	0.003 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.002 J (0.001)	0.005 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3
Sample Date				7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09
Sample ID				AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft
Sampling Company				GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1680744	1680744	1163143	1163143	1163143
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466414	8466397	8466403	5784781	5784782	5784783
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.940 J (0.003)	2.500 (0.003)	2.500 (0.003)	0.430 (0.033)	0.110 J (0.033)	4.7 (0.033)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.400 (0.003)	4.400 (0.003)	3.700 (0.003)	1.4 (0.033)	0.320 (0.033)	6.4 (0.033)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.900 (0.003)	4.300 (0.003)	4.000 (0.003)	1.7 (0.033)	0.360 (0.033)	5.1 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.400 (0.003)	4.800 (0.003)	4.500 (0.003)	2.2 (0.033)	0.410 (0.033)	7.0 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	2.000 (0.003)	4.600 (0.003)	2.700 (0.003)	1.4 (0.033)	0.290 (0.033)	3.4 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.600 (0.003)	3.800 (0.003)	3.600 (0.003)	1.4 (0.033)	0.340 (0.033)	7.1 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3
Sample Date				7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09
Sample ID				AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft
Sampling Company				GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1680744	1680744	1163143	1163143	1163143
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466414	8466397	8466403	5784781	5784782	5784783
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.490 J (0.003)	1.100 J (0.003)	2.000 (0.003)	0.210 J (0.033)	0.062 J (0.033)	4.1 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	1.2 (0.033)	0.250 (0.033)	2.8 (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	9.700 (0.003)	15.000 (0.003)	7.300 (0.003)	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.800 (0.003)	4.800 (0.003)	7.500 (0.003)	1.1 (0.033)	0.270 (0.033)	11 (0.033)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	1.900 (0.003)	5.200 (0.003)	6.100 (0.003)	1.9 (0.033)	0.440 (0.033)	15 (0.033)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3
Sample Date				7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09
Sample ID				AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft
Sampling Company				GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1680744	1680744	1680744	1163143	1163143	1163143
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8466414	8466397	8466403	5784781	5784782	5784783
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	343 (0.550)	200 (0.550)	151 (0.550)	73.1 (0.591)	47.1 (0.591)	264 (0.591)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	36.0 (0.50)	34.6 (0.50)	21.0 (0.50)	30.1 (0.50)	26.4 (0.50)	34.7 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-4	GP-270-S-5	GP-270-S-7	GP-270-S-8	GP-270-S-9	GP-270-S-10
Sample Date				22-Sep-09	22-Sep-09	29-Sep-09	29-Sep-09	6-Oct-09	6-Oct-09
Sample ID				S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)	S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)
Sample Depth				4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1163143	1163143	1163948	1163948	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5784784	5784785	5790787	5790788	5799591	5799592
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.035) (0.0005)	ND (0.031) (0.0005)	ND (0.044) (0.0005)	ND (0.044) (0.0005)	ND (0.057) (0.0005)	ND (0.051) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)	ND (0.088) (0.001)	ND (0.110) (0.001)	0.120 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.070) (0.001)	ND (0.061) (0.001)	0.100 J (0.001)	ND (0.088) (0.001)	ND (0.110) (0.001)	ND (0.100) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.070) (0.001)	0.130 J (0.001)	0.390 J (0.001)	0.710 (0.001)	0.660 (0.001)	0.870 (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.070) (0.001)	0.071 J (0.001)	0.280 J (0.001)	0.440 J (0.001)	0.990 (0.001)	0.700 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)	ND (0.088) (0.001)	0.120 J (0.001)	ND (0.100) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)	ND (0.088) (0.001)	ND (0.110) (0.001)	ND (0.100) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)	0.180 J (0.001)	0.170 J (0.001)	0.250 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-4	GP-270-S-5	GP-270-S-7	GP-270-S-8	GP-270-S-9	GP-270-S-10
Sample Date				22-Sep-09	22-Sep-09	29-Sep-09	29-Sep-09	6-Oct-09	6-Oct-09
Sample ID				S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)	S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)
Sample Depth				4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1163143	1163143	1163948	1163948	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5784784	5784785	5790787	5790788	5799591	5799592
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.230 J (0.033)	0.095 J (0.033)	4.1 (0.033)	2.1 J (0.033)	2.5 J (0.033)	2.0 J (0.033)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.520 (0.033)	0.230 (0.033)	4.9 (0.033)	2.2 J (0.033)	3.5 (0.033)	2.1 J (0.033)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.590 (0.033)	0.260 (0.033)	3.5 (0.033)	2.2 J (0.033)	2.9 (0.033)	3.6 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.690 (0.033)	0.340 (0.033)	3.9 (0.033)	2.5 J (0.033)	3.1 (0.033)	3.5 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.470 (0.033)	0.230 (0.033)	1.6 J (0.033)	1.5 J (0.033)	1.7 J (0.033)	4.5 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.610 (0.033)	0.260 (0.033)	5.6 (0.033)	2.6 J (0.033)	3.7 (0.033)	2.6 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-4	GP-270-S-5	GP-270-S-7	GP-270-S-8	GP-270-S-9	GP-270-S-10
Sample Date				22-Sep-09	22-Sep-09	29-Sep-09	29-Sep-09	6-Oct-09	6-Oct-09
Sample ID				S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)	S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)
Sample Depth				4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1163143	1163143	1163948	1163948	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5784784	5784785	5790787	5790788	5799591	5799592
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.160 J (0.033)	0.047 J (0.033)	4.3 (0.033)	1.7 J (0.033)	2.2 J (0.033)	0.960 J (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	0.410 (0.033)	0.210 J (0.033)	1.4 J (0.033)	1.1 J (0.033)	1.3 J (0.033)	3.5 (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	1.1 (0.033)	0.210 J (0.033)	18 (0.033)	5.5 (0.033)	8.9 (0.033)	3.1 (0.033)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.930 (0.033)	0.330 (0.033)	13 (0.033)	5.2 (0.033)	8.5 (0.033)	2.7 (0.033)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-4	GP-270-S-5	GP-270-S-7	GP-270-S-8	GP-270-S-9	GP-270-S-10
Sample Date				22-Sep-09	22-Sep-09	29-Sep-09	29-Sep-09	6-Oct-09	6-Oct-09
Sample ID				S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)	S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)
Sample Depth				4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1163143	1163143	1163948	1163948	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5784784	5784785	5790787	5790788	5799591	5799592
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1} [A]	190_{s1} [B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	20.7 (0.591)	28.9 (0.591)	387 (0.591)	443 (0.591)	328 (0.591)	447 (0.591)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	30.3 (0.50)	25.2 (0.50)	38.8 (0.50)	37.1 (0.50)	36.1 (0.50)	31.8 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07
Sample ID				S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Depth				2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	0.061 J (0.0005)	ND (0.41) ()	ND (0.35) ()	ND (0.39) ()	ND (0.390) (0.001)	ND (0.270) D ()	ND (0.270) D ()	ND (0.230) D ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.097) (0.001)	-	-	-	-	ND (0.270) D ()	ND (0.270) D ()	ND (0.230) D ()
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.097) (0.001)	-	-	-	-	ND (0.270) D ()	ND (0.270) D ()	ND (0.230) D ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.850 (0.001)	-	-	-	-	0.430 D ()	0.600 D ()	0.350 D ()
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.940 (0.001)	-	-	-	-	0.590 D ()	0.710 D ()	0.490 D ()
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	0.120 J (0.001)	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.097) (0.001)	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	0.190 J (0.001)	-	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07
Sample ID				S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Depth				2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.780 J (0.033)	ND (0.58) ()	0.39 J ()	-	-	ND (0.580) ()	ND (0.560) ()	ND (0.550) ()
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.0 J (0.033)	ND (0.58) ()	0.44 J ()	-	-	1.8 ()	0.380 J ()	0.810 ()
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.0 J (0.033)	ND (0.58) ()	0.41 J ()	-	-	2.0 ()	0.400 J ()	0.990 ()
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	1.4 J (0.033)	ND (0.58) ()	0.46 J ()	-	-	2.5 ()	0.560 ()	1.3 ()
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.760 J (0.033)	ND (0.58) ()	ND (0.56) ()	-	-	1.1 ()	ND (0.560) ()	0.390 J ()
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.1 J (0.033)	ND (0.58) ()	0.58 ()	-	-	2.0 ()	0.700 ()	0.890 ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07
Sample ID				S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Depth				2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.620 J (0.033)	ND (0.58) ()	0.4 J ()	-	-	ND (0.580) ()	ND (0.560) ()	ND (0.550) ()
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	0.620 J (0.033)	-	-	-	-	1.1 ()	ND (0.560) ()	0.360 J ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	0.92 ()	0.72 ()	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.1 J (0.033)	0.6 ()	1.5 ()	-	-	2.2 ()	0.590 ()	0.830 ()
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	1.9 J (0.033)	0.57 J ()	1.4 ()	-	-	2.9 ()	1.0 ()	1.8 ()
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07
Sample ID				S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3
Sample Depth				2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	LL	PIP	PIP	PIP
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	235 (0.591)	-	-	-	-	-	-	-
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	30.7 (0.50)	-	-	-	37.7 (0.50)	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Date				24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07
Sample ID				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074100	074100	074100	076856	076856	076856	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.230) D ()	ND (0.200) D ()	ND (0.340) D ()	ND (0.0058) ()	ND (0.0054) ()	ND (0.0051) ()	1.1 D[B] ()	2.8 D[B] ()
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.230) D ()	ND (0.200) D ()	ND (0.340) D ()	ND (0.0058) ()	ND (0.0054) ()	ND (0.0051) ()	1.2 D ()	1.9 D ()
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.230) D ()	ND (0.200) D ()	ND (0.340) D ()	ND (0.0058) ()	ND (0.0054) ()	ND (0.0051) ()	1.7 D ()	2.4 D ()
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.370 D ()	0.200 J D ()	ND (0.340) D ()	0.0022 J ()	0.0020 J ()	0.0023 J ()	1.0 D ()	0.870 D ()
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.500 D ()	0.380 D ()	ND (0.340) D ()	ND (0.0058) ()	ND (0.0054) ()	ND (0.0051) ()	1.4 D ()	2.6 D ()
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Date				24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07
Sample ID				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074100	074100	074100	076856	076856	076856	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.510) ()	ND (0.500) ()	ND (0.480) ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.1 ()	1.0 ()	0.460 J ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.320 J ()	ND (0.380) ()
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	1.7 ()	1.4 ()	0.590 ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.310 J ()	ND (0.380) ()
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.6 ()	1.5 ()	0.600 ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.420 ()	ND (0.380) ()
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.570 ()	0.830 ()	ND (0.480) ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	1.2 ()	1.2 ()	0.510 ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.410 ()	ND (0.380) ()
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Date				24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07
Sample ID				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074100	074100	074100	076856	076856	076856	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	ND (0.510) ()	ND (0.500) ()	ND (0.480) ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	0.540 ()	0.700 ()	0.430 J ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.850 ()	0.640 ()	0.470 J ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.510 ()	ND (0.380) ()
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	1.4 ()	1.4 ()	0.690 ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.820 ()	ND (0.380) ()
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Date				24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07
Sample ID				GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074100	074100	074100	076856	076856	076856	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	-	-	-	-	-	-	-	-
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16
Sample ID				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	LL
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	074097	074097	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4547	0705-4548	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103
Volatile Organic Compounds											
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	***3.3 D[B]*** ()	***3.0 D[B]*** ()	***8.6 D[B]*** ()	***3.8 D[B]*** ()	***0.790 D[B]*** ()	***1.3 D[B]*** ()	***2.1 D[B]*** ()	ND (0.0008) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	0.002 J (0.001)
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	1.8 D ()	4.1 D ()	1.1 D ()	12 D ()	0.250 D ()	0.530 D ()	0.520 D ()	ND (0.002) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	2.7 D ()	4.3 D ()	2.5 D ()	7.2 D ()	0.900 D ()	0.160 J D ()	0.920 D ()	ND (0.002) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	-	-	ND (0.0008) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.480 D ()	1.5 D ()	0.570 D ()	8.2 D ()	0.440 D ()	0.450 D ()	0.550 D ()	0.003 J (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	2.7 D ()	4.0 D ()	3.1 D ()	4.3 D ()	0.370 D ()	0.790 D ()	1.0 D ()	ND (0.002) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	-	-	0.002 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	-	-	-	-	-	ND (0.002) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16
Sample ID				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	LL
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	074097	074097	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4547	0705-4548	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)											
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	ND (0.00029) (0.00020)
Semi-Volatile Organic Compounds											
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	0.96 (0.0033)
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (0.550) ()	2.7 ()	ND (5.3) D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.8 (0.0033)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.330 J ()	ND (0.540) ()	ND (5.3) D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.9 (0.0033)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.350 J ()	ND (0.540) ()	ND (5.3) D ()	3.9 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.5 (0.0033)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.490 J ()	0.480 J ()	ND (5.3) D ()	3.5 J D ()	ND (5.5) D ()	0.550 ()	ND (0.540) ()	2.4 (0.0033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	ND (0.550) ()	ND (0.540) ()	ND (5.3) D ()	4.4 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.6 (0.0033)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	1.2 (0.0033)
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	1.5 (0.017)
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	-	ND (1.0) (0.067)
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	ND (1.0) (0.067)
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.370 J ()	0.440 J ()	5.5 D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.1 (0.0033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	-	0.66 (0.0033)
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	ND (1.0) (0.067)
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	ND (0.25) (0.017)
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	-	ND (4.5) (0.30)
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16
Sample ID				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	LL
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	074097	074097	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4547	0705-4548	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	-	2.5 (0.0033)
FLUORENE	mg/kg	190000[A]	3800[B]	ND (0.550) ()	1.1 ()	3.7 J D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.5 (0.0033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	ND (0.550) ()	ND (0.540) ()	ND (5.3) D ()	3.1 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.8 (0.0033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	8.4 (0.0033)
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-	-	-	-	-	-	0.87 (0.017)
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	-	ND (0.25) (0.017)
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	-	ND (2.5) (0.17)
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	ND (0.550) ()	2.7 ()	11 D ()	ND (5.6) D ()	ND (5.5) D ()	0.620 ()	ND (0.540) ()	5.8 (0.0033)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	ND (0.25) (0.017)
PYRENE	mg/kg	190000[A]	2200[B]	0.460 J ()	0.400 J ()	4.9 J D ()	ND (5.6) D ()	ND (5.5) D ()	0.530 J ()	ND (0.540) ()	2.6 (0.0033)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	ND (1.0) (0.067)
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	*ND (0.50)* (0.033)
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16
Sample ID				GP-277-PER3	GP-277-PER4	GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC
Laboratory				PIP	PIP	PIP	PIP	PIP	PIP	PIP	LL
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	074097	074097	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4547	0705-4548	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103
Metals											
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	-	20.5 (0.120)
LEAD	mg/kg	190000[A]	450[B]	-	-	-	-	-	-	-	286 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	-	42.7 (0.300)
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	-	51.4 (0.140)
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	546 (0.680)
General Chemistry											
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	34.6 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-02	GP280-03	GP280-04	GP280-05	GP280-06
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Sample ID				GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0
Sample Depth				3 ft	2 ft	3 ft	3 ft	3 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557105	8557106	8557107	8557109	8557110
Volatile Organic Compounds								
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.0007) (0.0005)	0.002 J (0.0005)	0.085 J (0.0005)	ND (0.0009) (0.0005)	ND (0.001) (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	0.005 J (0.001)	ND (0.002) (0.001)
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	0.10 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.0007) (0.0005)	ND (0.0006) (0.0005)	ND (0.034) (0.0005)	ND (0.0009) (0.0005)	ND (0.001) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	0.004 J (0.001)	0.002 J (0.001)	0.34 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	1.4 (0.001)	0.004 J (0.001)	ND (0.002) (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.001) (0.001)	0.001 J (0.001)	1.4 (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	0.18 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	0.24 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-02	GP280-03	GP280-04	GP280-05	GP280-06
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Sample ID				GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0
Sample Depth				3 ft	2 ft	3 ft	3 ft	3 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557105	8557106	8557107	8557109	8557110
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
Volatile Organic Compounds (SW8011)								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.00026) (0.00020)	ND (0.00024) (0.00020)	ND (0.00027) (0.00020)	ND (0.00029) (0.00020)	ND (0.00037) (0.00020)
Semi-Volatile Organic Compounds								
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	1.2 (0.0033)	0.088 J (0.0033)	2.1 (0.0033)	1.5 (0.0033)	0.65 (0.0033)
ANTHRACENE	mg/kg	190000[A]	350[B]	2.7 (0.0033)	0.24 (0.0033)	4.5 (0.0033)	2.1 (0.0033)	1.6 (0.0033)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	1.9 (0.0033)	0.43 (0.0033)	2.9 (0.0033)	1.4 (0.0033)	1.5 (0.0033)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	2.0 (0.0033)	0.52 (0.0033)	2.3 (0.0033)	1.1 (0.0033)	1.3 (0.0033)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	2.4 (0.0033)	0.61 (0.0033)	2.9 (0.0033)	1.6 (0.0033)	1.8 (0.0033)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	1.9 (0.0033)	0.47 (0.0033)	1.5 (0.0033)	1.2 (0.0033)	1.2 (0.0033)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	1.0 (0.0033)	0.31 (0.0033)	1.1 (0.0033)	0.83 (0.0033)	0.90 (0.0033)
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	2.0 (0.017)	ND (0.20) (0.017)	2.0 (0.017)	2.5 (0.017)	1.8 (0.017)
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	2.1 (0.0033)	0.77 (0.0033)	3.6 (0.0033)	1.7 (0.0033)	1.9 (0.0033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	0.49 (0.0033)	0.11 J (0.0033)	0.44 (0.0033)	0.31 (0.0033)	0.37 (0.0033)
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	ND (0.22) (0.017)	ND (0.20) (0.017)	1.1 (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	ND (3.9) (0.30)	ND (3.6) (0.30)	ND (4.2) (0.30)	ND (4.6) (0.30)	ND (5.6) (0.30)
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-02	GP280-03	GP280-04	GP280-05	GP280-06
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Sample ID				GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0
Sample Depth				3 ft	2 ft	3 ft	3 ft	3 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557105	8557106	8557107	8557109	8557110
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	3.2 (0.0033)	0.66 (0.0033)	6.6 (0.0033)	2.6 (0.0033)	2.6 (0.0033)
FLUORENE	mg/kg	190000[A]	3800[B]	1.8 (0.0033)	0.10 J (0.0033)	3.3 (0.0033)	1.3 (0.0033)	0.93 (0.0033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	1.4 (0.0033)	0.38 (0.0033)	1.1 (0.0033)	0.94 (0.0033)	1.0 (0.0033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	14 (0.0033)	0.62 (0.0033)	20 (0.0033)	20 (0.0033)	14 (0.0033)
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	1.5 (0.017)	ND (0.20) (0.017)	4.2 (0.017)	1.1 (0.017)	2.3 (0.017)
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	ND (0.22) (0.017)	ND (0.20) (0.017)	ND (0.23) (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	ND (2.2) (0.17)	ND (2.0) (0.17)	ND (2.3) (0.17)	ND (2.6) (0.17)	ND (3.1) (0.17)
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	6.9 (0.0033)	0.64 (0.0033)	11 (0.0033)	6.7 (0.0033)	5.2 (0.0033)
PHENOL	mg/kg	18000[A]	200[B]	ND (0.22) (0.017)	ND (0.20) (0.017)	ND (0.23) (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)
PYRENE	mg/kg	190000[A]	2200[B]	3.3 (0.0033)	0.74 (0.0033)	7.5 (0.0033)	2.3 (0.0033)	2.4 (0.0033)
PYRIDINE	mg/kg	10000[A]	12[B]	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)
QUINOLINE	mg/kg	10000[A]	0.37[B]	*ND (0.43)* (0.033)	*ND (0.40)* (0.033)	*ND (0.47)* (0.033)	*ND (0.51)* (0.033)	*ND (0.62)* (0.033)
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-02	GP280-03	GP280-04	GP280-05	GP280-06
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16
Sample ID				GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0
Sample Depth				3 ft	2 ft	3 ft	3 ft	3 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	1701349
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557105	8557106	8557107	8557109	8557110
Metals								
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	16.7 (0.120)	13.1 (0.120)	11.7 (0.120)	17.4 (0.120)	22.4 (0.120)
LEAD	mg/kg	190000[A]	450[B]	254 (0.550)	214 (0.550)	172 (0.550)	327 (0.550)	397 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	35.5 (0.300)	152 (0.300)	31.3 (0.300)	43.9 (0.300)	40.6 (0.300)
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	41.0 (0.140)	226 (0.140)	37.9 (0.140)	38.0 (0.140)	94.5 (0.140)
ZINC	mg/kg	190000[A]	12000[B]	595 (0.680)	1180 (0.680)	440 (0.680)	637 (0.680)	381 (0.680)
General Chemistry								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	22.9 (0.50)	18.3 (0.50)	29.1 (0.50)	35.0 (0.50)	46.8 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07
Sample ID				GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2
Sample Depth				3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	PIP	PIP
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557112	8557104	8557108	8557111	0706-0470	0706-0471
Volatile Organic Compounds									
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.0006) (0.0005)	ND (0.0006) (0.0005)	ND (0.0008) (0.0005)	ND (0.0006) (0.0005)	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	0.003 J (0.001)	ND (0.001) (0.001)	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.0006) (0.0005)	ND (0.0006) (0.0005)	ND (0.0008) (0.0005)	ND (0.0006) (0.0005)	-	-
HEXANE	mg/kg	10000[A]	5600[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.002 J (0.001)	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07
Sample ID				GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2
Sample Depth				3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	PIP	PIP
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557112	8557104	8557108	8557111	0706-0470	0706-0471
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)									
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.00022) (0.00020)	ND (0.00029) (0.00020)	ND (0.00030) (0.00020)	ND (0.0024) (0.00020)	-	-
Semi-Volatile Organic Compounds									
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	0.0048 J (0.0033)	0.31 (0.0033)	1.1 (0.0033)	0.31 (0.0033)	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.021 (0.0033)	0.94 (0.0033)	2.1 (0.0033)	0.86 (0.0033)	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.020 (0.0033)	1.2 (0.0033)	1.4 (0.0033)	0.79 (0.0033)	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.021 (0.0033)	1.3 (0.0033)	1.1 (0.0033)	0.75 (0.0033)	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.030 (0.0033)	1.6 (0.0033)	1.5 (0.0033)	0.82 (0.0033)	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.022 (0.0033)	1.1 (0.0033)	1.1 (0.0033)	1.0 (0.0033)	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	0.012 J (0.0033)	0.73 (0.0033)	0.74 (0.0033)	0.35 (0.0033)	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	ND (0.019) (0.017)	0.80 (0.017)	2.1 (0.017)	0.75 (0.017)	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.046 (0.0033)	1.3 (0.0033)	1.6 (0.0033)	1.3 (0.0033)	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	0.0057 J (0.0033)	0.33 (0.0033)	0.32 (0.0033)	0.28 (0.0033)	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	ND (0.34) (0.30)	ND (4.3) (0.30)	ND (4.6) (0.30)	ND (3.7) (0.30)	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07
Sample ID				GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2
Sample Depth				3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	PIP	PIP
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557112	8557104	8557108	8557111	0706-0470	0706-0471
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	0.036 (0.0033)	1.6 (0.0033)	2.7 (0.0033)	0.96 (0.0033)	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.0077 J (0.0033)	0.45 (0.0033)	1.3 (0.0033)	0.40 (0.0033)	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	0.015 J (0.0033)	0.96 (0.0033)	0.82 (0.0033)	0.63 (0.0033)	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	0.053 (0.0033)	5.1 (0.0033)	17 (0.0033)	5.5 (0.0033)	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	ND (0.019) (0.017)	0.40 J (0.017)	1.2 (0.017)	0.68 (0.017)	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	ND (0.19) (0.17)	ND (2.4) (0.17)	ND (2.5) (0.17)	ND (2.0) (0.17)	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.050 (0.0033)	2.8 (0.0033)	6.1 (0.0033)	2.6 (0.0033)	-	-
PHENOL	mg/kg	18000[A]	200[B]	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.055 (0.0033)	1.7 (0.0033)	2.5 (0.0033)	1.1 (0.0033)	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	ND (0.038) (0.033)	*ND (0.48)* (0.033)	*ND (0.51)* (0.033)	*ND (0.41)* (0.033)	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2
Sample Date				29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07
Sample ID				GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2
Sample Depth				3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	PIP	PIP
Laboratory Work Order		A	B	1701349	1701349	1701349	1701349	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8557112	8557104	8557108	8557111	0706-0470	0706-0471
Metals									
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	7.17 (0.120)	14.6 (0.120)	34.9 (0.120)	11.4 (0.120)	-	-
LEAD	mg/kg	190000[A]	450[B]	10.9 (0.550)	201 (0.550)	344 (0.550)	209 (0.550)	-	-
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	12.4 (0.300)	35.8 (0.300)	70.1 (0.300)	30.1 (0.300)	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	330 J ()	210 J ()
VANADIUM	mg/kg	190000[A]	820[B]	37.5 (0.140)	67.1 (0.140)	44.1 (0.140)	60.7 (0.140)	-	-
ZINC	mg/kg	190000[A]	12000[B]	32.9 (0.680)	319 (0.680)	621 (0.680)	285 (0.680)	-	-
General Chemistry									
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	11.7 (0.50)	31.0 (0.50)	35.4 (0.50)	18.9 (0.50)	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	7.98 ()	7.84 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-PER-3	LO-1000-SUB-1
Sample Date				29-May-07	29-May-07
Sample ID				LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN
Laboratory				PIP	PIP
Laboratory Work Order		A	B	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0472	0706-0473
Volatile Organic Compounds					
ACETONITRILE	mg/kg	5500[A]	n/v	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-
BENZENE	mg/kg	330[A]	0.5[B]	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-
TOLUENE	mg/kg	10000[A]	100[B]	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-PER-3	LO-1000-SUB-1
Sample Date				29-May-07	29-May-07
Sample ID				LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN
Laboratory				PIP	PIP
Laboratory Work Order		A	B	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0472	0706-0473
Ethyleneimine	mg/kg	n/v	n/v	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-
Methanethiol	mg/kg	n/v	n/v	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-
Volatile Organic Compounds (SW8011)					
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-
Semi-Volatile Organic Compounds					
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-PER-3	LO-1000-SUB-1
Sample Date				29-May-07	29-May-07
Sample ID				LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN
Laboratory				PIP	PIP
Laboratory Work Order		A	B	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0472	0706-0473
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-
INDENE	mg/kg	n/v	n/v	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{s2}[A]	58_{s2}[B]	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	-
PHENOL	mg/kg	18000[A]	200[B]	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-
Aniline	mg/kg	91[A]	n/v	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-

Table 4b

Historical Soil Analytical Results Summary – AOI 7 (>2 feet)
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				LO-1000-PER-3	LO-1000-SUB-1
Sample Date				29-May-07	29-May-07
Sample ID				LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN
Laboratory				PIP	PIP
Laboratory Work Order		A	B	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0706-0472	0706-0473
Metals					
ANTIMONY	mg/kg	190000[A]	n/v	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-
CHROMIUM	mg/kg	20000_{s1}[A]	190_{s1}[B]	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-
LEAD	mg/kg	190000[A]	450[B]	-	-
MERCURY	mg/kg	190000[A]	10[B]	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-
SODIUM	mg/kg	n/v	n/v	120 J ()	110 J ()
VANADIUM	mg/kg	190000[A]	820[B]	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-
General Chemistry					
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	8.22 ()	7.80 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-
SULFIDE	mg/kg	n/v	n/v	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-

Table 5

Summary PADEP Open Storage Tank Incidents
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

	PADEP Incident Number	Sunoco/ PES Tank Number	Former PADEP Tank Number	Current PADEP Tank Number (PES)	Quantity Released (Gallons)	Description	Regulatory Program
6/25/2002	29142	271	033A	NA	NA	Cat Cutter	PADEP Chapter 245 Storage Tank Program
11/11/1993	45694	272	054A	022A	142	Crude Oil	PADEP Chapter 245 Storage Tank Program
3/8/2011	42279	272	054A	022A	NA	Crude Oil	PADEP Chapter 245 Storage Tank Program
6/6/1995	45697	273	035A	003A	78	Cutter and VGO	PADEP Chapter 245 Storage Tank Program
9/16/1991	45689	275	057A	NA	84	Cat Charge Stock	PADEP Chapter 245 Storage Tank Program
6/25/2007	38132	277	039A	NA	NA	Petroleum Hydrocarbons	PADEP Chapter 245 Storage Tank Program
9/18/1999	30777	281	043A	025A	84	Cat Charge	PADEP Chapter 245 Storage Tank Program
11/24/2001	5913	281	043A	025A	200	Gas Oil	PADEP Chapter 245 Storage Tank Program
5/2/2006	36456	1002	139A	139A	NA	NA	PADEP Chapter 245 Storage Tank Program
5/30/2006	36578	1100	140A	140A	NA	NA	PADEP Chapter 245 Storage Tank Program
9/6/1998	45700	1108	149A	NA	4200	#6 Fuel Oil	PADEP Chapter 245 Storage Tank Program
01/1998	6134	M4	002	002	NA	Gasoline	PADEP Chapter 245 Storage Tank Program
01/1998	45686	M5	003	003	NA	Diesel Oil	PADEP Chapter 245 Storage Tank Program
01/1998	45699	M5	003	003	NA	Diesel Oil	PADEP Chapter 245 Storage Tank Program
Note: NA indicated information not applicable or not available							

Table 6

Existing Well Summary
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

AOI	Well ID	Former Well ID[2]	Well Status	Disposition of Well	Northing[3]	Easting[3]	Well Type[4]	Well Classification/ Hydrostratigraphic Unit[5]	Soil Boring Log Available (Y/N)	Contruction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[1]							
												Well Completion Depth (ft/bgs)[6]	Well Diameter (in)[7]	Top of Inner Casing Elevation (ft msl) (NAVD88)[8]	Ground Surface Elevation (ft msl) (NAVD88)[8]	Top of Screen Elev (ft msl) (NAVD88)[8]	Bottom of Screen Elevation (ft msl) (NAVD88)[8]	Depth to Screen (ft bgs)[8]	Screen Length (ft)[9]
AOI 7	C-104				219187.87	2679742	MW	Shallow						9.53	6.84				
AOI 7	C-105				219497.38	2679690.47	MW	Shallow						9.17	6.6				
AOI 7	C-106				219755.71	2679710.26	MW	Shallow						11.54	7.9				
AOI 7	C-107		Destroyed		220183.98	2680066.56	MW	Shallow						10.43	7.78				
AOI 7	C-108				219818.81	2680855.79	MW	Shallow						8.27	5.37				
AOI 7	C-109				219230.74	2682312.46	MW	Shallow						10	7.79				
AOI 7	C-110				219405.77	2682469.05	MW	Shallow						12.58	9.2				
AOI 7	C-111				219231.59	2682560.89	MW	Shallow						12.17	9.35				
AOI 7	C-112				218696.61	2682431.45	MW	Shallow						10.96	8.38				
AOI 7	C-113				218797.69	2682817.06	MW	Shallow						11.65	9.16				
AOI 7	C-114				218347.54	2683001.16	MW	Shallow						10.96	8.59				
AOI 7	C-127				220182.15	2680897.06	MW	Shallow	Y	Y	8/20/1992	16	4	9.8	6.7	1.7	-8.3	5	10
AOI 7	C-128		Destroyed		219916.236	2681231.109	MW	Shallow	Y	Y	8/12/1992	16	4	13.57				5	10
AOI 7	C-129				220497.185	2681937.365	MW	Shallow/Intermediate	Y	Y	6/2/2010	12	4	8.941	7.196	5.196	-4.804	2	10
AOI 7	C-130				219981.051	2682139.561	MW	Shallow	Y	Y	6/2/2010	15	4	11.984	10.287	5.287	-4.713	5	10
AOI 7	C-131				218971.277	2682328.675	MW	Shallow	Y	Y	6/3/2010	14	4	10.14	8.279	4.279	-5.721	4	10
AOI 7	C-132				218271.326	2682247.68	MW	Shallow	Y	Y	6/21/2010	14	4	9.973	8.094	4.094	-5.906	4	10
AOI 7	C-133				218336.074	2681693.849	MW	Shallow	Y	Y	6/21/2010	14	4	7.725	8.183	4.183	-5.817	4	10
AOI 7	C-136				219217.045	2680990.761	MW	Shallow	Y	Y	5/28/2010	14	4	8.846	6.785	2.785	-7.215	4	10
AOI 7	C-137		Repaired	Converted to Flush Mount	219098.264	2680719.078	MW	Shallow	Y	Y	5/27/2010	14	4	3.91	4.715	0.715	-9.285	4	10
AOI 7	C-138				218657.809	2680452.928	MW	Shallow	Y	Y	5/27/2010	12	4	6.95	4.477	2.477	-7.523	2	10
AOI 7	C-139				219443.936	2680633.143	MW	Shallow	Y	Y	6/2/2010	12	4	7.315	5.469	3.469	-6.531	2	10
AOI 7	C-140				218857.817	2679799.125	MW	Shallow	Y	Y	5/26/2010	12	4	7.545	7.987	5.987	-4.013	2	10
AOI 7	C-142				220134.108	2680659.962	MW	Shallow/Intermediate	Y	Y	6/3/2010	14	4	11.352	9.622	5.622	-4.378	4	10
AOI 7	C-143				220232.931	2680321.403	MW	Shallow/Intermediate	Y	Y	6/3/2010	14	4	6.45	6.89	2.89	-7.11	4	10
AOI 7	C-145				220222.267	2681007.478	MW	Shallow	Y	Y	8/9/2010	15	4	6.922	7.357	-7.643	-17.643	15	10
AOI 7	C-146				220254.825	2680639.828	MW	Shallow	Y	Y	8/10/2010	15	4	6.739	7.198	-7.802	-17.802	15	10
AOI 7	C-147				220262.747	2680516.947	MW	Shallow	Y	Y	8/10/2010	15	4	6.874	7.312	-7.688	-17.688	15	10
AOI 7	C-148		Destroyed		220266.672	2680540.203	MW	Shallow	Y	Y	5/23/2011	18	4	9.341	6.891	-8.109	-23.109	15	15
AOI 7	C-149		Destroyed		220269.615	2680524.161	MW	Shallow	Y	Y	5/23/2011	11	4	9.325	7.491	-7.509	-14.509	15	7
AOI 7	C-150				220262.743	2680607.068	MW	Shallow						8.19	6.76				
AOI 7	C-151		Damaged		220255.074	2680490.079	MW	Shallow						7.91	7.21				
AOI 7	C-152				220265.627	2680476.565	MW	Shallow						9.38	7.36				
AOI 7	C-153				220219.944	2680514.198	MW	Shallow						8.27	6.56				
AOI 7	C-154				220189.491	2680516.314	MW	Shallow						7.89	6.51				
AOI 7	C-155				220082.15	2680524.532	MW	Shallow						9.17	7.29				
AOI 7	C-156				220254.474	2681408.164	MW	Shallow	Y	Y	8/30/2011	23.5	4	6.7196	7.09	3.4589	-16.41	4	20
AOI 7	C-157				220255.107	2681432.423	MW	Shallow	Y	Y	8/31/2011	24	4	6.5824	6.83	3.8282	-17.17	3	20
AOI 7	C-158		Damaged	Well casing separated underground	220261.4	2681457.3	MW	Shallow	Y	Y	9/1/2011	24	4	6.6311	6.94	3.8786	-17.06	3	20
AOI 7	C-159				220269.235	2681506.198	MW	Shallow	Y	Y	9/6/2011	24	4	6.7927	6.9	3.9777	-17.1	3	20
AOI 7	C-160		Damaged	TIC broken/filled in with gravel	220255.771	2680459.144	MW	Shallow	Y	Y	9/7/2011	10	4	6.87				0	10
AOI 7	C-161				220266.206	2680460.174	MW	Shallow	Y	Y	9/7/2011	10	4	9.07	7.3	7.3	-2.7	0	10
AOI 7	C-162				220197.288	2680323.697	MW	Shallow						8.5	6.47				
AOI 7	C-163				220248.194	2681331.62	MW	Shallow						6.8749	7.25				
AOI 7	C-164				220252.467	2681359.225	MW	Shallow						6.8319	7.18				
AOI 7	C-165			Shallow	220255.493	2681386.442	MW	Shallow			12/31/1999			8.46	7.31				
AOI 7	C-166				220241.93	2680285.122	MW	Shallow						6.99	7.26				
AOI 7	C-167				220238.583	2680255.748	MW	Shallow						7.81	7.99				
AOI 7	C-168		Damaged	Shallow; Needs new riser	220173.58	2679988.45	MW	Shallow			12/31/1999			7.41	7.4				
AOI 7	C-169			Shallow	220266.914	2680430.61	MW	Shallow	Y	Y	12/31/1999	25	6	6.968	7.29	2.29	-17.71	5	20
AOI 7	C-170		Damaged				MW	Shallow	Y	Y	7/6/2016	11.5	4	-	-	-	-	1.5	10
AOI 7	C-171				219648.9	2679794.90	MW	Shallow	Y	Y	7/5/2016	13	4	10.36	7.9	7.36	0.36	3	10
AOI 7	C-172				218450.7	2680374.84	MW	Shallow	Y	Y	7/6/2016	13	4	5.91	3.8	2.91	-4.09	3	10
AOI 7	C-173		Reserved																
AOI 7	C-49				218494.96	2683022.45	MW	Shallow	Y	Y	2/22/1986	18	4	9.58	8.34	0.34	-9.66	8	10
AOI 7	C-50				219618.59	2682341.31	MW	Shallow	Y	Y	2/22/1986	15.5	4	12.77	9.33	3.83	-6.17	6	10
AOI 7	C-51				220073.27	2681621.38	MW	Shallow	Y	Y	2/25/1986	13	4	9.26				3	10
AOI 7	C-52				220206.46	2681216.48	MW	Shallow	Y	Y	2/25/1986	13	4	7.63	6.68	3.68	-6.32	3	10
AOI 7	C-53		Destroyed				MW	Shallow	Y	Y	2/24/1986	15	4					5	10
AOI 7	C-53A				219939.83	2681030.76	MW	Shallow	Y	Y	12/19/1991	14	4	9.47	7.12	5.12	-6.88	2	12
AOI 7	C-54				219458.97	2680975.3	MW	Shallow	Y	Y	12/19/1991	15	4	6.61	5.99	3.49	-8.51	3	12
AOI 7	C-55				218851.05	2680863.56	MW	Shallow	Y	Y	2/24/1986	15	4	9.41	6.49	1.49	-8.51	5	10

Table 6

Existing Well Summary
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

AOI	Well ID	Former Well ID[2]	Well Status	Disposition of Well	Northing[3]	Easting[3]	Well Type[4]	Well Classification/ Hydrostratigraphic Unit[5]	Soil Boring Log Available (Y/N)	Contruction Detail Available (Y/N)	Date of Well Completion	Well Construction Details[1]							
												Well Completion Depth (ft/bgs)[6]	Well Diameter (in)[7]	Top of Inner Casing Elevation (ft msl) (NAVD88)[8]	Ground Surface Elevation (ft msl) (NAVD88)[8]	Top of Screen Elev (ft msl) (NAVD88)[8]	Bottom of Screen Elevation (ft msl) (NAVD88)[8]	Depth to Screen (ft bgs)[8]	Screen Length (ft)[9]
AOI 7	C-56				218775.795	2681367.141	MW	Shallow	Y	Y	2/24/1986	13	4	10.72				3	10
AOI 7	C-57				219572.12	2681650.57	MW	Shallow	Y	Y	2/24/1986	14.5	4	8.5	8.45	3.95	-6.05	5	10
AOI 7	C-58				219017.2	2681692.06	MW	Shallow	Y	Y	2/28/1986	13	4	7.42	7.39	4.39	-5.61	3	10
AOI 7	C-59		Unable to Locate		218657.752	2681702.651	MW	Shallow	Y	Y		14	4					4	10
AOI 7	C-60				218657.01	2680150.7	MW	Shallow	Y	Y	2/24/1986	13	4	7.44	6.02	3.02	-6.98	3	10
AOI 7	C-61				219306.24	2679819.48	MW	Shallow	Y	Y	2/25/1986	13	4	7.93	7.88	4.88	-5.12	3	10
AOI 7	C-62				219889.7	2679892.08	MW	Shallow	Y	Y	2/25/1986	13	4	11.4	8.35	5.35	-4.65	3	10
AOI 7	C-63				219610.62	2680379.05	MW	Shallow	Y	Y	2/24/1986	13	4	7.41	4.17	1.17	-8.83	3	10
AOI 7	C-64				220166.66	2680430.9	MW	Shallow	Y	Y	2/24/1986	13	4	8.14	6.17	3.17	-6.83	3	10
AOI 7	C-65				220116.4	2680266	MW	Shallow	Y	Y	2/25/1986	13	4	10.84	7.47	4.47	-5.53	3	10
AOI 7	C-65D		Destroyed		220116.05	2680259.79	MW	Deep	Y	Y	11/11/1986	75	4	9.62	7.6	-57.4	-67.4	65	10
AOI 7	C-96				219529.38	2681979.8	MW	Shallow	Y	Y	10/23/1986	17	4	12.88	9.82	2.82	-7.18	7	10
AOI 7	C-97				220229.81	2680615.97	MW	Shallow	Y	Y	10/23/1986	15	4	10.52	7.55	2.55	-7.45	5	10
AOI 7	C-98				219208.25	2680220.18	MW	Shallow	Y	Y	10/23/1986	16.5	4	10.55	10.84	4.34	-5.66	7	10
AOI 7	PH-35		Destroyed				MW												
AOI 7	PH-38		Destroyed				MW												
AOI 7	PH-40		Destroyed		219766.99	2681683.823	MW												
AOI 7	PH-41		Destroyed		219112.637	2681758.395	MW												
AOI 7	RW-801				220246.373	2680575.418	RW	Shallow	N	N		25	6	6.272	6.71	1.71	-18.29	5	20
AOI 7	RW-802				220231.545	2680523.528	RW	Shallow	N	N		25	6	5.702	7.1	2.1	-17.9	5	20
AOI 7	RW-803				220259.632	2680481.614	RW	Shallow	N	N		25	6	5.776	7.15	2.15	-17.85	5	20
AOI 7	RW-804	C-170			220256.715	2680431.902	RW	Shallow	N	N		25.5	6	5.782	7.03	2.03	-18.47	5	20.5
AOI 7	RW-805				220256.5	2680430.59	RW	Shallow	Y	Y		25	6	5.7474	7.03	4.937	-17.97	2	20
AOI 7	RW-806				220228.801	2680360.113	RW	Shallow	N	N		25	6	5.41	6.82	1.82	-18.18	5	20
AOI 7	RW-807				220237.02	2680336.5	RW	Shallow	N	N		25	6	6.84	6.78	1.78	-18.22	5	20
AOI 7	RW-808				220230.297	2680285.228	RW	Shallow	N	N		25	6	6.081	7.37	2.37	-17.63	5	20
AOI 7	RW-809				220222.165	2680226.857	RW	Shallow	N	N		25	6	6.551	7.89	2.89	-17.11	5	20
AOI 7	RW-810				220214.629	2680174.32	RW	Shallow	N	N		25	6	6.438	7.82	2.82	-17.18	5	20
AOI 7	WP13-1		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP13-2		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP13-3		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP14-1		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP14-2				220196.331	2680218.708	Temporary Well Point	Shallow	Y	Y	5/27/1993	10.5		7.91	8.13	7.63	-2.37	1	10
AOI 7	WP14-3		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP14-4		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP14-5		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP15-1		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP15-2		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10
AOI 7	WP15-3		Destroyed				Temporary Well Point		Y	Y	5/27/1993	10.5						1	10

Notes:

ft/bgs Feet below ground surface
in Inches
NAVD88 North American Vertical Datum of 1988

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-49	C-50	C-51	C-51	C-52	C-54	C-54	C-57
Sample ID:		PADEP Act2	GW-11109614-C-49-072116-JM-005	GW-11109614-C-50-072716-JM-022	GW-11109614-C-51-072716-JM-024	GW-11109614-C-51D-072716-JM-026	GW-11109614-C-52-072716-AC-027	GW-11109614-C-54-072116-AC-006	GW-11109614-C54-081916-AC-03	GW-11109614-C-57-072616-JM-018
Sample Date:		Used Aquifer	07/21/2016	07/27/2016	07/27/2016	07/27/2016 Duplicate	07/27/2016	07/21/2016	08/19/2016	07/26/2016
Parameters	**Units**	**NR MSC**								
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	0.6 J	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.029)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.029)	ND(0.028)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	0.6 J	ND(2)	ND(2)	3	ND(2)	ND(2)	ND(2)
Methyl tert butyl ether (MTBE)	µg/L	20	1	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	-	-	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds										
Anthracene	µg/L	66	0.19	0.028 J	0.15	0.32	0.14	0.032 J	0.045 J	0.98
Benzo(a)anthracene	µg/L	4.9	0.017 J	ND(0.051)	0.060	0.12	0.033 J	0.026 J	0.034 J	1.2
Benzo(a)pyrene	µg/L	0.2	ND(0.052)	ND(0.051)	0.019 J	0.053	0.025 J	0.027 J	0.034 J	**1.1**
Benzo(b)fluoranthene	µg/L	1.2	0.013 J	ND(0.051)	0.031 J	0.071	0.042 J	0.035 J	0.032 J	1.2
Benzo(g,h,i)perylene	µg/L	0.26	0.012 J	ND(0.051)	0.015 J	0.041 J	0.020 J	0.020 J	0.026 J	**0.58**
Chrysene	µg/L	1.9	ND(0.052)	ND(0.051)	0.059	0.13	0.043 J	0.029 J	0.035 J	1.3
Fluorene	µg/L	1900	0.011 J	0.051	0.99	1.8	0.010 J	0.013 J	0.025 J	1.9
Naphthalene	µg/L	100	ND(0.062)	ND(0.061)	0.041 J	0.070	ND(0.060)	0.045 J	0.10	1.7
Phenanthrene	µg/L	1100	ND(0.062)	ND(0.061)	0.096	0.22	0.11	ND(0.062)	0.091	3.8
Pyrene	µg/L	130	0.040 J	0.065	0.87	1.7	0.15	0.042 J	0.055	2.2
Metals - Dissolved										
Lead (dissolved)	µg/L	5	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	0.11 J	ND(1.0)
General Chemistry										
Turbidity	NTU	-	-	-	-	-	-	-	-	-
Field Parameters										
Conductivity, field	umhos/cm	-	-	-	-	-	-	-	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-	-	-
pH, field	s.u.	-	-	-	-	-	-	-	-	-
Temperature, field	Deg C	-	-	-	-	-	-	-	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	-	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-58	C-60	C-61	C-62	C-96	C-104	C-104	C-104	C-105
Sample ID:		PADEP Act2	GW-11109614-C-58-072516-JM-014	GW-11109614-C-60-072116-AC-008	GW-11109614-C-61-072516-AC-013	GW-11109614-C-62-072716-JM-028	GW-11109614-C-96-072116-JM-009	C-104_20150521	C-104-20160524	GW-11109614-C-104-072616-AC-015	GW-11109614-C-105-072516-AC-011
Sample Date:		Used Aquifer	07/25/2016	07/21/2016	07/25/2016	07/27/2016	07/21/2016	05/21/2015	05/24/2016	07/26/2016	07/25/2016
Parameters	**Units**	**NR MSC**									
Volatile Organic Compounds											
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	8	ND(10)	ND(20)	ND(0.5)	ND(0.5)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(5)	**ND(10)**	ND(0.5)	ND(0.5)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.029)	ND(0.028)	ND(0.028)	ND(0.029)	ND(0.0096)	ND(0.0096)	ND(0.028)	ND(0.028)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	2	ND(10)	ND(20)	ND(0.5)	ND(0.5)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	ND(1)	ND(5)	**ND(10)**	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(5)	ND(10)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	ND(2)	2 J	ND(10)	ND(20)	ND(0.5)	ND(0.5)	ND(2)	ND(2)
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	1	ND(1)	ND(5)	ND(10)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(5)	ND(10)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	-	ND() ND	ND() ND	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	1	ND(5)	ND(10)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Semi-Volatile Organic Compounds											
Anthracene	µg/L	66	0.15	0.069	0.19	0.33	0.49	1	0.5 J	0.47	0.089
Benzo(a)anthracene	µg/L	4.9	0.050 J	0.025 J	0.12	0.26	0.27	0.8	0.1 J	0.15	0.080
Benzo(a)pyrene	µg/L	0.2	0.013 J	0.012 J	0.054	**0.30**	0.19	**0.6**	ND(0.1)	0.036 J	0.040 J
Benzo(b)fluoranthene	µg/L	1.2	0.015 J	0.020 J	0.042 J	0.34	0.20	0.5 J	ND(0.1)	0.044 J	0.041 J
Benzo(g,h,i)perylene	µg/L	0.26	ND(0.052)	0.012 J	0.018 J	0.22	0.10	**0.3 J**	ND(0.1)	0.014 J	0.018 J
Chrysene	µg/L	1.9	0.053	0.017 J	0.11	0.28	0.30	1	0.1 J	0.17	0.088
Fluorene	µg/L	1900	0.57	0.012 J	1.1	0.64	0.96	7	6	3.2	0.23
Naphthalene	µg/L	100	0.12	ND(0.062)	1.4	ND(0.061)	0.22	0.2 J	ND(0.1)	ND(0.061)	0.063
Phenanthrene	µg/L	1100	1.6	ND(0.062)	0.16	1.2	2.0	3	0.3 J	0.25	0.038 J
Pyrene	µg/L	130	0.61	0.091	0.85	0.46	1.1	3	2	1.9	0.31
Metals - Dissolved											
Lead (dissolved)	µg/L	5	ND(1.0)	ND(1.0)	ND(1.0)	0.19 J	0.10 J	ND(0.082)	ND(0.13)	ND(1.0)	0.13 J
General Chemistry											
Turbidity	NTU	-	-	-	-	-	-	195	39.6	-	-
Field Parameters											
Conductivity, field	umhos/cm	-	-	-	-	-	-	1180	958	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	1780	4100	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-110	-139	-	-
pH, field	s.u.	-	-	-	-	-	-	7.88	7.47	-	-
Temperature, field	Deg C	-	-	-	-	-	-	13.6	14.75	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	754000	612000	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			**C-106**	**C-108**	**C-112**	**C-113**	**C-127**	**C-127**	**C-127**	**C-129**
Sample ID:		**PADEP Act2**	**GW-11109614-C-106-080116-AC-042**	**GW-11109614-C-108-072816-JM-034**	**GW-11109614-C-112-072916-JM-040**	**GW-11109614-C-113-072116-JM-007**	**C-127_20150521**	**C-127-20160524**	**GW-11109614-C-127-072616-AC-020**	**GW-11109614-C-129-080116-AC-041**
Sample Date:			**08/01/2016**	**07/28/2016**	**07/29/2016**	**07/21/2016**	**05/21/2015**	**05/24/2016**	**07/26/2016**	**08/01/2016**
Parameters	**Units**	**Used Aquifer NR MSC**								
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	ND(2)	ND(2)	ND(0.5)	ND(0.5)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.028)	ND(0.028)	ND(0.029)	ND(0.0097)	ND(0.0097)	ND(0.028)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	ND(2)	ND(2)	ND(0.5)	ND(0.5)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	ND(2)	ND(2)	ND(2)	2	4	6	ND(2)
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	ND(1)	ND(1)	ND(1)	6	5	5	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	ND() ND	ND() ND	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(1)	ND(1)
Semi-Volatile Organic Compounds										
Anthracene	µg/L	66	0.40	0.073	0.13	0.061	0.5 J	0.4 J	0.59	0.031 J
Benzo(a)anthracene	µg/L	4.9	0.26	0.018 J	0.098	0.034 J	0.1 J	0.1 J	0.11	0.014 J
Benzo(a)pyrene	µg/L	0.2	0.19	ND(0.050)	0.069	0.017 J	ND(0.1)	0.1 J	0.079	ND(0.051)
Benzo(b)fluoranthene	µg/L	1.2	0.27	0.012 J	0.078	0.018 J	ND(0.1)	ND(0.1)	0.058	0.013 J
Benzo(g,h,i)perylene	µg/L	0.26	0.049 J	ND(0.050)	0.022 J	0.011 J	ND(0.1)	**0.6**	**0.36**	0.011 J
Chrysene	µg/L	1.9	0.33	0.017 J	0.10	0.034 J	0.2 J	ND(0.1)	0.13	0.015 J
Fluorene	µg/L	1900	0.76	0.076	0.68	0.057	4	3	1.1	ND(0.051)
Naphthalene	µg/L	100	0.15	0.054 J	0.079	ND(0.061)	ND(0.1)	ND(0.1)	ND(0.063)	0.18
Phenanthrene	µg/L	1100	1.5	ND(0.060)	0.25	0.17	0.1 J	0.3 J	0.30	ND(0.061)
Pyrene	µg/L	130	0.93	0.039 J	0.38	0.15	1	0.7	0.92	0.040 J
Metals - Dissolved										
Lead (dissolved)	µg/L	5	0.10 J	0.17 J	ND(1.0)	ND(1.0)	ND(0.082)	ND(0.13)	ND(1.0)	0.42 J
General Chemistry										
Turbidity	NTU	-	-	-	-	-	30.8	17.3	-	-
Field Parameters										
Conductivity, field	umhos/cm	-	-	-	-	-	2390	1540	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	810	3010	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-109	-131	-	-
pH, field	s.u.	-	-	-	-	-	7.8	7.42	-	-
Temperature, field	Deg C	-	-	-	-	-	14.88	16.33	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	1550000	982000	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-130	C-131	C-131	C-132	C-136	C-140	C-142
Sample ID:		PADEP Act2	GW-11109614-C-130-072516-JM-012	GW-11109614-C-131-072616-JM-016	GW-11109614-C131-081916-AC-04	GW-11109614-C-132-072516-JM-010	GW-11109614-C-136-072916-JM-036	GW-11109614-C-140-072616-AC-017	GW-11109614-C-142-072816-JM-030
Sample Date:		Used Aquifer	07/25/2016	07/26/2016	08/19/2016	07/25/2016	07/29/2016	07/26/2016	07/28/2016
Parameters	**Units**	**NR MSC**							
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.028)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	ND(2)	ND(2)	0.7 J	0.5 J	ND(2)	130
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	13	11	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	0.6 J
Total BTEX	µg/L	-	-	-	-	-	-	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds									
Anthracene	µg/L	66	ND(0.050)	1.4	0.32	0.082	0.080	0.15	0.61
Benzo(a)anthracene	µg/L	4.9	ND(0.050)	0.61	0.034 J	0.061	0.058	0.037 J	0.17
Benzo(a)pyrene	µg/L	0.2	ND(0.050)	**0.43**	ND(0.050)	0.031 J	0.026 J	0.026 J	0.14
Benzo(b)fluoranthene	µg/L	1.2	0.014 J	0.42	0.012 J	0.044 J	0.029 J	0.031 J	0.092
Benzo(g,h,i)perylene	µg/L	0.26	ND(0.050)	0.23	ND(0.050)	0.024 J	ND(0.051)	0.020 J	0.064
Chrysene	µg/L	1.9	0.012 J	0.67	0.044 J	0.077	0.063	0.035 J	0.33
Fluorene	µg/L	1900	ND(0.050)	3.9	0.67	0.074	0.25	1.3	1.2
Naphthalene	µg/L	100	ND(0.060)	0.65	0.072	0.038 J	ND(0.061)	0.34	0.27
Phenanthrene	µg/L	1100	ND(0.060)	0.63	0.15	0.041 J	ND(0.061)	0.30	0.38
Pyrene	µg/L	130	0.011 J	2.1	0.31	0.59	0.33	0.35	0.38
Metals - Dissolved									
Lead (dissolved)	µg/L	5	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	0.53 J	0.17 J
General Chemistry									
Turbidity	NTU	-	-	-	-	-	-	-	-
Field Parameters									
Conductivity, field	umhos/cm	-	-	-	-	-	-	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-	-
pH, field	s.u.	-	-	-	-	-	-	-	-
Temperature, field	Deg C	-	-	-	-	-	-	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-145	C-146	C-150	C-152	C-152	C-157	C-161
Sample ID:		PADEP Act2	GW-11109614-C-145-072716-AC-025	GW-11109614-C-146-080116-JM-037	GW-11109614-C-150-080116-JM-039	GW-11109614-C-152-072916-AC-033	GW-11109614-C-152-081916-AC-05	GW-11109614-C-157-072816-JM-032	GW-11109614-C-161-080116-JM-035
Sample Date:			07/27/2016	08/01/2016	08/01/2016	07/29/2016	08/19/2016	07/28/2016	08/01/2016
Parameters	**Units**	**Used Aquifer NR MSC**							
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	46	**130**	ND(2)	ND(2)	ND(2)	14
1,2-Dichloroethane	µg/L	5	ND(1)	ND(5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.029)	ND(0.028)	ND(0.029)	ND(0.028)	ND(0.028)	ND(0.028)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	14	48	ND(2)	ND(2)	ND(2)	3
Benzene	µg/L	5	ND(1)	ND(5)	ND(1)	**51**	2	ND(1)	1
Ethylbenzene	µg/L	700	ND(1)	ND(5)	16	3	ND(1)	ND(1)	7
Isopropyl benzene	µg/L	3500	ND(2)	130	59	15	3	ND(2)	31
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	ND(5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(5)	3	ND(1)	ND(1)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	-	-	-
Xylenes (total)	µg/L	10000	ND(1)	8	190	ND(1)	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds									
Anthracene	µg/L	66	0.45	**220**	20	0.18	0.079	0.039 J	1.4
Benzo(a)anthracene	µg/L	4.9	0.53	**190**	**10**	0.078	0.037 J	0.012 J	0.87
Benzo(a)pyrene	µg/L	0.2	**0.40**	**130**	**5.6**	0.048 J	0.030 J	0.011 J	**0.60**
Benzo(b)fluoranthene	µg/L	1.2	0.45	**170**	**6.8**	0.060	0.031 J	0.017 J	0.87
Benzo(g,h,i)perylene	µg/L	0.26	0.18	**38**	**1.3**	0.021 J	0.018 J	0.011 J	0.22
Chrysene	µg/L	1.9	0.68	**210**	**17**	0.12	0.061	0.011 J	0.85
Fluorene	µg/L	1900	0.22	320	45	0.51	0.25	ND(0.050)	5.8
Naphthalene	µg/L	100	0.53	**830**	**110**	2.9	0.39	ND(0.060)	3.5
Phenanthrene	µg/L	1100	0.46	1000	120	0.87	0.35	ND(0.060)	5.6
Pyrene	µg/L	130	1.5	**370**	28	0.30	0.17	0.042 J	2.8
Metals - Dissolved									
Lead (dissolved)	µg/L	5	0.19 J	0.97 J	ND(1.0)	0.11 J	0.12 J	0.19 J	0.19 J
General Chemistry									
Turbidity	NTU	-	-	-	-	-	-	-	-
Field Parameters									
Conductivity, field	umhos/cm	-	-	-	-	-	-	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-	-
pH, field	s.u.	-	-	-	-	-	-	-	-
Temperature, field	Deg C	-	-	-	-	-	-	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-163	C-163	C-168	C-169	C-170	C-170	C-170
Sample ID:		PADEP Act2	GW-11109614-C-163-072716-AC-021	GW-11109614-C-163D-072716-AC-023	GW-11109614-C-168-072616-AC-019	GW-11109614-C-169-080216-JM-043	GW-11109614-C-170-072916-AC-029	GW-11109614-C-170-082616-AC-001	GW-11109614-C-170D-082616-AC-002
Sample Date:		Used Aquifer	07/27/2016	07/27/2016 Duplicate	07/26/2016	08/02/2016	07/29/2016	08/26/2016	08/26/2016 Duplicate
Parameters	**Units**	**NR MSC**							
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	**170**	**250**	ND(2)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(5)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.029)	0.027 J	ND(0.028)	ND(0.029)	ND(0.029)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	65	72	ND(2)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	**600**	**370**	ND(1)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	79	150	ND(1)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	1 J	1 J	22	34	ND(2)	ND(2)	ND(2)
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	ND(1)	ND(1)	ND(5)	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	14	210	ND(1)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	-	-	-
Xylenes (total)	µg/L	10000	0.7 J	0.6 J	470	600	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds									
Anthracene	µg/L	66	0.50	0.36	0.96	14	0.17	0.19	0.24
Benzo(a)anthracene	µg/L	4.9	0.065	0.055	1.6	4.9	0.017 J	0.040 J	0.037 J
Benzo(a)pyrene	µg/L	0.2	0.032 J	0.024 J	**1.1**	**2.9**	0.011 J	0.047 J	0.041 J
Benzo(b)fluoranthene	µg/L	1.2	0.046 J	0.034 J	**1.4**	**3.1**	0.015 J	0.048 J	0.046 J
Benzo(g,h,i)perylene	µg/L	0.26	0.020 J	0.014 J	**0.53**	**0.71**	ND(0.050)	0.031 J	0.031 J
Chrysene	µg/L	1.9	0.085	0.074	1.6	**19**	0.024 J	0.033 J	0.044 J
Fluorene	µg/L	1900	2.2	1.7	3.9	50	0.022 J	0.054	0.062
Naphthalene	µg/L	100	ND(0.061)	ND(0.060)	ND(0.32)	**360**	0.068	0.11	0.11
Phenanthrene	µg/L	1100	0.89	0.58	3.0	170	ND(0.060)	0.056 J	0.059 J
Pyrene	µg/L	130	0.49	0.42	3.5	17	0.21	0.12	0.11
Metals - Dissolved									
Lead (dissolved)	µg/L	5	ND(1.0)	ND(1.0)	0.62 J	ND(1.0)	1.1	1.2	1.2
General Chemistry									
Turbidity	NTU	-	-	-	-	-	-	711.00	-
Field Parameters									
Conductivity, field	umhos/cm	-	-	-	-	-	-	4960	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	23130	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-162.00	-
pH, field	s.u.	-	-	-	-	-	-	6.98	-
Temperature, field	Deg C	-	-	-	-	-	-	21.44	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7a

Groundwater Analytical Results Summary, Unconfined Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			**C-171**	**C-171**	**C-172**	**C-172**
Sample ID:		**PADEP Act2 Used Aquifer**	**GW-11109614-C-171-072916-AC-031**	**GW-11109614-C-171-082616-AC-003**	**GW-11109614-C-172-072916-JM-038**	**GW-11109614-C-172-082616-AC-004**
Sample Date:			**07/29/2016**	**08/26/2016**	**07/29/2016**	**08/26/2016**
Parameters	**Units**	**NR MSC**				
Volatile Organic Compounds						
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.028)	ND(0.029)	ND(0.028)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	ND(2)	0.7 J	0.7 J
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds						
Anthracene	µg/L	66	0.25	0.32	0.23	0.58
Benzo(a)anthracene	µg/L	4.9	0.028 J	0.042 J	0.15	0.17
Benzo(a)pyrene	µg/L	0.2	0.011 J	0.027 J	0.11	0.097
Benzo(b)fluoranthene	µg/L	1.2	0.014 J	0.033 J	0.13	0.12
Benzo(g,h,i)perylene	µg/L	0.26	ND(0.051)	0.027 J	0.043 J	0.047 J
Chrysene	µg/L	1.9	0.021 J	0.039 J	0.16	0.18
Fluorene	µg/L	1900	0.064	0.036 J	2.8	6.2
Naphthalene	µg/L	100	0.037 J	0.071	0.16	0.25
Phenanthrene	µg/L	1100	0.11	0.13	1.3	7.7
Pyrene	µg/L	130	0.070	0.089	0.65	1.4
Metals - Dissolved						
Lead (dissolved)	µg/L	5	0.12 J	0.64 J	0.24 J	0.77 J
General Chemistry						
Turbidity	NTU	-	-	>1000.00	-	>1000.00
Field Parameters						
Conductivity, field	umhos/cm	-	-	2450	-	1630
Dissolved oxygen (DO), field	µg/L	-	-	2080	-	680
Oxidation reduction potential (ORP), field	millivolts	-	-	-158.00	-	-112.00
pH, field	s.u.	-	-	6.71	-	6.41
Temperature, field	Deg C	-	-	21.67	-	25.55
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-

Notes:

NR MSC	Non Residential Medium-Specific Concentrations (MSCs)
µg/L	Micrograms per liter.
deg c	Degrees Celcius.
S.U.	Standard Units.
NTU	Nephelometric Turbidity Units.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
ND(10)	Indicates reporting limit was above the applicable standard.

Table 7b

Groundwater Analytical Results Summary
Semi-Confined (Lower) Aquifer
Statewide Health Standards
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:			C-50D	C-129D	C-129D	C-134D	C-134D	C-144D
Sample ID:		PADEP Act2	GW-11109614-C-50D-072016-AC-003	GW-11109614-C-129D-072116-AC-004	GW-11109614-C129D-081916-AC-01	GW-11109614-C-134D-072016-AC-002	GW-11109614-C134D-081916-AC-02	GW-11109614-C-144D-072016-AC-001
Sample Date:		Used Aquifer	07/20/2016	07/21/2016	08/19/2016	07/20/2016	08/19/2016	07/20/2016
Parameters	**Units**	**NR MSC**						
Volatile Organic Compounds								
1,2,4-Trimethylbenzene	µg/L	62	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
1,2-Dichloroethane	µg/L	5	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	ND(0.029)	ND(0.029)	ND(0.028)	ND(0.029)	ND(0.028)	ND(0.029)
1,3,5-Trimethylbenzene	µg/L	1200	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
Benzene	µg/L	5	ND(1)	ND(1)	0.6 J	ND(1)	ND(1)	ND(1)
Ethylbenzene	µg/L	700	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Isopropyl benzene	µg/L	3500	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
Methyl tert butyl ether (MTBE)	µg/L	20	ND(1)	1	0.6 J	ND(1)	ND(1)	ND(1)
Toluene	µg/L	1000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Total BTEX	µg/L	-	-	-	-	-	-	-
Xylenes (total)	µg/L	10000	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)
Semi-Volatile Organic Compounds								
Anthracene	µg/L	66	0.17	0.016 J	0.041 J	0.011 J	ND(0.050)	ND(0.050)
Benzo(a)anthracene	µg/L	4.9	0.16	ND(0.051)	ND(0.050)	ND(0.051)	ND(0.050)	ND(0.050)
Benzo(a)pyrene	µg/L	0.2	**0.24**	ND(0.051)	ND(0.050)	ND(0.051)	ND(0.050)	ND(0.050)
Benzo(b)fluoranthene	µg/L	1.2	0.23	ND(0.051)	ND(0.050)	ND(0.051)	ND(0.050)	ND(0.050)
Benzo(g,h,i)perylene	µg/L	0.26	0.15	ND(0.051)	ND(0.050)	ND(0.051)	ND(0.050)	ND(0.050)
Chrysene	µg/L	1.9	0.15	ND(0.051)	ND(0.050)	ND(0.051)	ND(0.050)	ND(0.050)
Fluorene	µg/L	1900	0.71	0.035 J	0.11	0.075	ND(0.050)	ND(0.050)
Naphthalene	µg/L	100	ND(0.060)	ND(0.061)	0.095	ND(0.061)	ND(0.060)	ND(0.060)
Phenanthrene	µg/L	1100	0.20	ND(0.061)	0.13	ND(0.061)	ND(0.060)	ND(0.060)
Pyrene	µg/L	130	0.43	0.14	0.071	0.033 J	ND(0.050)	ND(0.050)
Metals - Dissolved								
Lead (dissolved)	µg/L	5	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
General Chemistry								
Turbidity	NTU	-	-	-	-	-	-	-
Field Parameters								
Conductivity, field	umhos/cm	-	-	-	-	-	-	-
Dissolved oxygen (DO), field	µg/L	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	-	-	-	-	-	-
pH, field	s.u.	-	-	-	-	-	-	-
Temperature, field	Deg C	-	-	-	-	-	-	-
Total dissolved solids, field (TDS)	µg/L	-	-	-	-	-	-	-

Notes:

NR MSC Non Residential Medium-Specific Concentrations (MSCs)
µg/L Micrograms per liter.
deg c Degrees Celcius.
S.U. Standard Units.
NTU Nephelometric Turbidity Units.
ND Not detected at the associated reporting limit.
J Estimated concentration.
ND(10) Indicates reporting limit was above the applicable standard.

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-49	C-50	C-50D			C-51		C-52	C-54		C-57	C-58	C-60	C-61	C-62	C-96
Sample Date			21-Jul-16	27-Jul-16	2-Apr-13	2-Apr-13	20-Jul-16	27-Jul-16	27-Jul-16	27-Jul-16	21-Jul-16	19-Aug-16	26-Jul-16	25-Jul-16	21-Jul-16	25-Jul-16	27-Jul-16	21-Jul-16
Sample ID			GW-11109614-C-49-072116-JM-005	GW-11109614-C-50-072716-JM-022	C-50D_40213	C-50D_40213	GW-11109614-C-50D-072016-AC-003	GW-11109614-C-51-072716-JM-024	GW-11109614-C-51D-072716-JM-026	GW-11109614-C-52-072716-AC-027	GW-11109614-C-54-072116-AC-006	GW-11109614-C54-081916-AC-03	GW-11109614-C-57-072616-JM-018	GW-11109614-C-58-072516-JM-014	GW-11109614-C-60-072116-AC-008	GW-11109614-C-61-072516-AC-013	GW-11109614-C-62-072716-JM-028	GW-11109614-C-96-072116-JM-009
Sampling Company			GHD	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory			LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order			1686199	1688921	JB33050	JB33050	1686199	1688921	1688921	1688921	1686199	1698036	1687764	1687764	1686199	1687764	1688921	1686199
Laboratory Sample ID	Units	MSC-PA	8489355	8501210	JB33050-3	JB33050-3F	8489351	8501212	8501214	8501215	8489353	8541533	8496061	8496057	8489354	8496056	8501216	8489357
Field Parameters																		
CONDUCTIVITY	mS/cm	n/v	1.815	0.89	-	-	1.22	0.667	0.667	0.614	1.21	-	1.798	7.055	1.18	1.14	2.999	1.655
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	8.54	3.31	-	-	0	2.84	2.84	7.18	3.47	-	2.87	0.34	6.06	4.13	2.18	7.8
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-157.6	-174.8	-	-	-123	-120.6	-120.6	-86	-48	-	-163.3	-165.3	-63	-77	-167.2	-142
pH, FIELD MEASURED	S.U.	n/v	6.84	7.2	-	-	6.89	6.8	6.8	6.62	7.56	-	6.88	6.8	6.67	7.11	7.38	6.99
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	17.45	22.86	-	-	18.36	25.2	25.2	26.05	30.9	-	17.73	30.06	29.17	32.3	22.04	19.63
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	52.8	288.4	-	-	43.1	39.8	39.8	0.1	156	-	177	147.3	27.3	26.2	277	192.2
Volatile Organic Compounds																		
BENZENE	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	*ND (10)* (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	*ND (10)* (0.5)
ETHYLBENZENE	µg/L	700	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (2) (0.5)	0.6 J (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	3 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	2 J (0.5)	ND (10) (0.5)	ND (20) (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	1 (0.5)	ND (1) (0.5)	ND (1.0) (0.16)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	1 (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)
TOLUENE	µg/L	1000	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)
TOTAL BTEX	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	0.6 J (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	8 (0.5)	ND (10) (0.5)	ND (20) (0.5)
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	2 (0.5)	ND (10) (0.5)	ND (20) (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	1 (0.5)	ND (5) (0.5)	ND (10) (0.5)
Volatile Organic Compounds (SW8011)																		
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)
Semi-Volatile Organic Compounds																		
ANTHRACENE	µg/L	66	0.19 (0.010)	0.028 J (0.010)	ND (0.10) (0.020)	-	0.17 (0.010)	0.15 (0.010)	0.32 (0.010)	0.14 (0.010)	0.032 J (0.010)	0.045 J (0.010)	0.98 (0.010)	0.15 (0.010)	0.069 (0.010)	0.19 (0.010)	0.33 (0.010)	0.49 (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	0.017 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	0.16 (0.010)	0.060 (0.010)	0.12 (0.010)	0.033 J (0.010)	0.026 J (0.010)	0.034 J (0.010)	1.2 (0.010)	0.050 J (0.010)	0.025 J (0.010)	0.12 (0.010)	0.26 (0.010)	0.27 (0.010)
BENZO(A)PYRENE	µg/L	0.2	ND (0.052) (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	***0.24 (0.010)***	0.019 J (0.010)	0.053 (0.010)	0.025 J (0.010)	0.027 J (0.010)	0.034 J (0.010)	***1.1 (0.010)***	0.013 J (0.010)	0.012 J (0.010)	0.054 (0.010)	***0.30 (0.010)***	0.19 (0.010)
BENZO(B)FLUORANTHENE	µg/L	1.2	0.013 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.010)	-	0.23 (0.010)	0.031 J (0.010)	0.071 (0.010)	0.042 J (0.010)	0.035 J (0.010)	0.032 J (0.010)	1.2 (0.010)	0.015 J (0.010)	0.020 J (0.010)	0.042 J (0.010)	0.34 (0.010)	0.20 (0.010)
BENZO(G,H,I)PERYLENE	µg/L	0.26	0.012 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.016)	-	0.15 (0.010)	0.015 J (0.010)	0.041 J (0.010)	0.020 J (0.010)	0.020 J (0.010)	0.026 J (0.010)	***0.58 (0.010)***	ND (0.052) (0.010)	0.012 J (0.010)	0.018 J (0.010)	0.22 (0.010)	0.10 (0.010)
CHRYSENE	µg/L	1.9	ND (0.052) (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	0.15 (0.010)	0.059 (0.010)	0.13 (0.010)	0.043 J (0.010)	0.029 J (0.010)	0.035 J (0.010)	1.3 (0.010)	0.053 (0.010)	0.017 J (0.010)	0.11 (0.010)	0.28 (0.010)	0.30 (0.010)
FLUORENE	µg/L	1900	0.011 J (0.010)	0.051 (0.010)	ND (0.10) (0.017)	-	0.71 (0.010)	0.99 (0.010)	1.8 (0.010)	0.010 J (0.010)	0.013 J (0.010)	0.025 J (0.010)	1.9 (0.010)	0.57 (0.010)	0.012 J (0.010)	1.1 (0.010)	0.64 (0.010)	0.96 (0.010)
NAPHTHALENE	µg/L	100	ND (0.062) (0.030)	ND (0.061) (0.030)	ND (0.10) (0.036)	-	ND (0.060) (0.030)	0.041 J (0.030)	0.070 (0.030)	ND (0.060) (0.030)	0.045 J (0.030)	0.10 (0.030)	1.7 (0.030)	0.12 (0.030)	ND (0.062) (0.030)	1.4 (0.030)	ND (0.061) (0.030)	0.22 (0.030)
PHENANTHRENE	µg/L	1100	ND (0.062) (0.030)	ND (0.061) (0.030)	ND (0.10) (0.021)	-	0.20 (0.030)	0.096 (0.030)	0.22 (0.030)	0.11 (0.030)	ND (0.062) (0.030)	0.091 (0.030)	3.8 (0.030)	1.6 (0.030)	ND (0.062) (0.030)	0.16 (0.030)	1.2 (0.030)	2.0 (0.030)
PYRENE	µg/L	130	0.040 J (0.010)	0.065 (0.010)	ND (0.10) (0.015)	-	0.43 (0.010)	0.87 (0.010)	1.7 (0.010)	0.15 (0.010)	0.042 J (0.010)	0.055 (0.010)	2.2 (0.010)	0.61 (0.010)	0.091 (0.010)	0.85 (0.010)	0.46 (0.010)	1.1 (0.010)
Metals																		
ARSENIC	µg/L	10	-	-	***56.2 (0.97)***	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	58600 (24)	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	ND (3.0) (1.7)	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	***3560 (0.40)***	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																		
ARSENIC	µg/L	10	-	-	-	***17.2 (0.97)***	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	36300 (24)	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	ND (1.0) (0.090)	ND (1.0) (0.090)	-	ND (3.0) (1.7)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.11 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.19 J (0.090)	0.10 J (0.090)
MANGANESE	µg/L	300	-	-	-	***3310 (0.40)***	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																		
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	396000 (5000)	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	396000 (3500)	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	272000 (48)	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	270 (5.1)	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	10800 (400)	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	43 B (5.6)	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	43 B (4.6)	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	ND (10) (1)	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	390 B (380)	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	980 (28)	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	242000 (2400)	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	836000 (1800)	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-104								C-105	C-106	C-108	C-112	C-113	C-127				
Sample Date			8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14	21-May-15	24-May-16	26-Jul-16	25-Jul-16	1-Aug-16	28-Jul-16	29-Jul-16	21-Jul-16	8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14
Sample ID			C-104	C-104_040813	C-104_040813	C-104	C-104	C-104_20150521	C-104-20160524	GW-11109614-C-104-072616-AC-015	GW-11109614-C-105-072516-AC-011	GW-11109614-C-106-080116-AC-042	GW-11109614-C-108-072816-JM-034	GW-11109614-C-112-072916-JM-040	GW-11109614-C-113-072116-JM-007	C-127	C-127_040813	C-127_040813	C-127	C-127
Sampling Company			UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL	UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order			20140718EZ	JB33644	JB33644	JB68336	JB68336	1563553	1666456	1687764	1687764	1689795	1688921	1689254	1686199	20140718EZ	JB33644	JB33644	JB68336	JB68336
Laboratory Sample ID	**Units**	**MSC-PA**	UNKNOWN	JB33644-11	JB33644-11F	JB68336-16	JB68336-16F	7900310	8402595	8496058	8496054	8504222	8501220	8502288	8489356	UNKNOWN	JB33644-12	JB33644-12F	JB68336-17	JB68336-17F
Field Parameters																				
CONDUCTIVITY	mS/cm	n/v	-	-	-	-	-	-	-	1.14	0.74	NM	1.04	1.23	0.545	-	-	-	-	-
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	-	-	-	-	-	1.78	4.1	4.11	3.81	NM	1.11	6.34	5.74	-	-	-	-	-
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-	-	-	-	-	-110	-139	-129	-81	NM	-99.9	-88	-108.2	-	-	-	-	-
pH, FIELD MEASURED	S.U.	n/v	-	-	-	-	-	7.88	7.47	6.96	6.61	NM	6.43	6.44	7.25	-	-	-	-	-
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	1.18	0.958	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	-	-	-	-	-	13.6	14.75	24.77	22.75	NM	21.75	22.38	24.02	-	-	-	-	-
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	0.754	0.612	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	-	-	-	-	-	195	39.6	39.2	117	NM	73.6	269	32.2	-	-	-	-	-
Volatile Organic Compounds																				
BENZENE	µg/L	5	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-
1,2-DICHLOROETHANE (EDC)	µg/L	5	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-
ETHYLBENZENE	µg/L	700	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	-	ND (2) (0.45)	-	ND (1.0) (0.26)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	2.2 (0.45)	-	3.6 (0.26)	-
METHYL TERTIARY BUTYL ETHER	µg/L	20	-	ND (1) (0.16)	-	ND (1.0) (0.26)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	7.5 (0.16)	-	4.4 (0.26)	-
TOLUENE	µg/L	1000	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-
TOTAL BTEX	µg/L	n/v	0.62 ()	-	-	-	-	ND	ND	-	-	-	-	-	-	0.57 ()	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-
1,3,5-TRIMETHYLBENZENE	µg/L	1200	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	-	0.62 J (0.24)	-	ND (1.0) (0.20)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	0.57 J (0.24)	-	0.22 J (0.20)	-
Volatile Organic Compounds (SW8011)																				
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-	ND (0.0096) (0.010)	ND (0.0096) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-
Semi-Volatile Organic Compounds																				
ANTHRACENE	µg/L	66	-	0.364 (0.02)	-	ND (0.10) (0.021)	-	1 (0.1)	0.5 J (0.1)	0.47 (0.010)	0.089 (0.010)	0.40 (0.010)	0.073 (0.010)	0.13 (0.010)	0.061 (0.010)	-	0.285 (0.02)	-	0.281 (0.021)	-
BENZO(A)ANTHRACENE	µg/L	4.9	-	ND (0.1) (0.012)	-	0.260 (0.012)	-	0.8 (0.1)	0.1 J (0.1)	0.15 (0.010)	0.080 (0.010)	0.26 (0.010)	0.018 J (0.010)	0.098 (0.010)	0.034 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-
BENZO(A)PYRENE	µg/L	0.2	-	ND (0.1) (0.012)	-	***0.201 (0.013)***	-	***0.6 (0.1)***	ND (0.1) (0.1)	0.036 J (0.010)	0.040 J (0.010)	0.19 (0.010)	ND (0.050) (0.010)	0.069 (0.010)	0.017 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.013)	-
BENZO(B)FLUORANTHENE	µg/L	1.2	-	ND (0.1) (0.01)	-	0.240 (0.010)	-	0.5 J (0.1)	ND (0.1) (0.1)	0.044 J (0.010)	0.041 J (0.010)	0.27 (0.010)	0.012 J (0.010)	0.078 (0.010)	0.018 J (0.010)	-	ND (0.1) (0.01)	-	ND (0.10) (0.010)	-
BENZO(G,H,I)PERYLENE	µg/L	0.26	-	ND (0.1) (0.016)	-	0.122 (0.016)	-	***0.3 J (0.1)***	ND (0.1) (0.1)	0.014 J (0.010)	0.018 J (0.010)	0.049 J (0.010)	ND (0.050) (0.010)	0.022 J (0.010)	0.011 J (0.010)	-	ND (0.1) (0.016)	-	ND (0.10) (0.016)	-
CHRYSENE	µg/L	1.9	-	ND (0.1) (0.012)	-	0.202 (0.012)	-	1 (0.1)	0.1 J (0.1)	0.17 (0.010)	0.088 (0.010)	0.33 (0.010)	0.017 J (0.010)	0.10 (0.010)	0.034 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-
FLUORENE	µg/L	1900	-	2.35 (0.017)	-	ND (0.10) (0.017)	-	7 (0.1)	6 (0.1)	3.2 (0.010)	0.23 (0.010)	0.76 (0.010)	0.076 (0.010)	0.68 (0.010)	0.057 (0.010)	-	1.64 (0.017)	-	2.15 (0.018)	-
NAPHTHALENE	µg/L	100	-	ND (0.1) (0.036)	-	ND (0.10) (0.036)	-	0.2 J (0.1)	ND (0.1) (0.1)	ND (0.061) (0.030)	0.063 (0.030)	0.15 (0.030)	0.054 J (0.030)	0.079 (0.030)	ND (0.061) (0.030)	-	ND (0.1) (0.036)	-	ND (0.10) (0.037)	-
PHENANTHRENE	µg/L	1100	-	0.633 (0.021)	-	0.161 (0.021)	-	3 (0.1)	0.3 J (0.1)	0.25 (0.030)	0.038 J (0.030)	1.5 (0.030)	ND (0.060) (0.030)	0.25 (0.030)	0.17 (0.030)	-	ND (0.1) (0.021)	-	0.225 (0.022)	-
PYRENE	µg/L	130	-	0.641 (0.015)	-	0.429 (0.015)	-	3 (0.1)	2 (0.1)	1.9 (0.010)	0.31 (0.010)	0.93 (0.010)	0.039 J (0.010)	0.38 (0.010)	0.15 (0.010)	-	0.59 (0.015)	-	0.440 (0.015)	-
Metals																				
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																				
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	ND (3) (1.7)	-	2.3 J (1.3)	ND (0.082) (0.082)	ND (0.13) (0.13)	ND (1.0) (0.090)	0.13 J (0.090)	0.10 J (0.090)	0.17 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	-	-	ND (3) (1.7)	-	ND (3.0) (1.3)
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																				
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-127			C-129								C-129D				C-130
Sample Date			21-May-15	24-May-16	26-Jul-16	8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14	21-May-15	24-May-16	1-Aug-16	2-Apr-13	2-Apr-13	21-Jul-16	19-Aug-16	25-Jul-16
Sample ID			C-127_20150521	C-127-20160524	GW-11109614-C-127-072616-AC-020	C-129	C-129_040813	C-129_040813	C-129	C-129	C-129_20150521	C-129-20160524	GW-11109614-C-129-080116-AC-041	C-129D_40213	C-129D_40213	GW-11109614-C-129D-072116-AC-004	GW-11109614-C129D-081916-AC-01	GW-11109614-C-130-072516-JM-012
Sampling Company			STANTEC	STANTEC	GHD	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	GHD	LANGAN	LANGAN	GHD	GHD	GHD
Laboratory			LL	LL	LL	UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL
Laboratory Work Order			1563553	1666456	1687764	20140718EZ	JB33644	JB33644	JB68336	JB68336	1563553	1666456	1689795	JB33050	JB33050	1686199	1698036	1687764
Laboratory Sample ID	Units	MSC-PA	7900309	8402596	8496064	UNKNOWN	JB33644-13	JB33644-13F	JB68336-18	JB68336-18F	7900308	8402597	8504218	JB33050-4	JB33050-4F	8489352	8541531	8496055
Field Parameters																		
CONDUCTIVITY	mS/cm	n/v	-	-	1.64	-	-	-	-	-	-	-	0.715	-	-	0.73	-	0.518
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	0.81	3.01	2.71	-	-	-	-	-	1.65	2.92	5.01	-	-	2.34	-	4.9
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-109	-131	-115	-	-	-	-	-	1	3	-17	-	-	-202	-	-101
pH, FIELD MEASURED	S.U.	n/v	7.8	7.42	6.76	-	-	-	-	-	8.5	8.04	7.4	-	-	7.53	-	7.78
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	2.39	1.54	-	-	-	-	-	-	0.748	0.584	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	14.88	16.33	27.22	-	-	-	-	-	14.52	16.16	23.21	-	-	20.17	-	19.28
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	1.55	0.982	-	-	-	-	-	-	0.479	0.372	-	-	-	-	-	-
TURBIDITY	NTU	n/v	30.8	17.3	11.4	-	-	-	-	-	39.6	31.4	76.6	-	-	0	-	63.4
Volatile Organic Compounds																		
BENZENE	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	0.6 J (0.5)	ND (1) (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ETHYLBENZENE	µg/L	700	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	2 (0.5)	4 (0.5)	6 (0.5)	-	ND (2) (0.45)	-	ND (1.0) (0.26)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	6 (0.5)	5 (0.5)	5 (0.5)	-	ND (1) (0.16)	-	ND (1.0) (0.26)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	0.82 J (0.16)	-	1 (0.5)	0.6 J (0.5)	ND (1) (0.5)
TOLUENE	µg/L	1000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
TOTAL BTEX	µg/L	n/v	ND	ND	-	ND	-	-	-	-	ND	ND	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (1.0) (0.20)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
Volatile Organic Compounds (SW8011)																		
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.0097) (0.010)	ND (0.0097) (0.010)	ND (0.028) (0.010)	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-	ND (0.0096) (0.010)	ND (0.0097) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)
Semi-Volatile Organic Compounds																		
ANTHRACENE	µg/L	66	0.5 J (0.1)	0.4 J (0.1)	0.59 (0.010)	-	ND (0.1) (0.02)	-	ND (0.10) (0.020)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.031 J (0.010)	ND (0.10) (0.020)	-	0.016 J (0.010)	0.041 J (0.010)	ND (0.050) (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	0.1 J (0.1)	0.1 J (0.1)	0.11 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.014 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)
BENZO(A)PYRENE	µg/L	0.2	ND (0.1) (0.1)	0.1 J (0.1)	0.079 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)
BENZO(B)FLUORANTHENE	µg/L	1.2	ND (0.1) (0.1)	ND (0.1) (0.1)	0.058 (0.010)	-	ND (0.1) (0.01)	-	ND (0.10) (0.010)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.013 J (0.010)	ND (0.10) (0.010)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.014 J (0.010)
BENZO(G,H,I)PERYLENE	µg/L	0.26	ND (0.1) (0.1)	***0.6 (0.1)***	***0.36 (0.010)***	-	ND (0.1) (0.016)	-	ND (0.10) (0.016)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.011 J (0.010)	ND (0.10) (0.016)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)
CHRYSENE	µg/L	1.9	0.2 J (0.1)	ND (0.1) (0.1)	0.13 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.015 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.012 J (0.010)
FLUORENE	µg/L	1900	4 (0.1)	3 (0.1)	1.1 (0.010)	-	ND (0.1) (0.017)	-	ND (0.10) (0.017)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.051) (0.010)	0.207 (0.017)	-	0.035 J (0.010)	0.11 (0.010)	ND (0.050) (0.010)
NAPHTHALENE	µg/L	100	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.063) (0.030)	-	ND (0.1) (0.036)	-	ND (0.10) (0.036)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.18 (0.030)	ND (0.10) (0.036)	-	ND (0.061) (0.030)	0.095 (0.030)	ND (0.060) (0.030)
PHENANTHRENE	µg/L	1100	0.1 J (0.1)	0.3 J (0.1)	0.30 (0.030)	-	ND (0.1) (0.021)	-	ND (0.10) (0.021)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.061) (0.030)	ND (0.10) (0.021)	-	ND (0.061) (0.030)	0.13 (0.030)	ND (0.060) (0.030)
PYRENE	µg/L	130	1 (0.1)	0.7 (0.1)	0.92 (0.010)	-	ND (0.1) (0.015)	-	ND (0.10) (0.015)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.040 J (0.010)	ND (0.10) (0.015)	-	0.14 (0.010)	0.071 (0.010)	0.011 J (0.010)
Metals																		
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	2.6 J (0.97)	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	*ND (50)* (0.59)	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	76100 (24)	-	-	-	-
LEAD	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	2.2 J (1.7)	-	-	-	-
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	***1540 (0.40)***	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-	-
Metals, Dissolved																		
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	ND (3.0) (0.97)	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	*ND (50)* (0.59)	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	54300 (24)	-	-	-
LEAD	µg/L	5	ND (0.082) (0.082)	ND (0.13) (0.13)	ND (1.0) (0.090)	-	-	ND (3) (1.7)	-	2.2 J (1.3)	0.13 J (0.082)	ND (0.13) (0.13)	0.42 J (0.090)	-	2.5 J (1.7)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	***1500 (0.40)***	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-
General Chemistry																		
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	447000 (5000)	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	447000 (3500)	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	33200 (48)	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	-	-	-	-	-	-	-	-	83 B (5.1)	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	-	-	-	-	-	-	-	-	***32400 (1600)***	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	-	-	-	-	-	-	-	-	36 B (5.6)	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	36 B (4.6)	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	-	-	-	-	-	-	-	-	ND (10) (1)	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	600 B (380)	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	1200 B (280)	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	249000 (2400)	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	485000 (1800)	-	-	-	-

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-131		C-132	C-134D				C-136	C-140	C-142	C-144D			C-145	C-146	C-150
Sample Date			26-Jul-16	19-Aug-16	25-Jul-16	1-Apr-13	1-Apr-13	20-Jul-16	19-Aug-16	29-Jul-16	26-Jul-16	28-Jul-16	2-Apr-13	2-Apr-13	20-Jul-16	27-Jul-16	1-Aug-16	1-Aug-16
Sample ID			GW-11109614-C-131-072616-JM-016	GW-11109614-C131-081916-AC-04	GW-11109614-C-132-072516-JM-010	C-134D_40113	C-134D_40113	GW-11109614-C-134D-072016-AC-002	GW-11109614-C134D-081916-AC-02	GW-11109614-C-136-072916-JM-036	GW-11109614-C-140-072616-AC-017	GW-11109614-C-142-072816-JM-030	C-144D_40213	C-144D_40213	GW-11109614-C-144D-072016-AC-001	GW-11109614-C-145-072716-AC-025	GW-11109614-C-146-080116-JM-037	GW-11109614-C-150-080116-JM-039
Sampling Company			GHD	GHD	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD
Laboratory			LL	LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL
Laboratory Work Order			1687764	1698036	1687764	JB32976	JB32976	1686199	1698036	1689254	1687764	1688921	JB33050	JB33050	1686199	1688921	1689795	1689795
Laboratory Sample ID	Units	MSC-PA	8496059	8541534	8496053	JB32976-6	JB32976-6F	8489350	8541532	8502286	8496060	8501217	JB33050-5	JB33050-5F	8489349	8501213	8504220	8504221
Field Parameters																		
CONDUCTIVITY	mS/cm	n/v	4.212	-	0.574	-	-	0.725	-	1.6612	1.41	1.91	-	-	0.415	1.26	NM	NM
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	4.25	-	1.38	-	-	2.83	-	4.63	14.63	6.59	-	-	5.08	1.54	NM	NM
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-138.2	-	-173	-	-	-48	-	-35	-54	-122	-	-	64	-116	NM	NM
pH, FIELD MEASURED	S.U.	n/v	7	-	7.47	-	-	6.58	-	6.5	7.51	6.93	-	-	9.26	6.88	NM	NM
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	20.01	-	22.6	-	-	22.45	-	21.05	25	30.43	-	-	21.88	28.1	NM	NM
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	230.3	-	50	-	-	76.4	-	11.6	93.2	0	-	-	0	504	NM	NM
Volatile Organic Compounds																		
BENZENE	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)
ETHYLBENZENE	µg/L	700	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	16 (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (2) (0.5)	ND (2) (0.5)	0.7 J (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	0.5 J (0.5)	ND (2) (0.5)	130 (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	130 (0.5)	59 (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	13 (0.5)	11 (0.5)	ND (1) (0.5)	0.92 J (0.16)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	2.4 (0.16)	-	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)
TOLUENE	µg/L	1000	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	0.6 J (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	3 (0.5)
TOTAL BTEX	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	46 (0.5)	***130 (0.5)***
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	14 (0.5)	48 (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	8 (0.5)	190 (0.5)
Volatile Organic Compounds (SW8011)																		
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)
Semi-Volatile Organic Compounds																		
ANTHRACENE	µg/L	66	1.4 (0.010)	0.32 (0.010)	0.082 (0.010)	ND (0.10) (0.020)	-	0.011 J (0.010)	ND (0.050) (0.010)	0.080 (0.010)	0.15 (0.010)	0.61 (0.010)	ND (0.10) (0.020)	-	ND (0.050) (0.010)	0.45 (0.010)	***220 (0.010)***	20 (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	0.61 (0.010)	0.034 J (0.010)	0.061 (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.058 (0.010)	0.037 J (0.010)	0.17 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)	0.53 (0.010)	***190 (0.010)***	***10 (0.010)***
BENZO(A)PYRENE	µg/L	0.2	***0.43 (0.010)***	ND (0.050) (0.010)	0.031 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.026 J (0.010)	0.026 J (0.010)	0.14 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)	***0.40 (0.010)***	***130 (0.010)***	***5.6 (0.010)***
BENZO(B)FLUORANTHENE	µg/L	1.2	0.42 (0.010)	0.012 J (0.010)	0.044 J (0.010)	ND (0.10) (0.010)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.029 J (0.010)	0.031 J (0.010)	0.092 (0.010)	ND (0.10) (0.010)	-	ND (0.050) (0.010)	0.45 (0.010)	***170 (0.010)***	***6.8 (0.010)***
BENZO(G,H,I)PERYLENE	µg/L	0.26	0.23 (0.010)	ND (0.050) (0.010)	0.024 J (0.010)	ND (0.10) (0.016)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.051) (0.010)	0.020 J (0.010)	0.064 (0.010)	ND (0.10) (0.016)	-	ND (0.050) (0.010)	0.18 (0.010)	***38 (0.010)***	***1.3 (0.010)***
CHRYSENE	µg/L	1.9	0.67 (0.010)	0.044 J (0.010)	0.077 (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.063 (0.010)	0.035 J (0.010)	0.33 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)	0.68 (0.010)	***210 (0.010)***	***17 (0.010)***
FLUORENE	µg/L	1900	3.9 (0.010)	0.67 (0.010)	0.074 (0.010)	ND (0.10) (0.017)	-	0.075 (0.010)	ND (0.050) (0.010)	0.25 (0.010)	1.3 (0.010)	1.2 (0.010)	ND (0.10) (0.017)	-	ND (0.050) (0.010)	0.22 (0.010)	320 (0.010)	45 (0.010)
NAPHTHALENE	µg/L	100	0.65 (0.030)	0.072 (0.030)	0.038 J (0.030)	ND (0.10) (0.036)	-	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.061) (0.030)	0.34 (0.030)	0.27 (0.030)	ND (0.10) (0.036)	-	ND (0.060) (0.030)	0.53 (0.030)	***830 (0.030)***	***110 (0.030)***
PHENANTHRENE	µg/L	1100	0.63 (0.030)	0.15 (0.030)	0.041 J (0.030)	ND (0.10) (0.021)	-	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.061) (0.030)	0.30 (0.030)	0.38 (0.030)	0.203 (0.021)	-	ND (0.060) (0.030)	0.46 (0.030)	1000 (0.030)	120 (0.030)
PYRENE	µg/L	130	2.1 (0.010)	0.31 (0.010)	0.59 (0.010)	ND (0.10) (0.015)	-	0.033 J (0.010)	ND (0.050) (0.010)	0.33 (0.010)	0.35 (0.010)	0.38 (0.010)	0.173 (0.015)	-	ND (0.050) (0.010)	1.5 (0.010)	***370 (0.010)***	28 (0.010)
Metals																		
ARSENIC	µg/L	10	-	-	-	4.9 (0.97)	-	-	-	-	-	-	***10.6 (0.97)***	-	-	-	-	-
COBALT	µg/L	35	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	1.7 J (0.59)	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	17100 (24)	-	-	-	-	-	-	23100 (24)	-	-	-	-	-
LEAD	µg/L	5	-	-	-	***5.7 (1.7)***	-	-	-	-	-	-	ND (3.0) (1.7)	-	-	-	-	-
MANGANESE	µg/L	300	-	-	-	***785 (0.40)***	-	-	-	-	-	-	95.9 (0.40)	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-	-	-
Metals, Dissolved																		
ARSENIC	µg/L	10	-	-	-	-	2.1 J (0.97)	-	-	-	-	-	-	1.9 J (0.97)	-	-	-	-
COBALT	µg/L	35	-	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	1.6 J (0.59)	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	1150 (24)	-	-	-	-	-	-	4470 (24)	-	-	-	-
LEAD	µg/L	5	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	-	***6.0 (1.7)***	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.53 J (0.090)	0.17 J (0.090)	-	ND (3.0) (1.7)	ND (1.0) (0.090)	0.19 J (0.090)	0.97 J (0.090)	ND (1.0) (0.090)
MANGANESE	µg/L	300	-	-	-	-	***711 (0.40)***	-	-	-	-	-	-	84.9 (0.40)	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-	-
General Chemistry																		
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	382000 (5000)	-	-	-	-	-	-	448000 (5000)	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	383000 (3500)	-	-	-	-	-	-	448000 (3500)	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	136000 (48)	-	-	-	-	-	-	45200 (48)	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	740 (5.1)	-	-	-	-	-	-	330 (5.1)	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	16200 (1200)	-	-	-	-	-	-	***35000 (1800)***	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	30 B (5.6)	-	-	-	-	-	-	22 B (5.6)	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	30 B (4.6)	-	-	-	-	-	-	22 B (4.6)	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	ND (10) (1)	-	-	-	-	-	-	ND (10) (1)	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	11200 (380)	-	-	-	-	-	-	2400 B (380)	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	410 B (280)	-	-	-	-	-	-	ND (2000) (280)	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	2900 (240)	-	-	-	-	-	-	267000 (4800)	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	544000 (1800)	-	-	-	-	-	-	312000 (1800)	-	-	-	-	-

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-152		C-157	C-161	C-163		C-168	C-169	C-170			C-171		C-172	
Sample Date			29-Jul-16	19-Aug-16	28-Jul-16	1-Aug-16	27-Jul-16	27-Jul-16	26-Jul-16	2-Aug-16	29-Jul-16	26-Aug-16	26-Aug-16	29-Jul-16	26-Aug-16	29-Jul-16	26-Aug-16
Sample ID			GW-11109614-C-152-072916-AC-033	GW-11109614-C152-081916-AC-05	GW-11109614-C-157-072816-JM-032	GW-11109614-C-161-080116-JM-035	GW-11109614-C-163-072716-AC-021	GW-11109614-C-163D-072716-AC-023	GW-11109614-C-168-072616-AC-019	GW-11109614-C-169-080216-JM-043	GW-11109614-C-170-072916-AC-029	GW-11109614-C-170-082616-AC-001	GW-11109614-C-170D-082616-AC-002	GW-11109614-C-171-072916-AC-031	GW-11109614-C-171-082616-AC-003	GW-11109614-C-172-072916-JM-038	GW-11109614-C-172-082616-AC-004
Sampling Company			GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory			LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order			1689254	1698036	1688921	1689795	1688921	1688921	1687764	1689795	1689254	1700683	1700683	1689254	1700683	1689254	1700683
Laboratory Sample ID	Units	MSC-PA	8502285	8541535	8501219	8504219	8501209	8501211	8496062	8504223	8502282	8553542	8553543	8502283	8553545	8502287	8553546
Field Parameters																	
CONDUCTIVITY	mS/cm	n/v	NM	-	1.155	NM	1.66	1.66	NM	NM	4.03	4.96	-	2.44	2.45	0.995	1.63
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	NM	-	4	NM	NM	NM	NM	NM	7.15	23.13	-	1.63	2.08	3.64	0.68
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	NM	-	-86.4	NM	-114	-114	NM	NM	-126	-162	-	-121	-158	-48	-112
pH, FIELD MEASURED	S.U.	n/v	NM	-	6.89	NM	6.82	6.82	NM	NM	6.76	6.98	-	6.53	6.71	6.4	6.41
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	NM	-	26.68	NM	23.99	23.99	NM	NM	25.11	21.44	-	23.28	21.67	22.49	25.55
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	NM	-	10	NM	0	0	NM	NM	310	711	-	0	1000.00 >	178.7	1000.00 >
Volatile Organic Compounds																	
BENZENE	µg/L	5	***51 (0.5)***	2 (0.5)	ND (1) (0.5)	1 (0.5)	ND (1) (0.5)	ND (1) (0.5)	***600 (0.5)***	***370 (0.5)***	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ETHYLBENZENE	µg/L	700	3 (0.5)	ND (1) (0.5)	ND (1) (0.5)	7 (0.5)	ND (1) (0.5)	ND (1) (0.5)	79 (0.5)	150 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	15 (0.5)	3 (0.5)	ND (2) (0.5)	31 (0.5)	1 J (0.5)	1 J (0.5)	22 (0.5)	34 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	0.7 J (0.5)	0.7 J (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
TOLUENE	µg/L	1000	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	14 (0.5)	210 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
TOTAL BTEX	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	14 (0.5)	ND (2) (0.5)	ND (2) (0.5)	***170 (0.5)***	***250 (0.5)***	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	3 (0.5)	ND (2) (0.5)	ND (2) (0.5)	65 (0.5)	72 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	0.7 J (0.5)	0.6 J (0.5)	470 (0.5)	600 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
Volatile Organic Compounds (SW8011)																	
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	0.027 J (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)
Semi-Volatile Organic Compounds																	
ANTHRACENE	µg/L	66	0.18 (0.010)	0.079 (0.010)	0.039 J (0.010)	1.4 (0.010)	0.50 (0.010)	0.36 (0.010)	0.96 (0.010)	14 (0.010)	0.17 (0.010)	0.19 (0.010)	0.24 (0.010)	0.25 (0.010)	0.32 (0.010)	0.23 (0.010)	0.58 (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	0.078 (0.010)	0.037 J (0.010)	0.012 J (0.010)	0.87 (0.010)	0.065 (0.010)	0.055 (0.010)	1.6 (0.010)	4.9 (0.010)	0.017 J (0.010)	0.040 J (0.010)	0.037 J (0.010)	0.028 J (0.010)	0.042 J (0.010)	0.15 (0.010)	0.17 (0.010)
BENZO(A)PYRENE	µg/L	0.2	0.048 J (0.010)	0.030 J (0.010)	0.011 J (0.010)	***0.60 (0.010)***	0.032 J (0.010)	0.024 J (0.010)	***1.1 (0.010)***	***2.9 (0.010)***	0.011 J (0.010)	0.047 J (0.010)	0.041 J (0.010)	0.011 J (0.010)	0.027 J (0.010)	0.11 (0.010)	0.097 (0.010)
BENZO(B)FLUORANTHENE	µg/L	1.2	0.060 (0.010)	0.031 J (0.010)	0.017 J (0.010)	0.87 (0.010)	0.046 J (0.010)	0.034 J (0.010)	***1.4 (0.010)***	***3.1 (0.010)***	0.015 J (0.010)	0.048 J (0.010)	0.046 J (0.010)	0.014 J (0.010)	0.033 J (0.010)	0.13 (0.010)	0.12 (0.010)
BENZO(G,H,I)PERYLENE	µg/L	0.26	0.021 J (0.010)	0.018 J (0.010)	0.011 J (0.010)	0.22 (0.010)	0.020 J (0.010)	0.014 J (0.010)	***0.53 (0.010)***	***0.71 (0.010)***	ND (0.050) (0.010)	0.031 J (0.010)	0.031 J (0.010)	ND (0.051) (0.010)	0.027 J (0.010)	0.043 J (0.010)	0.047 J (0.010)
CHRYSENE	µg/L	1.9	0.12 (0.010)	0.061 (0.010)	0.011 J (0.010)	0.85 (0.010)	0.085 (0.010)	0.074 (0.010)	1.6 (0.010)	***19 (0.010)***	0.024 J (0.010)	0.033 J (0.010)	0.044 J (0.010)	0.021 J (0.010)	0.039 J (0.010)	0.16 (0.010)	0.18 (0.010)
FLUORENE	µg/L	1900	0.51 (0.010)	0.25 (0.010)	ND (0.050) (0.010)	5.8 (0.010)	2.2 (0.010)	1.7 (0.010)	3.9 (0.010)	50 (0.010)	0.022 J (0.010)	0.054 (0.010)	0.062 (0.010)	0.064 (0.010)	0.036 J (0.010)	2.8 (0.010)	6.2 (0.010)
NAPHTHALENE	µg/L	100	2.9 (0.030)	0.39 (0.030)	ND (0.060) (0.030)	3.5 (0.030)	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.32) (0.030)	***360 (0.030)***	0.068 (0.030)	0.11 (0.030)	0.11 (0.030)	0.037 J (0.030)	0.071 (0.030)	0.16 (0.030)	0.25 (0.030)
PHENANTHRENE	µg/L	1100	0.87 (0.030)	0.35 (0.030)	ND (0.060) (0.030)	5.6 (0.030)	0.89 (0.030)	0.58 (0.030)	3.0 (0.030)	170 (0.030)	ND (0.060) (0.030)	0.056 J (0.030)	0.059 J (0.030)	0.11 (0.030)	0.13 (0.030)	1.3 (0.030)	7.7 (0.030)
PYRENE	µg/L	130	0.30 (0.010)	0.17 (0.010)	0.042 J (0.010)	2.8 (0.010)	0.49 (0.010)	0.42 (0.010)	3.5 (0.010)	17 (0.010)	0.21 (0.010)	0.12 (0.010)	0.11 (0.010)	0.070 (0.010)	0.089 (0.010)	0.65 (0.010)	1.4 (0.010)
Metals																	
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																	
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	0.11 J (0.090)	0.12 J (0.090)	0.19 J (0.090)	0.19 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.62 J (0.090)	ND (1.0) (0.090)	1.1 (0.090)	1.2 (0.090)	1.2 (0.090)	0.12 J (0.090)	0.64 J (0.090)	0.24 J (0.090)	0.77 J (0.090)
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																	
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8

Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Notes:

MSC-PA	Pennsylvania Department of Environmental Protection - 2016 Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Groundwater - Used Aquifer, Non Residential, TDS ≤ 2500
6.5	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.50)	Laboratory reporting limit was greater than the applicable standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value in database - 2016 values have been populated for Evergreen Comprehensive List only. Criteria for other analytes may be available but may not be represented here.
-	Parameter not analyzed / not available.
NM	Not measured.
>	Report value is greater than associated value
B	Indicates the analyte is detected in the associated blank as well as in the sample.
J	Indicates an estimated value.
µg/L	Micrograms per liter.
mg/L	Milligrams per liter.
mV	Millivolts.
S.U.	Standard Units.
mS/cm	Microsiemens per centimeter.
deg c	Degrees Celcius.
g/L	Grams per liter.
NTU	Nephelometric Turbidity Units.
LL	Eurofins Lancaster Laboratories Environmental
	Method detection limit is shown in second set of parentheses.

Table 9

2016 Gauging Data for AOI 7 and Surrounding Area
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

AOI	Well ID	Top Inner Casing Elevation (ft msl) (NAVD88)	Date	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	Apparent NAPL Thickness (ft)	Corrected Groundwater Elevation (ft AMSL)	Product Density	LNAPL Denisty Source Well	Comments	Date	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	Apparent NAPL Thickness (ft)	Corrected Groundwater Elevation (ft AMSL)	Product Density	LNAPL Denisty Source Well	Comments
AOI 7	C-104	9.53	7/19/2016		6.96		2.57											
AOI 7	C-105	9.17	7/19/2016		4.23		4.94											
AOI 7	C-106	11.54	8/1/2016	7.93	10.42	2.49	3.44	0.9306	C-106							0.9306	C-106	
AOI 7	C-108	8.27	7/19/2016		4.43		3.84											
AOI 7	C-112	10.96	7/29/2016		3.17		7.79											
AOI 7	C-113	11.65	7/19/2016		4.24		7.41											
AOI 7	C-127	9.8	7/21/2016		8.57		1.23											
AOI 7	C-129	8.941	8/1/2016		4.79		4.15											
AOI 7	C-129D	9.19	7/19/2016		9.71		-0.52											
AOI 7	C-130	11.984	7/19/2016		6.89		5.09											
AOI 7	C-131	10.14	7/19/2016		3.23		6.91											
AOI 7	C-132	9.973	7/19/2016		4.63		5.34											
AOI 7	C-134D	9.4	7/19/2016		11.81		-2.41											
AOI 7	C-136	8.846	7/19/2016		4.38		4.47											
AOI 7	C-138	6.95	7/19/2016		5.1		1.85											
AOI 7	C-140	7.545	7/19/2016		1.38		6.17											
AOI 7	C-142	11.352	7/19/2016		8.48		2.87											
AOI 7	C-144D	8.96	7/19/2016		13.48		-4.52											
AOI 7	C-145	6.922	7/19/2016		6.68		0.24											
AOI 7	C-146	6.739	8/1/2016	11.03	11.17	0.14	-4.31	0.8428	C-150							0.8428	C-150	
AOI 7	C-150	8.19	8/1/2016	13.45	13.46	0.01	-5.26	0.8428	C-150							0.8428	C-150	
AOI 7	C-152	9.38	7/21/2016	10.62	10.63	0.01	-1.25											
AOI 7	C-158	6.6311	7/19/2016		3.56		3.07											
AOI 7	C-161	9.07	8/1/2016		10.29		-1.22											
AOI 7	C-162	8.5	7/19/2016		11.52		-3.02											
AOI 7	C-163	6.8749	7/19/2016		4.6		2.27											
AOI 7	C-168	7.41	7/26/2016	3.66	3.92	0.26	3.71	0.8487	C-168							0.8487	C-168	
AOI 7	C-169	6.968	7/21/2016	11.71	12.61	0.9	-4.86	0.8737	C-161							0.8737	C-161	
AOI 7	C-49	9.58	7/21/2016		4.86		4.72											
AOI 7	C-50	12.77	7/19/2016		7.58		5.19											
AOI 7	C-50D	11.49	7/19/2016		12.15		-0.66											
AOI 7	C-51	9.26	7/19/2016		4.91		4.35											
AOI 7	C-52	7.63	7/27/2016		4.88		2.75											
AOI 7	C-54	6.61	7/19/2016		0.2		6.41											
AOI 7	C-57	8.5	7/26/2016		2.37		6.13											
AOI 7	C-58	7.42	7/19/2016		2.03		5.39											
AOI 7	C-60	7.44	7/21/2016		3.72		3.72											
AOI 7	C-61	7.93	7/21/2016		3.81		4.12											
AOI 7	C-62	11.4	7/19/2016		4.29		7.11											
AOI 7	C-96	12.88	7/19/2016		5.99		6.89											
AOI 7	C-97	10.52	7/21/2016	16.65	17.94	1.29	-6.33	0.8428	C-150							0.8428	C-150	
AOI 7	C-170	Damaged	7/28/2016		4.50		-				8/25/2016		4.81	-				
AOI 7	C-171	10.36	7/28/2016		3.58		6.78				8/25/2016		4.09	6.27				
AOI 7	C-172	5.91	7/28/2016		3.06		2.85				8/25/2016		3.88	2.03				

Notes:

ft btoc feet below top of casing
NAVD88 North American Vertical Datum of 1988
ft AMSL feet above mean sea level

Table 10

Generalized Stratigraphic Section and Interpreted Hydrostratigraphic Units
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

<table>
<tr><th>System</th><th>Series</th><th colspan="2">Hydrogeologic Unit</th><th>Hydrostratigraphic Unit</th></tr>
<tr><td rowspan="2">Quaternary</td><td>Holocene</td><td colspan="2">Alluvium</td><td rowspan="3">Unconfined
(Water-Table) aquifer</td></tr>
<tr><td>Pleistocene</td><td colspan="2">Trenton "gravel"</td></tr>
<tr><td rowspan="8">Cretaceous</td><td rowspan="5">Upper
Cretaceous</td><td rowspan="8">Potomac-Raritan-Magothy aquifer system</td><td>Upper clay unit</td></tr>
<tr><td>Upper sand unit</td></tr>
<tr><td>Middle clay unit</td><td></td></tr>
<tr><td>Middle sand unit</td><td rowspan="5">Lower aquifer</td></tr>
<tr><td>Lower clay unit</td></tr>
<tr><td rowspan="3">Lower sand unit</td></tr>
<tr><td rowspan="2">Lower
Cretaceous</td></tr>
<tr><td></td></tr>
<tr><td>Pre-Cretaceous</td><td></td><td>Wissahickon Formation</td><td></td><td></td></tr>
</table>

Notes:

1. Adopted from Figure 2 of Schreffler, 2001.
2. Hydrostratigraphic units interpreted by Stantec based on observed AOI 1 subsurface conditions.

Table 11

Summary of Available LNAPL Sample Data
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Generalized LNAPL Type	Well ID	Sample Date	LNAPL Sub Types		Weathering	LNAPL Type Interpretation By
				Proportions %		
Heavy Distillate	C-106	2004	Heavy Distillate	100	Extreme	Stantec
Crude	C-146	2012	Crude	100	Extreme	Stantec
	C-150	2012	Crude	100	Extreme	Stantec
	C-152	2012	Crude	100	Severe	Stantec
	C-168	2012	Crude	100	Severe	Stantec
	C-169	2012	Crude	100	Extreme	Stantec
	C-97	2012	Crude	100	Extreme	Stantec

Table 12

Vapor Intrusion Screening Building Information
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

AOI	Building Number	Building Name	Approximate Footprint (square feet)	Height of Building	Basement	Description of Use	# Indoor Air Samples Collected
7	440	Shops/Offices	43350	2	No	2nd Floor 221	2
7						2nd Floor Meeting Room	2
7						1st Floor Lunch	0
7						1st Floor Lunch	0
7	442	Fire House	8250	1	No	Office Area	1
7	450	Electrical Bldg	53261	1	No	Electrical Building	5
7	595	Canteen Bldg	3763	1	No	Canteen	1
7	711	WTP Control House	1525	1	No	Control Room	1
7	6622	Control Room	1144	1	No	Control Room	1
7	6625	Control Room	800	1	No	Control Room	1
7	6626	Control Room	1000	1	No	Control Room	1

Table 13

Indoor Air Sampling Summary
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location									AOI7-AA-16-001	AOI7-AI-16-001	AOI7-AI-16-002	AOI7-AI-16-003
									Ambient, Near WTP Fence	595 Canteen Building	450 Elect Building, Computer Room	450 Building Elect Warehouse, Back Addition on Shelf
Sample Date									29-Mar-16	29-Mar-16	29-Mar-16	29-Mar-16
Sample ID									IA-AOI7-OUTDOOR	IA-AOI7-595	IA-AOI7-450-1	IA-AOI7-450-2
Sampling Company									GHD	GHD	GHD	GHD
Laboratory									ESC	ESC	ESC	ESC
Laboratory Work Order									L827327	L827327	L827327	L827327
Laboratory Sample ID									L827327-15	L827327-07	L827327-08	L827327-09
Sample Type	**Units**	**VI-PA**	**OSHA**	**USEPA RSL**	**ACGIH TLV**	**NIOSH**	**MH Air Tox**	**USEPA Res IA**				
Volatile Organic Compounds												
Benzene	µg/m^3	16[A]	3,190[B]	1.6[CD]	1,600[E]	319[F]	2.59	29	1.32	***4.63*** **[CD]**	1.00	0.860
1,2-Dibromoethane (EDB)	µg/m^3	0.2[A]	153,700[B]	0.02[CD]	n/v	346[F]	n/v	n/v	ND (1.54)	ND (1.54)	ND (1.54)	ND (1.54)
1,2-Dichloroethane (EDC)	µg/m^3	4.7[A]	202,400[B]	0.47[CD]	40,500[E]	4,000[F]	0.16	0.2	ND (0.810)	ND (0.810)	ND (0.810)	ND (0.810)
Ethylbenzene	µg/m^3	49[A]	435,000[B]	4.9[CD]	86,800[E]	435,000[F]	0.68	17	ND (0.867)	ND (0.867)	1.12	ND (0.867)
Isopropylbenzene (Cumene)	µg/m^3	1,800[A]	245,000[B]	1,800[C] 180[D]	246,000[E]	245,000[F]	11.2	n/v	ND (0.983)	ND (0.983)	ND (0.983)	ND (0.983)
Methyl Tert-Butyl Ether	µg/m^3	470[A]	n/v	47[CD]	180,000[E]	n/v	n/v	72	ND (0.721)	ND (0.721)	ND (0.721)	ND (0.721)
Naphthalene	µg/m^3	3.6[A]	50,000[B]	0.36[CD]	52,000[E]	50,000[F]	n/v	4.8*	ND (3.30)	ND (3.30)	ND (3.30)	ND (3.30)
Toluene	µg/m^3	22,000[A]	754,000[B]	22,000[C] 2,200[D]	75,400[E]	375,000[F]	4.52	144	4.05	5.51	10.5	3.15
1,2,4-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	1.12	19	ND (0.982)	1.09	1.05	ND (0.982)
1,3,5-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	0.38	6.5	ND (0.982)	ND (0.982)	ND (0.982)	ND (0.982)
Total Xylene	µg/m^3	440[A]	435,000[B]	44[CD]	434,000[E]	435,000[F]	3.14	63.5	1.99	3.371	6.25	2.09

Notes:

VI-PA[A]	PADEP Indoor Air Statewide Health Standard Vapor Intrusion Screening Values, Non-Residential (Draft, July 2015)
OSHA[B]	Occupational Safety and Health Administration - Permissible Exposure Limits
USEPA RSL	United States Environmental Protection Agency
[C]	Regional Screening Level for Non-residential indoor air Hazard Index of 1.0.
[D]	Regional Screening Level for Non-residential indoor air Hazard Index of 0.1.
**	The RSL for TMB were calculated using the September 2016 final IRIS RfD.
ACGIH TLV	American Conference of Governmental Industrial Hygienists
[E]	Threshold Limit Value
NIOSH	National Institute for Occupational Safety and Health
[F]	Recommended Exposure Limits
MH Air Tox	Marcus Hook Air Toxics Monitor 2015, maximum value of PADEP data accessed February 5, 2016.
USEPA Res IA	USEPA Background Residential Indoor Air 2011, 95th percentile.
*	95th percentile value not provided, value is 90th percentile.
6.5 **[A]**	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
J	Indicates an estimated value.

Table 13

Indoor Air Sampling Summary
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location									AOI7-AI-16-004	AOI7-AI-16-005	AOI7-AI-16-006	AOI7-AI-16-007
									450 Building Elect Warehouse, North Side	450 Building Elect Warehouse, Walled area Middle Bldg, Elect Testing	450 Building Elect Warehouse Table East Side Near Open Offices	442 Building Firehouse Office Table Office
Sample Date									29-Mar-16	29-Mar-16	29-Mar-16	29-Mar-16
Sample ID									IA-AOI7-450-3	IA-AOI7-450-4	IA-AOI7-450-5	IA-AOI7-442
Sampling Company									GHD	GHD	GHD	GHD
Laboratory									ESC	ESC	ESC	ESC
Laboratory Work Order									L827327	L827327	L827327	L827327
Laboratory Sample ID									L827327-10	L827327-11	L827327-12	L827327-13
Sample Type	**Units**	**VI-PA**	**OSHA**	**USEPA RSL**	**ACGIH TLV**	**NIOSH**	**MH Air Tox**	**USEPA Res IA**				
Volatile Organic Compounds												
Benzene	µg/m^3	16[A]	3,190[B]	1.6[CD]	1,600[E]	319[F]	2.59	29	0.973	1.54	***1.99*** [CD]	***1.68*** [CD]
1,2-Dibromoethane (EDB)	µg/m^3	0.2[A]	153,700[B]	0.02[CD]	n/v	346[F]	n/v	n/v	ND (1.54)	ND (1.54)	ND (1.54)	ND (1.54)
1,2-Dichloroethane (EDC)	µg/m^3	4.7[A]	202,400[B]	0.47[CD]	40,500[E]	4,000[F]	0.16	0.2	ND (0.810)	ND (0.810)	ND (0.810)	ND (0.810)
Ethylbenzene	µg/m^3	49[A]	435,000[B]	4.9[CD]	86,800[E]	435,000[F]	0.68	17	ND (0.867)	1.19	2.58	1.38
Isopropylbenzene (Cumene)	µg/m^3	1,800[A]	245,000[B]	1,800[C] 180[D]	246,000[E]	245,000[F]	11.2	n/v	ND (0.983)	ND (0.983)	ND (0.983)	ND (0.983)
Methyl Tert-Butyl Ether	µg/m^3	470[A]	n/v	47[CD]	180,000[E]	n/v	n/v	72	ND (0.721)	ND (0.721)	ND (0.721)	ND (0.721)
Naphthalene	µg/m^3	3.6[A]	50,000[B]	0.36[CD]	52,000[E]	50,000[F]	n/v	4.8*	ND (3.30)	ND (3.30)	ND (3.30)	ND (3.30)
Toluene	µg/m^3	22,000[A]	754,000[B]	22,000[C] 2,200[D]	75,400[E]	375,000[F]	4.52	144	4.12	8.91	49.8	19.1
1,2,4-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	1.12	19	ND (0.982)	1.23	2.13	1.22
1,3,5-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	0.38	6.5	ND (0.982)	ND (0.982)	ND (0.982)	ND (0.982)
Total Xylene	µg/m^3	440[A]	435,000[B]	44[CD]	434,000[E]	435,000[F]	3.14	63.5	ND (1.73)	4.46	10.76	4.99

Notes:

VI-PA[A]	PADEP Indoor Air Statewide Health Standard Vapor Intrusion Screening Values, Non-Residential (Draft, July 2015)
OSHA[B]	Occupational Safety and Health Administration - Permissible Exposure Limits
USEPA RSL	United States Environmental Protection Agency
[C]	Regional Screening Level for Non-residential indoor air Hazard Index of 1.0.
[D]	Regional Screening Level for Non-residential indoor air Hazard Index of 0.1.
**	The RSL for TMB were calculated using the September 2016 final IRIS RfD.
ACGIH TLV	American Conference of Governmental Industrial Hygienists
[E]	Threshold Limit Value
NIOSH	National Institute for Occupational Safety and Health
[F]	Recommended Exposure Limits
MH Air Tox	Marcus Hook Air Toxics Monitor 2015, maximum value of PADEP data accessed February 5, 2016.
USEPA Res IA	USEPA Background Residential Indoor Air 2011, 95th percentile.
*	95th percentile value not provided, value is 90th percentile.
6.5 [A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
J	Indicates an estimated value.

Table 13

Indoor Air Sampling Summary
AOI 7 Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location									**AOI7-AI-16-008**	**AOI7-AI-16-009**	**AOI7-AI-16-010**	**AOI7-AI-16-011**
									711 Building, WTP	**6622 Building, Control Room, Rear Table Center of Room**	**6626 Building, Control Room**	**6625 Building, Control Room, MF Unit**
Sample Date									**29-Mar-16**	**29-Mar-16**	**29-Mar-16**	**29-Mar-16**
Sample ID									**IA-AOI7-711**	**IA-AOI7-6622**	**IA-AOI7-6626**	**IA-AOI7-6625**
Sampling Company									**GHD**	**GHD**	**GHD**	**GHD**
Laboratory									**ESC**	**ESC**	**ESC**	**ESC**
Laboratory Work Order									**L827327**	**L827327**	**L827327**	**L827327**
Laboratory Sample ID									**L827327-14**	**L827327-16**	**L827327-17**	**L827327-18**
Sample Type	**Units**	**VI-PA**	**OSHA**	**USEPA RSL**	**ACGIH TLV**	**NIOSH**	**MH Air Tox**	**USEPA Res IA**				
Volatile Organic Compounds												
Benzene	µg/m^3	16[A]	3,190[B]	1.6[CD]	1,600[E]	319[F]	2.59	29	***2.22*** [CD]	***3.52*** [CD]	***3.36*** [CD]	***1.63*** [CD]
1,2-Dibromoethane (EDB)	µg/m^3	0.2[A]	153,700[B]	0.02[CD]	n/v	346[F]	n/v	n/v	ND (1.54)	ND (1.54)	ND (1.54)	ND (1.54)
1,2-Dichloroethane (EDC)	µg/m^3	4.7[A]	202,400[B]	0.47[CD]	40,500[E]	4,000[F]	0.16	0.2	ND (0.810)	ND (0.810)	ND (0.810)	ND (0.810)
Ethylbenzene	µg/m^3	49[A]	435,000[B]	4.9[CD]	86,800[E]	435,000[F]	0.68	17	ND (0.867)	***4.94*** [CD]	1.60	4.22
Isopropylbenzene (Cumene)	µg/m^3	1,800[A]	245,000[B]	1,800[C] 180[D]	246,000[E]	245,000[F]	11.2	n/v	ND (0.983)	1.27	2.09	ND (0.983)
Methyl Tert-Butyl Ether	µg/m^3	470[A]	n/v	47[CD]	180,000[E]	n/v	n/v	72	ND (0.721)	ND (0.721)	ND (0.721)	ND (0.721)
Naphthalene	µg/m^3	3.6[A]	50,000[B]	0.36[CD]	52,000[E]	50,000[F]	n/v	4.8*	ND (3.30)	ND (3.30)	ND (3.30)	ND (3.30)
Toluene	µg/m^3	22,000[A]	754,000[B]	22,000[C] 2,200[D]	75,400[E]	375,000[F]	4.52	144	3.93	7.29	3.06	71.4
1,2,4-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	1.12	19	2.94	21.6	3.81	6.40
1,3,5-Trimethylbenzene**	µg/m^3	31[A]	n/v	260[C] 26[D]	123,000[E]	125,000[F]	0.38	6.5	0.984	6.81	1.19	1.78
Total Xylene	µg/m^3	440[A]	435,000[B]	44[CD]	434,000[E]	435,000[F]	3.14	63.5	3.5	24.69	7.19	17.05

Notes:

VI-PA[A]	PADEP Indoor Air Statewide Health Standard Vapor Intrusion Screening Values, Non-Residential (Draft, July 2015)
OSHA[B]	Occupational Safety and Health Administration - Permissible Exposure Limits
USEPA RSL	United States Environmental Protection Agency
[C]	Regional Screening Level for Non-residential indoor air Hazard Index of 1.0.
[D]	Regional Screening Level for Non-residential indoor air Hazard Index of 0.1.
**	The RSL for TMB were calculated using the September 2016 final IRIS RfD.
ACGIH TLV	American Conference of Governmental Industrial Hygienists
[E]	Threshold Limit Value
NIOSH	National Institute for Occupational Safety and Health
[F]	Recommended Exposure Limits
MH Air Tox	Marcus Hook Air Toxics Monitor 2015, maximum value of PADEP data accessed February 5, 2016.
USEPA Res IA	USEPA Background Residential Indoor Air 2011, 95th percentile.
*	95th percentile value not provided, value is 90th percentile.
6.5 [A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
J	Indicates an estimated value.

Table 14

Outdoor Air Sampling Summary
Remedial Investigation Report
Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC

Sample Location:				**AOI7-AA-16-001**	**AOI7-AA-16-002**	**AOI7-AA-16-003**
Sample ID:				**AOI7-AA-16-001**	**AOI7-AA-16-002**	**AOI7-AA-16-003**
Sample Date:				**07/28/2016**	**07/28/2016**	**07/28/2016**
Parameters	**Units**	**MH Air Tox**	**USEPA Res IA**			
Volatile Organic Compounds						
1,2,4-Trimethylbenzene	µg/m^3	1.12	19	2.1 J	1.4 J	1.8 J
1,2-Dibromoethane (Ethylene dibromide)	µg/m^3	N/V	N/V	ND(7.7)	ND(7.7)	ND(7.7)
1,2-Dichloroethane	µg/m^3	0.16	0.2	ND(4.0)	ND(4.0)	ND(4.0)
1,3,5-Trimethylbenzene	µg/m^3	0.38	6.5	1.0 J	ND(4.9)	ND(4.9)
Benzene	µg/m^3	2.59	29	4.7	5.4	4.5
Ethylbenzene	µg/m^3	0.68	17	2.0 J	1.6 J	1.8 J
Isopropyl benzene	µg/m^3	11.2	N/V	1.5 J	1.4 J	1.7 J
Methyl tert butyl ether (MTBE)	µg/m^3	N/V	72	ND(3.6)	ND(3.6)	ND(3.6)
Naphthalene	µg/m^3	N/V	4.8*	4.8 J	ND(5.2)	ND(5.2)
Toluene	µg/m^3	4.52	144	5.5	5.9	3.9
Xylenes (total)	µg/m^3	3.14	63.5	10.2 J	7.6 J	8.8 J

Notes:

J - Estimated concentration.
ND - Not detected at the associated reporting limit.
N/V - No criteria value.
MH Air Tox - Marcus Hook Air Toxics Monitor 2015, maximum value of PADEP data accessed February 5, 2016.
USEPA Res IA - USEPA Background Residential Indoor Air 2011, 95th percentile.
* 95th percentile value not provided, value is 90th percentile.

Appendices

Appendix A
Notice of Intent to Remediate, Report Notifications, and Proofs

February 20, 2017 Reference No. 11109614

Sent via Certified Mail: 7016 0340 0000 6755 1540

Ms. Palak Raval-Nelson, MPH, PhD, Director
Environmental Health Services
Philadelphia Department of Public Health
321 University Avenue
Philadelphia, Pennsylvania 19104

Dear Ms. Raval-Nelson:

Re: Notice of Submittal of AOI 7 A Remedial Investigation Report
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC
Philadelphia Energy Solutions Refining and Marketing LLC (PES) Refinery
Philadelphia, Philadelphia County, Pennsylvania

Notice is hereby given that Evergreen Resources Group, LLC has submitted a Remedial Investigation Report to the Department of Environmental Protection for Area of Interest 7 (also known as the Girard Point Fuels Processing Area) at the Philadelphia Energy Solutions refinery at 3144 Passyunk Avenue, Philadelphia, Pennsylvania 19145. The report indicates that the remedial investigation was completed in accordance with the site specific standard.

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

Yours truly,

GHD

Colleen Costello

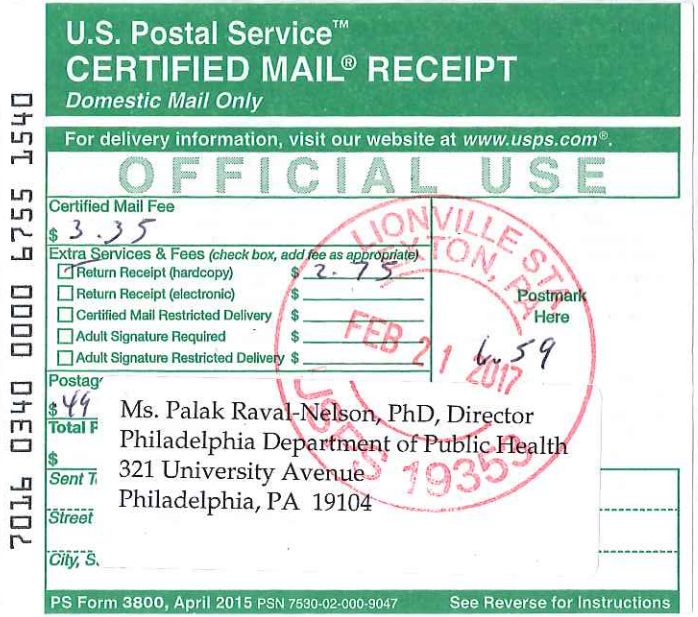
CC/cm/1

cc: David Brown, PG - PADEP
Tiffani Doerr - Evergreen

GHD Services Inc.
410 Eagleview Boulevard Suite 110 Exton Pennsylvania 19341 USA
T 610 321 1800 **F** 610 321 2763 **W** www.ghd.com

ISO 9001

7016 0340 0000 6755 1540



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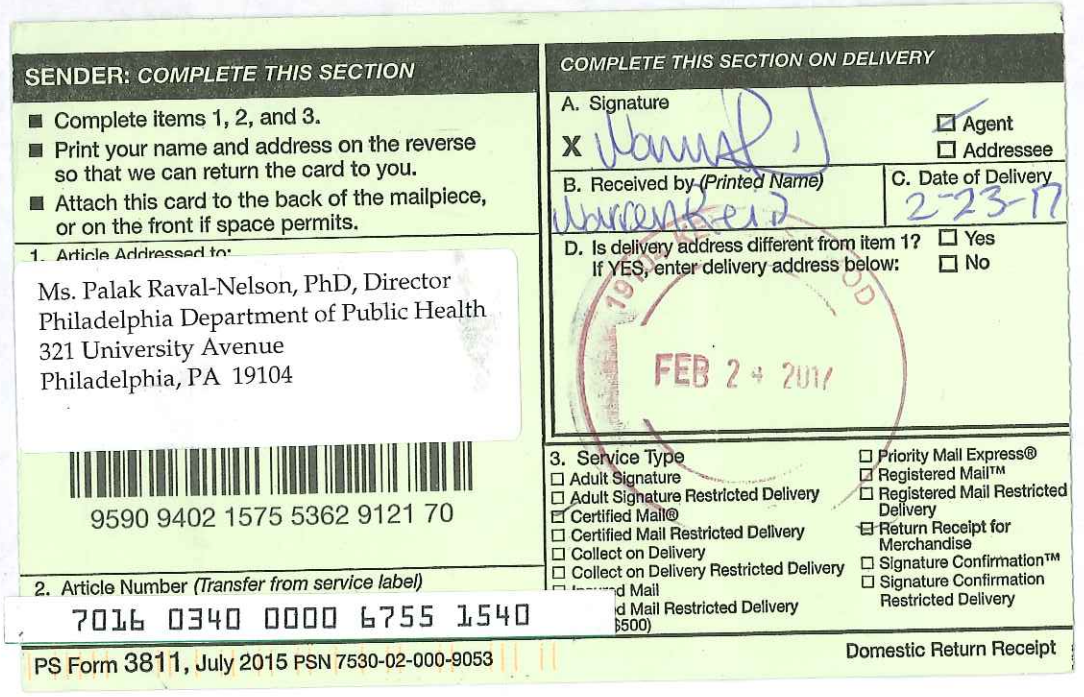
Ms. Palak Raval-Nelson, PhD, Director
Philadelphia Department of Public Health
321 University Avenue
Philadelphia, PA 19104

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions



SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Ms. Palak Raval-Nelson, PhD, Director
Philadelphia Department of Public Health
321 University Avenue
Philadelphia, PA 19104

9590 9402 1575 5362 9121 70

2. Article Number *(Transfer from service label)*

7016 0340 0000 6755 1540

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature]
☑ Agent
☐ Addressee

B. Received by *(Printed Name)*
Warren Reid

C. Date of Delivery
2-23-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

FEB 24 2017

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery ($500)
- ☐ Priority Mail Express®
- ☑ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☑ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

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

March 1, 2017

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

Helene Sweeney

Sworn to and subscribed before me this 1st day of March 2017.

Cindy Jakubowski
Notary Public

My Commission Expires:

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
CINDY JAKUBOWSKI, Notary Public
City of Philadelphia, Phila. County
My Commission Expires November 30, 2020

Copy of Notice of Publication



Notice of Report Submittal under an Environmental Standard (Section 304(n)(2)(i))

Notice is hereby given that Evergreen Resources Group, LLC has submitted a report to the Pennsylvania Department of Environmental Protection, Southeast Regional Office, indicates that planned remediation will attain compliance with the site-specific cleanup standard for Area of Interest 7 (also known as the Girard Point Fuels Processing Area) at the Philadelphia Energy Solutions refinery located at 3144 Passyunk Avenue, Philadelphia, Pennsylvania 19145. Evergreen Resources Group, LLC has indicated that the remedial investigation was completed in accordance with the site-specific cleanup standard established under the Land Recycling and Environmental Remediation Standards Act.

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



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

October 12, 2006

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

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

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

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

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

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

Please call me at 610-859-1881 or email me at jroppenheim@sunocoinc.com with any questions or comments.

Best Regards,

James Oppenheim, PE
Sr. Environmental Consultant

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

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

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

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim

Title: Project Manager

Address: 100 Green Street
Marcus Hook, PA 19061

Telephone: (610) 859-1881

Email Address: jroppenheim@sunocoinc.com

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

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

October 12, 2006

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

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

Dear Sir/Madam:

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

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

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

Best Regards,

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

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

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

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

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim
Title: Project Manager
Address: 100 Green Street
Marcus Hook, PA 19061
Telephone: (610) 859-1881
Email Address: jroppenheim@sunocoinc.com

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

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

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

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

October 16, 2006

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

Anna Dickerson

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

Mary Anne Logan
Notary Public

My Commission Expires:

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

Copy of Notice of Publication

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

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

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

LEGAL NOTICES

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

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

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

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

Back

Evergreen Resources Management
2 Righter Parkway, Suite 200
Wilmington, DE 19803

November 17, 2014

Mr. C. David Brown, Ph. D., PG
Department of Environmental Protection
2 East Main Street
Norristown, PA 19401

RE: Philadelphia Energy Solutions Refining & Marketing LLC (PES) Philadelphia Refinery Complex
3144 West Passyunk Avenue, Philadelphia, Philadelphia County, Pennsylvania

Dear Mr. Brown:

In accordance with the Land Recycling and Environmental Remediation Standards Act (Act 2), enclosed is the revised Notice of Intent to Remediate (NIR) for the Philadelphia Refinery Complex (site). The original NIR for the site was submitted on October 12, 2006. The purpose of this revision is to update owner and remediator information for the facility. This revision also includes a site location map depicting a change to property boundaries, most notably the exclusion of Belmont Terminal, which was covered under a separate NIR submission on October 6, 2014. It should be noted that the Belmont Terminal was not included in the original October 12, 2006 NIR, therefore, its exclusion from the revised NIR is not a change.

On August 14, 2012, Sunoco, Inc. (R&M) (Sunoco) entered into a Consent Order and Agreement with Philadelphia Energy Solutions Refining & Marketing LLC (PES) and the Pennsylvania Department of Environmental Protection (PADEP) for the Philadelphia Refinery Complex. As part of this buyer-seller agreement, Sunoco retained responsibility of remediation activities for environmental conditions existing at the time of the transfer, and PES is responsible for environmental conditions following the purchase agreement. On September 8, 2012, Sunoco conveyed the Philadelphia Refinery to PES. Effective December 30, 2013, "Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC" (Evergreen) assumed Sunoco legacy remediation liabilities with respect to the Philadelphia Refinery Complex. Evergreen will continue to manage the remediation work at the facility under the One Cleanup Program with the PADEP and United States Environmental Protection Agency (USEPA) and in accordance with 2012 Consent Order & Agreement.

Please call me at (302) 477-0192 with any questions or comments.

Best Regards,

James Oppenheim, PE
Vice President

cc: Evergreen File
Charles Barksdale, Philadelphia Energy Solutions Refining and Marketing, LLC
Jennifer Menges, Stantec Consulting Services Inc.

8000-FM-CRLG0010 Rev. 9/2010

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMMUNITY REVITALIZATION AND LOCAL GOVERNMENT SUPPORT

For DEP Use Only
PF #_____
Rem ID #_____

NOTICE OF INTENT TO REMEDIATE

Act 1995-2 requires four general information items to be included in the NIR: the general location, listing of contaminants, intended use of property, and proposed remediation measures. In addition, indicate the standard(s) to be obtained (if known) and attach a scaled site map (if available).

Property Name Philadelphia Energy Solutions Refining & Marketing LLC (PES) Philadelphia Refinery Complex

Former Name(s) / AKA Sunoco Inc. (R&M) Philadelphia Refinery

Address / Location 3144 Passyunk Avenue

City Philadelphia Zip Code 19145

Municipality(s) City of Philadelphia County(ies) Philadelphia

Latitude 39 º (deg). 55 ‘ (min) 13.976 “ (sec) Longitude 75 º (deg). 11 ‘ (min) 52.429 “ (sec)

Horizontal Collection Method Geographic Information Systems

Horizontal Reference Datum NAD 1983 Reference Point Visitor Entrance

☒ Wish to participate in the DEP/EPA MOA. Contact Troy Conrad at tconrad@state.pa.us for details.

EPA ID#, if known PAD049791098

DEP ID#(s), if known Multiple
(i.e., eFACTS site ID#, storage tank facility ID#, water quality permit #, watershed permit, air quality permit #, etc.)

Date Release Occurred (if known) _____

Provide a brief description of the site contamination in plain language (e.g. fuel oil spill, historical chemical industrial area contamination), the names of any know primary contaminants to be addressed, and the intended future use of the property.

The site contamination consists of impacts to soil and groundwater associated with historic petrochemical refining operations. The primary consistuents of concern in soil and groundwater are lead, 1,2-dichloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, cumene, ethylbenzene, methyl tertiary butyl ether, toluene, total xylenes, ethylene dibromide, anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene. The future use of the facility is to remain industrial.

Provide a general description of proposed remediation measures.

Evergreen is submitting this Notice of Intent to Remediate (NIR) in order update an NIR previously submitted on October 6, 2006 which formally entered the property into the PA Act 2 Program. In November 2011, the facility was formally entered into the PA One Cleanup Program with the USEPA and PADEP. The purpose of this NIR revision is to update the facility ownership and remediator information. The facility has been divided into 11 Areas of Interest (AOIs). These areas consist of the Point Breeze Processing Area North Yard (AOI 8) and South Yards (AOI 1 through AOI 4); the Girard Point South Tank Field (AOI 5) and Processing Area (AOI 6 and AOI 7); the Schuylkill River Tank Farm (AOI 9); the West Yard (AOI 10); and the deep aquifer (AOI 11). Each AOI will be characterized in accordance with PA Act 2, and remedial measures will be developed to address the risk of exposure identified during

the characterization activities.

Remediation Standard(s) planned (if known at this time):

☐ Unknown at this time	☐ Soil	☐ Groundwater
☐ Background Contaminants:	☐ Soil	☐ Groundwater
☐ Statewide Health - Residential Contaminants:	☐ Soil	☐ Groundwater
☐ Statewide Health – Non-Residential Contaminants:	☐ Soil	☐ Groundwater
☒ Site Specific Contaminants:	☒ Soil	☒ Groundwater
☐ Special Industrial Area* Contaminants:	☐ Soil	☐ Groundwater

*NOTE: Specific standard or Special Industrial Area require a 30-day municipal comment period

Remediator / Property Owner / Consultant. Complete the form below for *each* recipient obtaining a release of liability upon approval of the final report. Attach additional sheets as necessary.

Remediator

Contact Person/Title Jim Oppenheim, PE/Vice President eFACTS Client ID* 314958

Relationship to Site Remediator Client Type* Limited Liability Company
(e.g. owner, remediator, participant in cleanup, consultant, etc.)

Phone Number (302) 477-0192 Email Address JROPPENHEIM@evergreenresmgt.com

Company Name Evergreen Resources Management Operations EIN or Federal ID # 46-4184955

Address (street, city, state, zip) 2 Righter Parkway, Suite 200, Wilmington, DE 19803

Property Owner

Contact Person/Title Charles Barksdale Jr./Site Environmental Director eFACTS Client ID* 298341

Relationship to Site Owner Client Type* Limited Liability Company
(e.g. owner, remediator, participant in cleanup, consultant, etc.)

Phone Number 215-339-2074 Email Address charles.barksdale@pes-companies.com

Company Name Philadelphia Energy Solutions Refining and Marketing, LLC EIN or Federal ID # 61-168974

Address (street, city, state, zip) 3144 Passyunk Ave, Philadelphia, PA 19145

Consultant

Contact Person/Title Jennifer Menges/Principal Consultant, LRS eFACTS Client ID* N/A

Relationship to Site Consultant Client Type* N/A
(e.g. owner, remediator, participant in cleanup, consultant, etc.)

Phone Number (610) 840-2540 Email Address Jennifer.Menges@stantec.com

Company Name Stantec EIN or Federal ID # N/A

Address (street, city, state, zip) 1060 Andrew Drive, Suite 140, West Chester, PA 19380

*Include eFACTS Client ID (if known) – "Client Types" below:

Association/Organization	Limited Liability company	Partnership-General
Authority	Limited Liability Partnership	Partnership-Limited
County	Municipality	School District
Estate/Trust	Non-Pennsylvania Government	Sole Proprietorship
Federal Agency	Other (Non-Government)	State Agency
Individual	Pennsylvania Corporation	

Preparer of Notice of Intent to Remediate

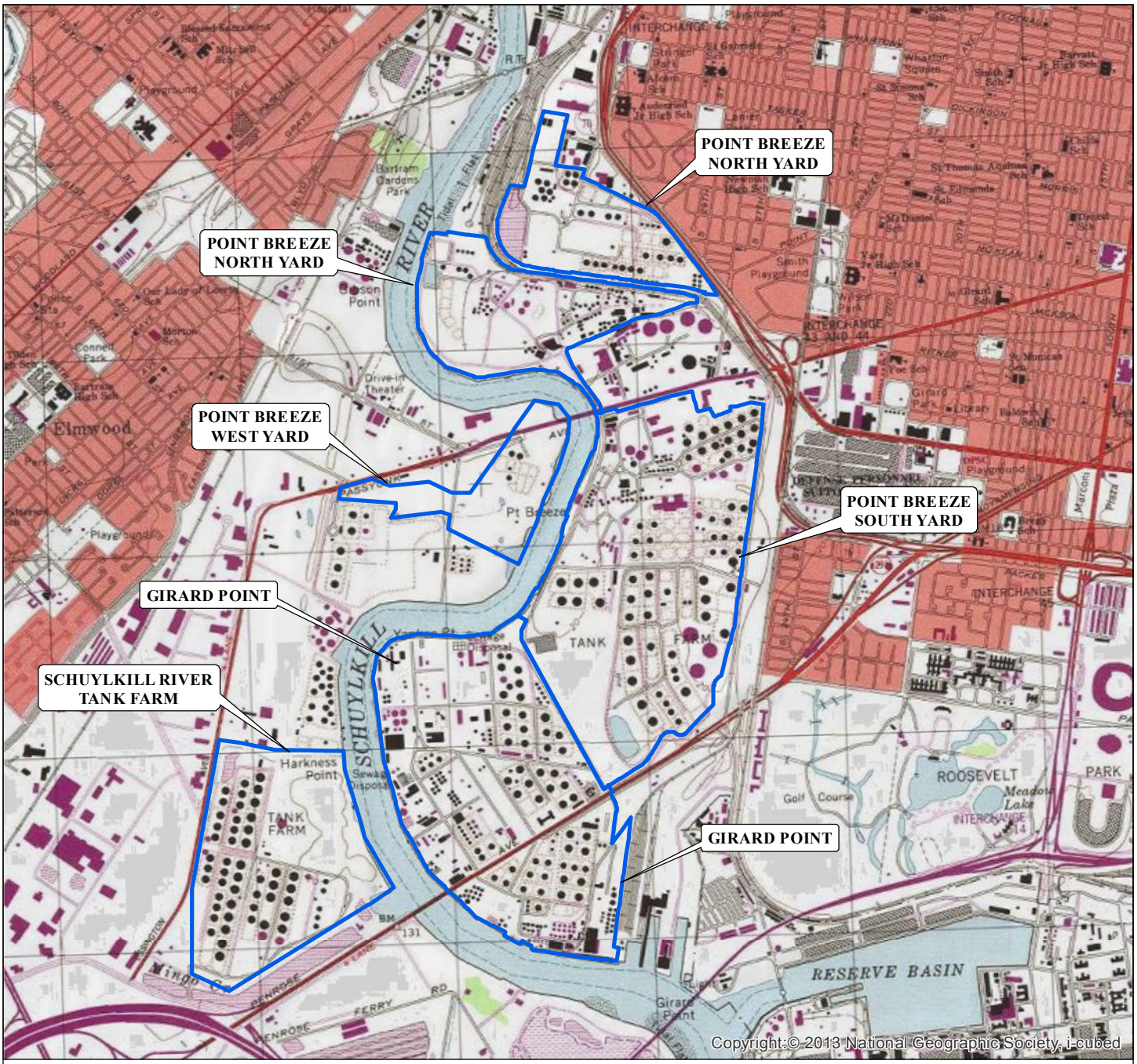
Name Jim Oppenheim, PE Title Vice President

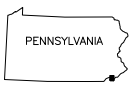
Phone Number (302) 477-0192 Email Address JROPPENHEIM@evergreenresmgt.com

Company Name Evergreen Resources Management eFACTS Client ID

Operations

Address (street, city, state, zip) 2 Righter Parkway, Suite 200, Wilmington, DE 19803





QUADRANGLE LOCATION

0 750 1,500 3,000 4,500 Feet

N

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PHILADELPHIA, PA.-NJ, QUADRANGLE, 1995

Stantec

Stantec Consulting Services Inc.
1060 Andrew Drive, Suite 140
West Chester, Pennsylvania 19380
Tel. 610-840-2500
Fax. 610-840-2501
www.stantec.com

DRAWN BY: GWC
CHECKED BY: JKD
APPROVED BY: JLM
DATE: 11/11/2014

Prepared For:

EVERGREEN RESOURCES
MANAGEMENT OPERATIONS
PHILADELPHIA REFINERY COMPLEX
3144 PASSYUNK AVENUE
PHILADELPHIA, PA. 19145

Figure Title:

Philadelphia Refinery Complex
Site Location Map

Figure No.:

1

Evergreen Resources Management
2 Righter Parkway, Suite 200
Wilmington, DE 19803

November 17, 2014

Leigh Anne Rainford, MPH
Sanitarian Supervisor
Philadelphia Department of Public Health
Environmental Engineering Section
321 University Avenue
Philadelphia, PA 19104

RE: Philadelphia Energy Solutions Refining & Marketing LLC (PES) Philadelphia Refinery Complex
3144 West Passyunk Avenue Philadelphia, Philadelphia County

Dear Ms. Rainford:

The Land Recycling and Environmental Remediation Standards Act (Act 2) requires that a Notice of Intent to Remediate (NIR) a site be provided to the municipality in which the site is located. This notification is to inform the City of Philadelphia of the submission of an update to the original October 12, 2006 NIR. The purpose of the revised NIR is to update the facility owner and remediator information. On September 8, 2012, Sunoco Inc., (R&M) (Sunoco) conveyed the Philadelphia Refinery to Philadelphia Energy Solutions Refining & Marketing LLC (PES). As part of the transaction, Sunoco retained responsibility for remediation activities for environmental conditions existing at the time of the transfer. Effective December 30, 2013, "Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC" (Evergreen) assumed Sunoco legacy remediation liabilities with respect to the Philadelphia Refinery Complex. A copy of the revised NIR is enclosed for your reference.

Please call me at (302) 477-0192 if you have any questions concerning the proposed remediation.

Best Regards,

James Oppenheim, PE
Vice President

cc: Evergreen File
C. David Brown, PADEP
Charles Barksdale, Philadelphia Energy Solutions Refining and Marketing, LLC
Jennifer Menges, Stantec Consulting Services Inc.

Appendix B
Quality Assurance/Quality Control Plan and Field Procedures Manual

AOI 7 RI Workplan

Philadelphia Refinery Complex
Philadelphia, Pennsylvania

Evergreen Resources Group, LLC

410 Eagleview Boulevard, Suite 110 Exton, Pennsylvania 19341

11109614 | Report No 1 | June 3, 2016

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Appendix C Standard Operating Procedures (SOPs)

Appendix D Quality Assurance/Quality Control (QA/QC) document

Appendix E Constituents of Concern (COC) List

1. Introduction

GHD has prepared this Workplan, on behalf of Evergreen Resources Group, LLC (Evergreen), for the Philadelphia Refinery Complex, Philadelphia, Pennsylvania, to support the submittal of a Remedial Investigation (RI) Report to the Pennsylvania Department of Environmental Protection (PADEP) and the United States Environmental Protection Agency (USEPA). The proposed activities will also support the submittal of a separate Site Characterization Report (SCR) in accordance with 25 PA Code Chapter 245 to address the pre-2013 tank issues identified by the PADEP in 2014.

GHD prepared a Scope of Work for AOI 7 based on the December 18, 2013 PADEP comments to the 2012/2013 Site Characterization/Remedial Investigation Report for AOI 7 and to address other general comments made by the PADEP for Act 2 submittals at the PES facility. GHD and Evergreen met with the PADEP on April 7, 2016 to discuss the proposed Scope of Work for the field activities in AOI 7. The PADEP provided comments on the proposed approach during the meeting and documented their comments in an April 13, 2016 email. A revised Scope of Work for AOI 7 was developed based on the PADEP's comments and additional information provided by Evergreen.

This Workplan presents the Scope of Work and Schedule for the AOI 7 activities.

2. Scope of Work

The following presents the proposed Scope of Work for AOI 7 to support the submittal and approval of the AOI 7 RIR and SCR. The Scope of Work for AOI-7 RI is presented in Table 1 and locations are shown in Figures 1 and 2. It should be noted that due to the presence of a locked fence located 30 feet from the bulkhead in AOI 7, some of the proposed locations may need to be field adjusted based on access restrictions. Unless noted otherwise all samples will be collected in accordance with the SOPs in Appendix D and analyzed for the COCs listed in Appendix E by Lancaster Laboratories as described in Sections 2.1 through 2.5.

A. Tank Related Items

In 2014, the PADEP provided Evergreen with a list of the open Evergreen tank incidents in the PADEP database for the PES facility (Table 2). GHD reviewed the available data to determine the appropriate technical approach for each incident. It is anticipated that one SCR will address all of the open tank corrective action requirements in AOI 7, unless directed differently by Evergreen or the PADEP.

1-Tank Incidents Identified by the PADEP – The following activities have been identified to address the tank incidents identified by the PADEP:

Tanks reported to be in AOI 7 that are actually located in other AOIs

- UST 002 is located in AOI 5, as confirmed by correspondence from Langan. Therefore, no additional work will be completed to address UST 002.
- UST 003 is located in AOI 5, as confirmed by correspondence from Langan. Therefore, no additional work will be completed to address UST 003.

Tanks AOI 7 with approved SCR

- AST 270 has an approved SCR from the PADEP, as confirmed by the PADEP's April 13, 2016 email. Therefore, no additional work will be completed for AST 270. The AOI 7 SCR will include a request that no further work is required for AST 270 and that this incident be closed.

Tanks to be Addressed by Additional Soil and Groundwater Sampling

- UST M-4/5 to be addressed by the following activities:
    - Soil – Prior soil investigation activities, completed during the tank removal in 1998, included the collection of eight soil samples. The results of the soil sampling met the direct contact MSCs. Therefore, no additional soil borings are proposed to address UST M-4/5. Soil sampling, however, will be completed during the installation of monitoring well C-172 which is to be installed in the location former UST M-4/5.
    - Groundwater – Groundwater samples collected from the excavation of UST M-4/5 had exceedances of the non-residential MSCs for benzene and toluene, therefore new monitoring well C-172 will be installed in the location of former UST M-4/5, as shown on Figure 1. Two groundwater sampling events will be completed in C-172, as part of the Workplan activities.
- AST 1108 to be addressed by:
    - Soil – Since no soil data exists in the immediate vicinity of AST 1108, soil sampling will be completed in four borings, BH-16-001 to BH-16-004.
    - Groundwater – Since previous groundwater data exists for existing C-54, one groundwater sampling event will be completed in existing downgradient monitoring well C-54 to complete characterization for AST 1108.
- AST 281 to be addressed by:
    - Soil – Since no soil data exists in the immediate vicinity of AST 281, soil sampling will be completed in four borings, BH-16-005 to BH-16-008.
    - Groundwater – Since previous groundwater data exists for existing monitoring well C-96, one groundwater sampling event will be completed in C-96, to complete characterization for AST 281.
- AST 272 to be addressed by:
    - Soil- Since no soil data exists in the immediate vicinity of AST 272, soil sampling will be completed in four borings, BH-16-009 to BH-16-012.
    - Groundwater – Since previous groundwater data exists for existing monitoring well C-58, one groundwater sampling event is recommended in C-58 to complete characterization for AST 272.
- AST 273 to be addressed by:
    - Soil - Since no soil data exists in the immediate vicinity of AST 273, soil sampling will be completed in four borings, BH-16-013 to BH-16-016.
    - Groundwater – Since previous groundwater data exists for existing monitoring well C-132, one groundwater sampling event will be completed for C-132 to complete characterization for AST 273.
- AST 1100 to addressed by:

- Soils – Existing soil data had one exceedance of the direct contact MSC for benzo(a)pyrene during previous investigations in the vicinity of AST 1100 which will be horizontal delineated by BH-16-017 and vertically delineated by BH-16-018.
- Groundwater – Since previous groundwater data exists for existing monitoring well C-163, one groundwater sampling event will be completed in C-163 to complete characterization for AST 1100.

Tanks to be Addressed by Only Groundwater Sampling

- AST 275 to be addressed by:
  - Soils – Since existing soil data (as reported in Aboveground Storage Tank GP-275 (PA Registration #037A) Tank Closure Confirmatory Sampling Activities Report January 7, 2008)) is less than direct contact MSCs, no additional soil data will be collected in the vicinity of AST 275.
  - Groundwater – Since previous groundwater data exists for existing monitoring wells C-131 and C-58, one groundwater sampling event will be completed in C-131 and C-58 to complete characterization for AST 275.
- AST 271 to addressed by:
  - Soils – Since existing soil data submitted in the December 20, 2002 SCR for AST 271 is less than direct contact MSCs, no additional soil data will be collected in the vicinity of AST 271.
  - Groundwater – Since previous groundwater data exists for existing monitoring wells C-58 and C-59, one groundwater sampling event is recommended in existing monitoring wells C-58 and C-59 to complete characterization in AST 271.
- AST 1002 to addressed by:
  - Soils – Since existing soil data collected in the vicinity of AST 1002 is less than direct contact MSCs, no additional soil data will be collected in the vicinity of AST 1002.
  - Groundwater – Since previous groundwater data exists for existing monitoring well C-104, one groundwater sampling event is recommended in C-104 to complete characterization of AST 1002.
- AST 277 to addressed by:
  - Soils – Since existing soil data (as reported in Aboveground Storage Tank GP-277 (PA Registration #039A) Closure Confirmatory Sampling Activities Report) is less than direct contact MSCs, so no additional soil sampling will be completed for AST 277.
  - Groundwater – Since previous groundwater data exists for existing monitoring well C112, one groundwater sampling event is to be completed in C-112 to complete characterization of AST 277.

2-Address Closed Tanks with No Record of Investigation Identified by the PADEP – GHD reviewed the available data for each of these tanks and did not identify any indication of releases from these tanks. To enable these tanks to be closed, GHD is proposing the collection of one boring from each of these former tank locations, as summarized below.

- AST, GP-274 – soil sampling in BH-16-034 is recommended to address GP-274.
- AST, GP-279- soil sampling in BH-16-035 is recommended to address GP-279.

- AST, GP- 287- soil sampling in BH-16-036 is recommended to address GP-287.
- AST, GP-288 – soil sampling in BH-16-037 is recommended to address GP-288.
- AST, GP-1102- soil sampling in BH-06-038 is recommended to address GP-1102.
- AST, GP-1103- soil sampling in BH-16-039 is recommended to address GP-1103.
- AST, GP-1123- soil sampling in BH-16-040 is recommended to address GP-1123.
- AST, GP-1132- soil sampling in BH-16-041 is recommended to address GP-1132.
- AST, GP-1135- soil sampling in BH-16-042 is recommended to address GP-1135.
- AST, GP-1202- soil sampling in BH-16-043 is recommended to address GP-1202.
- AST, 896-925- soil sampling in BH-16-044 is recommended to address GP-896-925.

3-Tank Issues Identified by the PADEP that are proposed to be treated as historical incidents–GHD reviewed the available data for each of the following items and determined that they do not meet the criteria identified by the PADEP to require corrective action in accordance with Chapter 245 (release to have occurred from a tank or related piping within a tank dike), as discussed with the PADEP. Therefore, these issues are proposed to be addressed by the following activities in the RI Report and not included in the SCR.

- **Crude oil at M Avenue at 1232**– This area was identified as investigation area 3 by GHD in Table 1 and as shown on Figure 1. Records indicate that there was a release from a 24 inch crude surge line near GP 272. Investigation area 3 will be investigated by soil sampling in boring BH-16-027 and one round of groundwater sampling in existing groundwater well C-163.
- **Slop oil backup from sewer near 1232**- This area was identified by GHD as investigation area 4 by GHD in Table 1 and as shown on Figure 1. Records indicate that it was an oil backup in the vicinity of the bulkhead. Investigation of area 4 will be by soil sampling in BH-16-028 and one round of groundwater sampling from existing monitoring wells C-163 and C-158.

B Act 2 Related Items

1-Items Proposed to Address PADEP Comments - The PADEP also provided comments related to the completion of Act 2 investigation requirements for items not related to corrective action for regulated tanks. The following summarizes the recommended Scope of Work for these items:

- **Provide and evaluate the data not presented in the 2012/2013 RI** – GHD has identified these data and worked with Stantec to bring these data into Stantec's database for AOI 7. GHD used all available data, including those not included in the 2012/2013 RIR, in preparing this Workplan. Based on this data review, lead was identified at a concentration exceeding the site specific standard for lead in historical boring BNA-10 from 2 to 4 feet below grade. One boring, BH-16-033, is proposed to confirm this lead detection. No additional points were identified to be addressed based on the historical data not included in the 2012/2-13 RIR.
- **Determine extent of LNAPL in the vicinity of monitoring wells C-106 and C-168** – GHD is proposing to install new monitoring wells C-170 and C-171 to delineate these areas. As discussed with the PADEP, additional wells cannot be installed to further delineate these areas due to access restrictions.

- **Verify potential benzo(a)pyrene (BAP) exceedance in vicinity of BP 271-** the PADEP confirmed in the April 13, 2016 email that there was no additional action required in this area since there were no BAP exceedance in this area.
- **Collect soil samples in NAPL areas**- Soil samples are proposed to be collected at every soil boring location. Soil samples from BH-16-029 and BH-16-030 were specifically selected to be collected in the vicinity of monitoring wells C-143 and C-169, which have identified NAPL to address the PADEP comment for soil samples in NAPL areas.
- **Collect groundwater samples beneath NAPL** – Groundwater samples are proposed to be collected beneath NAPL in monitoring wells C-106, 128, 146, 150, 151, 161 and 168. If LNAPL is detected in any of the new wells, groundwater beneath LNAPL at these locations will also be sampled.
- **Collect soil samples from 2-15 feet below grade** – All of the proposed soil borings are proposed to have samples collected from 0-2 and 2-15 foot below grade interval, unless noted otherwise in this Workplan. In addition, GHD reviewed the existing data and recommended soil sampling from 2 to 15 feet below grade at the locations of former soil borings, BH-16-29 through BH-16-32 since only shallow soil samples were collected previously at those locations.
- **Collect outdoor air samples above NAPL plumes**- Three air samples (AOI7 –AA-16-001 to 003) are to be collected above NAPL.
- **Complete two rounds of groundwater sampling** – 39 monitoring wells are proposed to be sampled one time since previous groundwater data exists in these wells. Thirty-five of these wells are shallow monitoring wells and 4 are deep (AOI 11) monitoring wells, as summarized in Table 1. The three new wells are proposed to be sampled twice during the RI activities, as summarized in Table 1.

2-Items Identified by Evergreen – Evergreen reviewed their records and identified additional areas to be included in the AOI 7 RI. These areas are discussed further below:

- **Charge line from GP 284 to 1232** – Evergreen identified a former release in the area which GHD identified as investigation area 1. Soil sampling from soil borings BH-16-019 to BH-16-022 and groundwater sampling from C-130 and C-51 will be completed to characterize investigation area 1.
- **9th and L Ave in concrete conduit between Unit 433 and 1232** – Evergreen identified a former release in a 24 inch surge line, which GHD identified as investigation area 2. Soil sampling from four borings, BH-16-023 to BH-16-026, and groundwater sampling from existing monitoring wells C-54 and C-57 will be completed to characterize investigation area 2.
- **Former Incinerator** – No post closure sampling was identified in the area of the former incinerator after it was closed, cleaned and partially dismantled in 1999. GHD proposes the collection of soil samples from soil boring BH-16-045 to investigate this area.
- **Former Sludge Basins** – These basins were closed in 1999 by power washing, testing the sump water and concrete coring. All data met appropriate criteria in 1999. The HDPE and concrete were removed and the area backfilled. Since no soil sampling was completed at the perimeter of the sludge basin, GHD is will collected soil samples from soil boring BH-16-046 in this area.

- **Former Hazardous Waste Tanks (1004-1007) –** Hazardous wastes were stored in these tanks and no release or closure information exists for these tanks. Soil sampling from boring BH-16-047, including the collection of dibenzo(a,h)anthracene, benzo(k)fluoranthene and hexavalent chromium and mercury based on the past storage of materials in these tanks, will be completed as part of the Workplan activities as summarized in Table 1.

2.1 Field Mobilization and Utility Clearance (To be Completed Early-June 2016)

All utility clearances for subsurface investigations will be completed through a PA One Call and site specific procedures including soft dig or hand augers, reviewing plans and coordination with PES and Evergreen personnel. GHD will prepare a pre-plan, Underground Utilities Checklist and JSAs (Appendix A) and a site-specific HASP (Appendix B) for the field activities. The pre-plan will be submitted to Evergreen for review and once the pre-plan is finalized, it will be submitted to PES for review. GHD will coordinate a meeting with Evergreen and the appropriate PES personnel to discuss the Scope of Work and the Pre-Plan.

GHD plans to install all borings utilizing hand augers due to the shallow depth to groundwater at AOI-7, therefore GHD does not anticipate that the boring locations will need to be cleared prior to sampling. The proposed monitoring wells will be installed using a drill rig, therefore these locations will be cleared to a depth of 8 feet below grade before drilling the wells. Based on past experience at the PES site, GHD assumes that Evergreen will contract All State to perform all of the clearance activities for the monitoring well installations. GHD will collect soil samples for characterization from the proposed monitoring well locations during the clearance activities. One sample will be collected from the 0-2 foot interval, and another from the 2 foot interval above the water table (selected based on field observations of potential impact, PID readings or last unsaturated interval) in accordance with the SOPs. Soil samples will be submitted to Lancaster Laboratories for the COCs in Appendix E, unless noted otherwise in this Workplan. After attainment of the 8 foot clearance depth, the soils will be backfilled, recompacted and staked so that the location can be easily located during the monitoring well installations. A hand held global positioning system (GPS) unit will also be used to capture and record the borings or cleared monitoring well locations.

2.2 Soil Borings and Soil Sampling (To Be Completed Mid-June 2016)

The soil borings and soil sampling will be completed in accordance with the Scope of Work. One person from GHD and one person from Aquaterra will work to complete all of the proposed soil sampling and soil borings.

Soil borings will be completed using a hand auger. One sample will be taken from the 0-2 foot interval, and another from the 2 foot interval above the water table (selected based on field observations of potential impact, PID readings or last unsaturated interval). Soil samples will be submitted to Lancaster Laboratories for the COCs or specific compounds as noted in this Workplan and in Table 1. Where borings occur below asphalt, Evergreen will hire a facility contractor to open paved areas by saw cutting the asphalt surface and excavating through subgrade to allow soil sampling. Three new monitoring wells will be installed in AOI-7. Soil samples from the monitoring wells will be collected as described in the utility clearance task.

The soils will be field described by the field geologist and specific observations will be made of observed staining, odor, and identifiable objects (plant matter, pebbles, etc.). After sample collection and documentation, any excess soil material will be placed at the ground surface adjacent to the boring location. SOPs to be followed for the field activities are included as Appendix E.

2.3 Monitoring Well Installation and Development (To be Completed Late June/Early July 2016)

Total Quality Drilling (TQD) will be used to complete the three proposed groundwater monitoring wells. Monitoring wells will be constructed with screens spanning the water table to allow investigation of shallow groundwater conditions in the fill material. Wells will be installed with 10 feet of 2-inch PVC screen set at or above the water table in accordance with the SOPs. The annulus of the well will be filled with filter pack to up to one foot above the screen and the balance of the annulus will be filled with cement/bentonite to the base of the concrete well pad. A protective outer steel casing or flush mount completion (selected by CA) will be set in the pad for the 3 wells.

It is not anticipated that soil samples will be selected for laboratory analysis from below 8 feet (past the clearance depth) and submitted to Lancaster Laboratories for analyses, but if conditions warrant samples will be collected below 8 feet. The soils will be field-described by the field geologist and specific observations will be made of observed staining, odor, and identifiable objects (plant matter, pebbles, etc.). After sample collection and documentation, any excess soil material will be placed at the ground surface adjacent to the boring location.

Following installation, the three new wells will be developed until free of sediment (if possible). GHD will coordinate with Stantec for the locations (borings and wells) and reference elevations to be surveyed. SOPs to be followed for the field activities are included as Appendix C.

2.4 Groundwater Sampling (To Be Completed Late July 2016)

Prior to sampling, the monitoring wells will be gaged for depth to water and the presence of non-aqueous phase liquids. Each of the three new wells, plus the 39 additional wells, will be sampled and sent to Lancaster Laboratories for the COCs in Appendix E unless noted otherwise in Table 1. The three new monitoring wells will be sampled in one additional event during the RI activities, for a total of two events. If NAPL is present within one of the new monitoring wells and for the 7 monitoring wells listed on Table 1, the groundwater beneath the NAPL will be sampled following Evergreen's SOPs (Appendix E).

2.5 Ambient Air Sample Collection (to be completed July 2016)

Three (two samples with one duplicate) ambient air samples (AOI7 –AA-16-001 to 003) will be collected to investigate outdoor air quality in locations over NAPL plumes. SOPs to be followed for the field activities are included as Appendix E.

2.6 Data Validation and Data Evaluation (to be completed August 2016)

GHD will perform a quality assurance review of the analytical results of the investigation to document the data usability and will flag results for limitations due to exceedance of holding times, temperature or analytical performance due to method or travel blank detections, internal or

surrogate blank performance or matrix interferences. GHD will provide appropriate notations on the data and upload to the Stantec Portal for further use of the results.

GHD will review and summarize the results of the investigations and meet with Evergreen to discuss the results and preliminary conclusions.

2.7 Preparation of RI Report (Draft Due Nov. 1, 2016)

GHD will prepare a Draft RI Report in accordance with 25 Pa. Code (Act 2) and the previous PADEP comments for review by Evergreen and the other consultants on the Evergreen team, as appropriate. The Draft RI will present the soil, groundwater and air characterization data for AOI 7. A narrative and supporting documents will be provided on the methods and rationale behind the RI data collection, recommendations and conclusions. GHD will finalize the RI Report after reviewing the provided comments.

2.8 Preparation of SCR/RACR (Draft Due Nov. 1, 2016)

GHD will prepare a Draft SCR under separate cover to address the corrective action requirements under 25 PA Code Chapter 245 CAP Program for the tanks with open PADEP incidents for review by Evergreen and the other consultants on the Evergreen team, as appropriate. GHD will finalize the RI Report after reviewing the provided comments.

3. Schedule

GHD expects the field implementation to commence in mid-June 2016. Final validated analytical results would be expected to be available three weeks after groundwater sampling. This schedule will provide ample time for preparation of the draft RI Report and draft SCR by November 1, 2016.



GHD Limited
651 Colby Drive
Waterloo Ontario N2V 1C2 Canada
T 519 884 0510 F 519 884 0525 W www.ghd.com

Notes:
1. Soil sample GP-1100-100-CV2 exceeded the criteria for benzo(a)pyrene
Investigation Areas:
2. Investigation Area 1 – release of 7182 gallons of residual oil from charge line from GP-284 to Unit 1232 9/27/2008
3. Investigation Area 2 – release of approx. 500 gallons of gasoline to concrete in conduit between Unit 433 and Unit 1232 at 4th Street and L Avenue on 3/6/2006
4. Old Tank Farm - shown on Gulf Oil Corporation Girard Point – Map of Tanks, Buildings and Structures
Philadelphia Refinery Acc No 352C 5/1/11931 (last revision 10/22/1942)

Source: AOIs and Remediation Systems - Stantec
Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, June 2014

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

- Proposed Soil Boring location 0-2, 2-15 ft. bgs samples
- Exceedance of Lead at 2-4 ft
- Soil Location for Verification of Lead in Subsurface
- Soil Direct Contact Exceedance
- Soil Location for Vertical Delineation of benzo(a)pyrene in Subsurface
- Proposed Soil Boring location 2-15 ft. bgs sample
- Prior Soil Boring (green with sample > 2 ft.
- Prior Soil Boring shallow soil sample over NAPL
- Samples at Features Identified by Evergreen
- Priorir Soil Sample Location
- Existing Tank
- Removed Tank
- Other Tank
- Tank DEP identified for Corrective Action
- Tank DEP requested information on
- Tank Identified by PA DEP as Closed – No Further
- Investigation Area
- Area Of Interest
- Features Identified by Evergreen (not PA DEP

Original Size	Bar is one inch on original size drawing
ANSI D	0 — 1"

Project : 11109614

Date: Jun 6, 2016

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA
REFINERY OPERATIONS

HISTORICAL AND PROPOSED SOIL BORINGS

Figure No.

FIGURE 1

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\PRES005\11109614-00(PRES005)GIS-OT002.mxd



GHD Limited
651 Colby Drive
Waterloo Ontario N2V 1C2 Canada
T 519 884 0510 F 519 884 0525 W www.ghd.com

Investigation Areas:
1. Investigation Area 1 – release of 7182 gallons of residual oil from charge line from GP-284 to Unit 1232 9/27/2008
2. Investigation Area 2 – release of approx. 500 gallons of gasoline to concrete in conduit between Unit 433 and Unit 1232 at 4th Street and L Avenue on 3/6/2006

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Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, June 2014

0 150 300 450
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

Legend
- Proposed Monitoring Well
- Wells to be sampled
- Wells Not Exceeding MSCs in last 10 years
- NAPL detected
- Wells which exceeded MSCs in the past 10 years
- Wells Without Data in Past 10 years
- May 2013 Water-Table Elevation Contour (feet NAVD 88)
- Existing Tank
- Removed Tank
- Tank DEP identified for Corrective Action

Probable LNAPL Type(s)
- Light Crude Oil
- Investigation Area
- Area Of Interest

Original Size
ANSI D

Bar is one inch on original size drawing
0 1"

Project : 11109614

Date: Jun 6, 2016

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA
REFINERY OPERATIONS

EXISTING AND PROPOSED GROUNDWATER MONITORING

Figure No.

FIGURE 2

GIS File: Q:\GIS\PRO\JECTS\11109000s\11109614\Layouts\PRES005\11109614-00(PRES005)GIS-OT001.mxd

TABLE 1
SUMMARY OF PROPOSED SITE CHARACTERIZATION ACTIVITIES
AOI 7 WORK PLAN
PHILADELPHIA REFINERY OPERATIONS
EVERGREEN RESOURCES GROUP

Location ID	Old Number (Temp)	Existing	Proposed	Esitmated Completion Depth for Proposed Monitoring Wells and Soil Borings	Media	Collection of Surface Soil Sample (0-2 ft bgs) for Analytical Paramenters in Table 3	Collection of Soil Sample from Soil/GW interface for Analytical Paramenters in Table 3	Round 1 Collection of Groundwater Sample for Analytical Paramenters in Table 3	Round 2 Collection of Groundwater Sample for Analytical Paramenters in Table 3	Objective of Proposed Activity	Used for Evaluation of Regulated Tank Incident	Paved?
C-104		X			GW			X		Site Boundary Well; Dowgradient of GP-1002	YES	
C-105		X			GW			X		Side gradient delineation NAPL	NO	
C-106		X			GW			X		Groundwater sample under LNAPL	NO	
C-108		X			GW			X		Downgradient of GP-1108	YES - secondary	
C-112		X			GW			X		Downgradient of GP-277	YES	
C-113		X			GW			X		Downgradient of GP-277	YES - secondary	
C-127		X			GW			X		Side gradient delineation NAPL	NO	
C-128*		X			GW			X		Groundwater sample under LNAPL	NO	
C-129		X			GW			X		Downgradient of Investigation Area #1	NO	
C-130		X			GW			X		Downgradient of Investigation Area #1	NO	
C-131		X			GW			X		Downgradient of GP-275	YES	
C-132		X			GW			X		Downgradient of GP-273 and 277	YES	
C-136		X			GW			X		Downgradient of Investigation Area #2	NO	
C-138		X			GW			X		Downgradient of former UST M004 and M005	YES	
C-140		X			GW			X		Site Boundary Well	NO	
C-142		X			GW			X		Side gradient delineation NAPL	NO	
C-145		X			GW			X		Downgradient of NAPL at C-128	NO	
C-146		X			GW			X		Groundwater sample under LNAPL	NO	
C-150		X			GW			X		Groundwater sample under LNAPL	NO	
C-151		X			GW			X		Groundwater sample under LNAPL	NO	
C-158		X			GW			X		Downgradient of Investigation Area #1	NO	
C-161		X			GW			X		Groundwater sample under LNAPL	NO	
C-162		X			GW			X		Downgradient of NAPL at C-143	NO	
C-163		X			GW			X		Downgradient of GP-1100	YES	
C-168		X			GW			X		Groundwater sample under LNAPL	NO	
C-49		X			GW			X		Downgradient of GP-277	YES	
C-50		X			GW			X		Downgradient of GP-281	YES	
C-51		X			GW			X		Downgradient of Investigation Area #1	NO	
C-52		X			GW			X		Site Boundary Well	NO	
C-54		X			GW			X		Downgradient of GP-1100	YES	
C-57		X			GW			X		Downgradient of Investigation Area #1	NO	
C-58		X			GW			X		Downgradient of Investigation Area #2, GP-271, 272, 277 and 281	YES	
C-59		X			GW			X		Downgradient of Investigation Area #2, GP-271, and 277	YES	
C-62		X			GW			X		Side gradient delineation NAPL	NO	
C-96		X			GW			X		Downgradient of GP-281	YES	
C-134D		X			GW			X		AOI-11 Characterization	NO	
C-129D		X			GW			X		AOI-11 Characterization	NO	
C-144D		X			GW			X		AOI-11 Characterization; Site Boundary Well	NO	
C-50D		X			GW			X		AOI-11 Characterization	NO	
C-170			X		GW	X	X	X	X	Delineate NAPL southwest of C-168	NO	
C-171			X		GW	X	X	X	X	Delineate NAPL southeast of C-106	NO	
C-172			X		GW	X	X	X	X	Investigate potential impacts from M-004 and M-005 USTs; subsurface soil characterization	YES	
AOI7-BH-16-001	AOI7-BH-16-001		X		Soil	X	X			Delineate by Tank 1108	YES	
AOI7-BH-16-002	AOI7-BH-16-002		X		Soil	X	X			Delineate by Tank 1108	YES	
AOI7-BH-16-003	AOI7-BH-16-003		X		Soil	X	X			Delineate by Tank 1108	YES	
AOI7-BH-16-004	AOI7-BH-16-004		X		Soil	X	X			Delineate by Tank 1108	YES	
AOI7-BH-16-005	AOI7-BH-16-005		X		Soil	X	X			Delineate by Tank 281	YES	
AOI7-BH-16-006	AOI7-BH-16-006		X		Soil	X	X			Delineate by Tank 281	YES	
AOI7-BH-16-007	AOI7-BH-16-007		X		Soil	X	X			Delineate by Tank 281	YES	
AOI7-BH-16-008	AOI7-BH-16-008		X		Soil	X	X			Delineate by Tank 281	YES	
AOI7-BH-16-009	AOI7-BH-16-011		X		Soil	X	X			Delineate by Tank 272	YES	
AOI7-BH-16-010	AOI7-BH-16-012		X		Soil	X	X			Delineate by Tank 272	YES	
AOI7-BH-16-011	AOI7-BH-16-013		X		Soil	X	X			Delineate by Tank 272	YES	
AOI7-BH-16-012	AOI7-BH-16-014		X		Soil	X	X			Delineate by Tank 272	YES	
AOI7-BH-16-013	AOI7-BH-16-017		X		Soil	X	X			Delineate by Tank 273	YES	
AOI7-BH-16-014	AOI7-BH-16-018		X		Soil	X	X			Delineate by Tank 273	YES	
AOI7-BH-16-015	AOI7-BH-16-019		X		Soil	X	X			Delineate by Tank 273	YES	
AOI7-BH-16-016	AOI7-BH-16-020		X		Soil	X	X			Delineate by Tank 273	YES	
AOI7-BH-16-017	AOI7-BH-16-023		X		Soil	BaP only [6]	BaP only [6]			Delineate to NE at Tank 1100 for direct contact BaP exceedance	YES	
AOI7-BH-16-018	AOI7-BH-16-038		X		Soil		BaP only [6]			Delineate subsurface soil conditions at GP-1100-1100-CV2 for benzo(a)pyrene vertical delineation	YES	
AOI7-BH-16-019	AOI7-BH-16-024		X		Soil	X	X			Delineate for Investigation Area # 1	NO	
AOI7-BH-16-020	AOI7-BH-16-025		X		Soil	X	X			Delineate for Investigation Area # 1	NO	
AOI7-BH-16-021	AOI7-BH-16-026		X		Soil	X	X			Delineate for Investigation Area # 1	NO	
AOI7-BH-16-022	AOI7-BH-16-027		X		Soil	X	X			Delineate for Investigation Area # 1	NO	YES
AOI7-BH-16-023	AOI7-BH-16-029		X		Soil	X	X			Delineate for Investigation Area #2	NO	YES
AOI7-BH-16-024	AOI7-BH-16-030		X		Soil	X	X			Delineate for Investigation Area #2	NO	
AOI7-BH-16-025	AOI7-BH-16-031		X		Soil	X	X			Delineate for Investigation Area #2	NO	YES
AOI7-BH-16-026	AOI7-BH-16-032		X		Soil	X	X			Delineate for Investigation Area #2	NO	
AOI7-BH-16-027	AOI7-BH-16-028		X		Soil	X	X			Investigation Area # 3 in M Avenue north of 1132 unit	NO	YES
AOI7-BH-16-028	AOI7-BH-16-036		X		Soil	X	X			Investigation Area #4 in area of sewer backup north of 1332 at bulkhead; delineate subsurface soil conditions at C-165	NO	
AOI7-BH-16-029	AOI7-BH-16-033		X		Soil		X			Delineate subsurface soil conditions at C-143	NO	
AOI7-BH-16-030	AOI7-BH-16-034		X		Soil		X			Delineate subsurface soil conditions at C-169	NO	
AOI7-BH-16-031	AOI7-BH-16-035		X		Soil		X			Delineate subsurface soil conditions at AOI7-BH-10-20	NO	
AOI7-BH-16-032	AOI7-BH-16-037		X		Soil		X			Delineate subsurface soil conditions at AOI7-BH-12-56	NO	
AOI7-BH-16-033	AOI7-BH-16-039		X		Soil		Pb [7]			Verify Lead concentration at BNA-10 2-4 ft	NO	
AOI7-BH-16-034	AOI7-BH-16-043		X		Soil	X	X			Investigate conditions at former tank GP-274	YES	
AOI7-BH-16-035	AOI7-BH-16-044		X		Soil	X	X			Investigate conditions at former tank GP-279	YES	
AOI7-BH-16-036	AOI7-BH-16-045		X		Soil	X	X			Investigate conditions at former tank GP-287	YES	
AOI7-BH-16-037	AOI7-BH-16-046		X		Soil	X	X			Investigate conditions at former tank GP-288	YES	
AOI7-BH-16-038	AOI7-BH-16-047		X		Soil	X	X			Investigate conditions at former tank GP-1102	YES	
AOI7-BH-16-039	AOI7-BH-16-048		X		Soil	X	X			Investigate conditions at former tank GP-1103	YES	
AOI7-BH-16-040	AOI7-BH-16-049		X		Soil	X [9]	X [9]			Investigate conditions at former tank GP-1123	YES	
AOI7-BH-16-041	AOI7-BH-16-050		X		Soil	X	X			Investigate conditions at former tank GP-1132	YES	
AOI7-BH-16-042	AOI7-BH-16-051		X		Soil	X	X			Investigate conditions at former tank GP-1135	YES	
AOI7-BH-16-043	AOI7-BH-16-052		X		Soil	X [9]	X [9]			Investigate conditions at former tank GP-1202	YES	
AOI7-BH-16-044	AOI7-BH-16-053		X		Soil	X	X			Investigate conditions at former tank historical tank farm	YES	
AOI7-BH-16-045	AOI7-BH-16-054		X		Soil	X [8]	X [8]			Investigate unpaved area adjacent to former incinerator (SW)		
AOI7-BH-16-046	AOI7-BH-16-056		X		Soil	X [8]	X [8]			Investigate unpaved area adjacent to former sludge basins (W)		
AOI7-BH-16-047	AOI7-BH-16-060		X		Soil	X [8]	X [8]			Investigate unpaved area adjacent to former haz waste tanks 1004-1007 (N)		
AOI7-AA-16-001			X		Outdoor Air			Note 5		Investigate outdoor air quality in location over NAPL plume - light crude oil plume	NO	
AOI7-AA-16-002			X		Outdoor Air			Note 5		Investigate outdoor air quality in location over NAPL plume - light crude oil plume	NO	
AOI7-AA-16-003			X		Outdoor Air			Note 5		duplicate sample	NO	

1. Investigation Area #1
2. Investigation Area #2
3. Investigation Area #3
4. Investigation Area #4
5. Outdoor air samples to be collected for volatile organics by TO-15 analytical method
6. Soil sample analyzed only for benzo(a)pyrene to complete delineation of impact observed in sample GP-1100-1100-CV2
7. Soil sample analyzed only for lead at location to verify concentrations at BNA-10
8. Site specific constituents - add dibenz(a,h)anthracene, benzo(k)fluoranthene, hexavalent chromium and mercury
9. Sulfur tank

TABLE 2
SUMMARY OF STORAGE TANK CORRECTIVE ACTION INVESTIGATIONS
AOI 7 WORK PLAN
PHILADELPHIA REFINERY OPERATIONS
EVERGREEN RESOURCES GROUP

Release/ Incident Date	PADEP Incident ID	Sunoco Tank Number or Release Location	PADEP Tank Number	Facility ID	RMS File	Quantity Released (gallons)	Product Description
8/5/1999	5825	Unknown UST	002?	51-11554		NA	gasoline?
8/5/1999	5915	Unknown UST	003?	51-11554		NA	diesel?
1/31/1991	45686	M-5	005	51-11554	18126		diesel
9/16/1991	45689	275	057A	51-11554	18126		cat charge stock
11/11/1993	45694	272	054A	51-11554	18126	132 gal (3bbls)	crude oil
6/6/1995	45697	273	035A	51-36558	93287	78 gallons	vacuum gas oil
5/6/1998	6134	M-4	001	51-36558	93336		gasoline
5/6/1998	45699	M-5	002	51-36558	93336		diesel
9/6/1998	45700	1108	149A	51-36558	93336	420 gallons	No. 6 Fuel Oil
9/18/1999	30777	281	043A	51-36558	93336	84 gallons	gas oil/ cat charge
11/24/2001	5913	281	043A	51-36558	93336	200 gallons	gas oil
6/25/2002	29142	271	033A	51-36558	400761	Unk - soil contamination	cat charge (gas oil)
5/2/2006	36456	1002	139A	51-36558	571004	Unk - soil contamination	decanted oil
5/30/2006	36578	1100	140A	51-36558	571004	Unk - soil contamination	slop oil
6/25/2007	38132	277	039A	51-36558	571004	Unk - soil contamination	heavy gas oil
6/28/2009	40386	270	032A	51-36558	636651	6000 gallons	crude oil/recovered oil
3/8/2011	42279	272	034A	51-36558	636651		crude oil

PHILADELPHIA ENERGY SOLUTIONS

General Pre-plan

Date: June 16, 2016

Unit/Area: Girard Point, North of Penny Packer Avenue **Equipment ID:**

Job Description: Install 3 monitoring wells and collect soil samples during clearance; install 47 soil borings, and sample 42 monitoring wells

List additional pre-plans/procedures associated with this work and where they can be accessed:

Pedestrian and Vehicle Pre-Plan: There may be a few of the locations described below that are proposed to be installed near the bulkhead. If they cannot be moved to greater than 35' from the bulkhead (outside of the fence), they a pedestrian and/or vehicle pre-plan will be generated/obtained as needed based on each location.

List of applicable site-specific contractor JSAs and standard operating procedures: Driving; Environmental-Site Recon; Environmental-Soil Sampling; Environmental-Oversight of Monitoring Well Installation and/or Soil Borings; Environmental-Decontamination of Sampling Equipment and Personnel; Environmental-Concrete Coring; Drilling-Monitoring Well Pad Construction; Well Development; Environmental-Monitoring Well Sampling; Geotechnical-Soil Sampling Using Hand Augers/Shovel/Post Hole Digger.

Reason for Preplan: This pre-plan explains Field Personnel plans to oversee installation of 3 wells via hollow stem auger drilling, installation of 47 soil borings (by hand auger), sample 42 monitoring wells, and to communicate how work will be performed in a safe manner that will not interfere with the operations of the plant.

Scope of Work: The scope of work currently entails the installation of 3 test wells via hollow stem auger drilling (Total Quality Drilling). Two proposed well and boring locations are located near the bulkhead in the northwest portion of the area west of 2nd Street and north of M Ave. as shown on the attached figure. The third is in the southern portion of the area north of Pennypacker Avenue and east of 2nd Street. The wells will be screened from 5-15 feet below ground surface (bgs) and will be completed with steel stick-up protective casing unless flush-mount manholes are requested due to location.

Additionally, 47 soil borings will be advanced throughout the facility to investigate tank incidents, support completion of corrective action activities and investigate five additional areas of investigation. The soil borings will be advanced to groundwater (expected to be a depth of 5 feet maximum) and two samples will generally be procured from each. Soil borings will be advanced using hand augers or hydrovac units where needed due to more compact soils and/or fill material that cannot be hand augered through. In areas where soil borings are to be drilled below asphalt, Evergreen will hire a facility contractor to cut open asphalt to allow for hand augering/hydrovac. Soil boring activities will be performed by both Aquaterra Technologies and GHD personnel.

Each of the well drilling and soil boring locations will have one-call clearance initiated by GHD Services, Inc/TQD (GHD/TQD). The drilling points will be cleared by water blasting (hydrovac) down to 8 feet with oversight by Field Personnel. Locations will be backfilled with clean sand prior to drilling. Each well will be developed by TQD and development water will be processed in the facility. Following development and

recovery, each of the newly installed wells will be sampled by evacuation of 3 well volumes of water using whale pumps; the four deep wells will be purged using low flow purging and sampling methods. Excess purge water will be treated with carbon and discharged to the ground surface unless non-aqueous phase liquids are detected, in which case the purge water will be contained and staged for subsequent disposal. Surveying of final well locations and reference elevations will be performed upon completion.

- Field personnel will have PSM and site-specific training, TWIC and PES contractor ID cards on hand.
- Field personnel will arrive on-site by 7 am each day. Field staff will check in on site at the appropriate block house to obtain the necessary permits.
- JSAs will be filled out daily.
- Field staff will monitor air space and upgrade as appropriate in accordance with PES procedures (will notify operatory of any change in conditions).
- Tailings from well drilling will be stored either on a plastic sheet by the hole, or in a designated place decided on in advance, for Evergreen to dispose of later.
- Appropriate Area Operators will be notified of upcoming work in their respective units the day before work to expedite the permit process.
- In order to leave PES temporarily, for purposes such as dropping off samples to couriers or obtaining supplies, field staff must badge out and alert/sign out with the area operator manager. Field staff must alert/sign in and out with area operators when entering their units, then sign out when work is complete within those units.

Subcontractors in both facilities typically work from 7:00 am until 2:00 pm, so work involving subcontractors must be scheduled accordingly. Field staff will be onsite up to 5:00 pm or work permit expiration time.

GHD Field Foreman Alissa Cannon Phone 484-401-1441
Aquaterra Field Foreman Shaun Sykes Phone 484-356-8497
Evergreen Resources Management Contact: Tiffani Doerr, 484-889-7347

Safety Precautions/Controls: All personnel involved in this work will wear full level D PPE, including Nomex, steel toed boots, eye/ear protection, hard hat, and cut resistant gloves. All personnel will have passed the PSM training, the site specific safety training and have TWIC cards. Field Personnel will meet with the CA to discuss the scope of work and field methods before drilling begins. In addition, Field Personnel will be in contact with the CA during operations so that the work can be coordinated and conducted in a manner that is least intrusive to the operations of the plant. **A photoionization detector (PID) and/or 5-gas meter (O2, LEL, PID, H2S, CO) will be used to monitor the breathing zone while drilling. Also, in areas where benzene vapors are anticipated, a benzene meter will be used to monitor breathing space. If conditions require upgrade to additional PPE including appropriate respirator, work will stop and the CA will be notified. The CA will also be notified of any change in drilling location or work conditions.**

Approval Signatures

	Name Printed	Signature	Date
Operations Supervision	Steve Stoner	Steve Stoner	6/17/16
Maintenance Supervision	Dan Riccio	Dan Riccio	6/17/16
Salaried Safety Representative	Sean McIlvaine	Sean McIlvaine	6/22/16

Reviewer Signatures

	Name Printed	Signature	Date
Others (USW Safety, Inspections, Reliabilty, etc.) *Optional at request of pre-plan generator			
Permit Issuer(s)			
Maintenance Foreman			
Affected Workers			



GHD Limited
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Waterloo Ontario N2V 1C2 Canada
T 519 884 0510 F 519 884 0525 W www.ghd.com

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Philadelphia Refinery Acc No 352C 5/1/11931 (last revision 10/22/1942)

Source: AOIs and Remediation Systems - Stantec
Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, June 2014

0 150 300 450
Feet

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NAD 1983 StatePlane Pennsylvania South FIPS
3702 Feet

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Original Size	Bar is one inch on original size drawing
ANSI D	0 1"

Project : 11109614

Date: Jun 6, 2016

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA
REFINERY OPERATIONS

HISTORICAL AND PROPOSED SOIL BORINGS

Figure No.

FIGURE 1

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\PRES005\11109614-00(PRES005)GIS-OT002.mxd



Site-Specific Health and Safety Plan

Philadelphia Refinery Operations AOI-7 RI

Evergreen Resource Management

June 14 2016
11109614|***|***
Approval Date: 6-09-2016

HEALTH AND SAFETY PLAN

Signature page

This HASP was electronically signed by the Project Manager and Safety Group within the HASP Builder Software. Fully approved HASP is printed without a DRAFT watermark.

Project Name: Philadelphia Refinery Operations AOI-7 RI

Project Manager Approval Date: David Steele, 6-09-2016
Safety Group Approval Date: William (Bill) Doyle, 6-09-2016

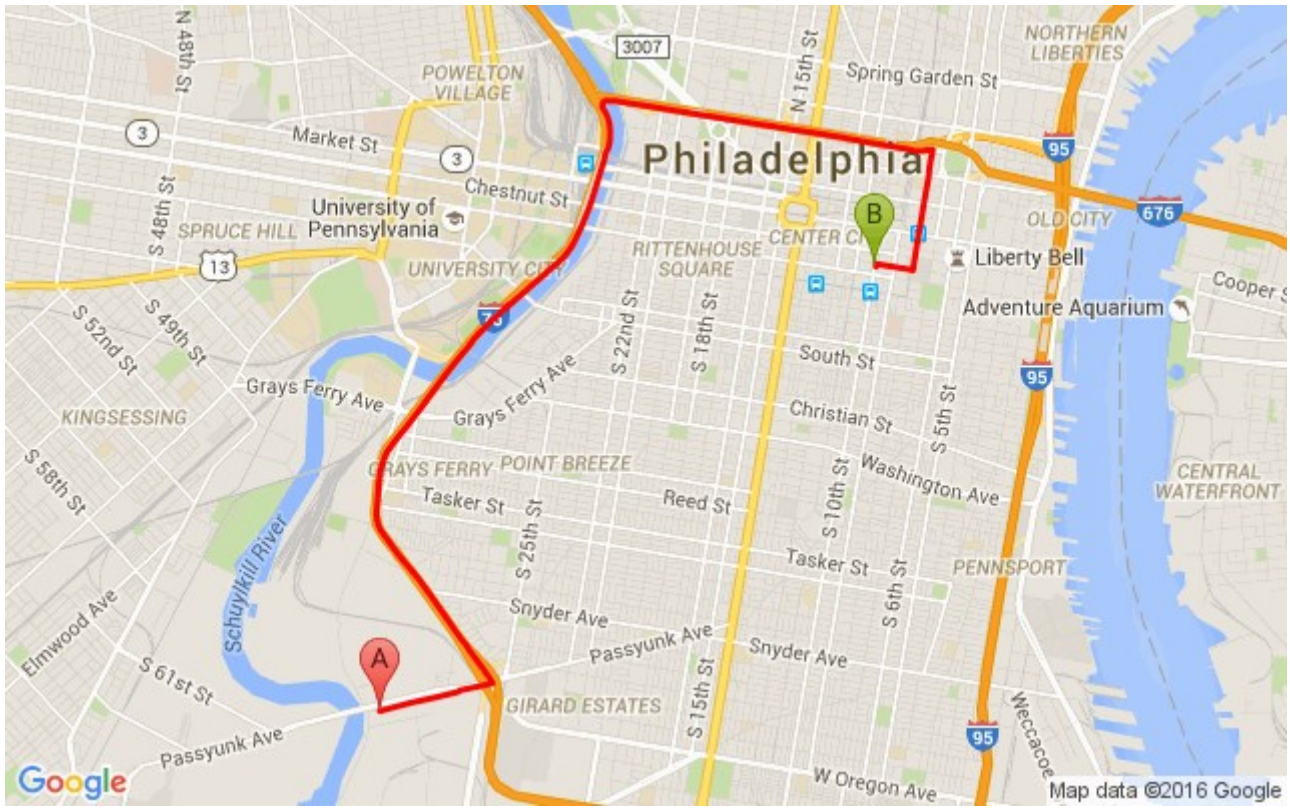
Project Number: 11109614

Emergency Information

<table>
<tr><th>Contact</th><th>Phone Number</th><th></th></tr>
<tr><td>Local Police</td><td>911
215-686-3010</td><td rowspan="4">Hospital Directions
Directions:
1. Head east on Frontage Rd
2. Turn right onto W Passyunk Ave
3. Turn left to merge onto I-76 W
4. Take exit 344 for I-676 E/US-30 E toward Central Phila
5. Continue onto I-676/US-30 E
6. Take the 8th St exit
7. Turn right onto N 8th St
8. Turn right onto Sansom St
9. Turn left onto S 10th St
Destination will be on the right

Driving Time: 17 mins
Driving Distance: 6.0 mi</td></tr>
<tr><td>Fire Department</td><td>911</td></tr>
<tr><td>Ambulance</td><td>911
215-685-4216</td></tr>
<tr><td>Local Hospital
Thomas Jefferson University Hospital
132 South 10th Street
Philadelphia, Pennsylvania
United States 19107</td><td>215-935-6840</td></tr>
<tr><td>National Poison Center</td><td>1-800-222-1222</td><td rowspan="8">GHD - Incident Reporting Hotline
Please call (866) 529-4886 and provide:
• Name and location of caller
• Description of incident
• Name of injured person(s)
• Description of injuries
• Phone number for return call</td></tr>
<tr><td>Project Manager
David Steele</td><td>Work: 610-321-1800
Cell: 859-321-3730</td></tr>
<tr><td>Site Supervisor
Alissa Cannon</td><td>Work: 610-321-1800
Cell: 484-401-1441</td></tr>
<tr><td>GHD Regional S&H Manager
William (Bill) Doyle</td><td>Work: 734-453-5123
Cell: 734-536-1282</td></tr>
<tr><td>Client Contact
Tiffani Doerr</td><td>302-477-1305</td></tr>
<tr><td>Client Site Contact
Tiffani Doerr</td><td>Work: 610-431-5733 x 106
Cell: 484-889-7347</td></tr>
<tr><td>Other Contact</td><td></td></tr>
<tr><td>Site Health Officer</td><td>Phone:</td></tr>
<tr><td>Person to verify hospital route:</td><td colspan="2">Signature:</td></tr>
</table>

Hospital Driving Directions



1. Head **east** on **Frontage Rd**
2. Turn **right** onto **W Passyunk Ave**
3. Turn **left** to merge onto **I-76 W**
4. Take exit **344** for **I-676 E**/**US-30 E** toward **Central Phila**
5. Continue onto **I-676**/**US-30 E**
6. Take the **8th St** exit
7. Turn **right** onto **N 8th St**
8. Turn **right** onto **Sansom St**
9. Turn **left** onto **S 10th St**
   Destination will be on the right

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Appendix

Chemical Table

Appendix A - GHD Mandatory Documents

- Tailgate Safety Meeting Form (Large)
- Tailgate Safety Meeting Form (Small)
- GHD - Field STEP Form
- GHD - Driving STEP Form
- GHD - Unsafe Act/Unsafe Condition/Stop Work Authority Form
- GHD - Near Miss Reporting Form
- GHD - Incident Reporting Form
- QSF-006 - Management of Change
- QSF-019 Underground Utilities Checklist
- HASP Amendment Form
- HASP Acknowledgement Sheet

Appendix B - JSAs

- Environmental-Soil Sampling
- Environmental-Soil Sampling From Excavator Bucket
- Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)
- Driving
- Construction-Excavation Oversight
- Environmental- Monitoring Well Sampling
- Environmental-Oversight of Monitoring Well Installation and/or Soil Boring
- Vacuum Truck Operation Oversight
- Mobilization-Demobilization
- Environmental-Site Recon and Walkthrough

Appendix C - Safety Data Sheets (SDS)

- Alconox SDS

Appendix D - Training Records

- Record of Training Form

Other

- EXCAVATION SAFETY PROGRAM
- FALL PROTECTION PROGRAM
- CONTROL OF HAZARDOUS ENERGY PROGRAM
- TABLE 2

1. Introduction

1.1 Purpose And Policy

The purpose of this site specific health and safety plan (HASP) is to provide guidelines and establish procedures for reducing and controlling hazard exposure to the public, property, and personnel. The HASP is a living document and must continually evolve as site conditions and knowledge of the site activities develop.

This document has been developed to meet or exceed the requirements set forth by federal, state, and provincial legislation. If any procedure outlined in this plan conflicts with federal, state/provincial, and/or municipal law, prescribed standards, or client requirements, then the most stringent set of standards applies.

1.2 Stop Work Authority

All employees are empowered and expected to stop the work of coworkers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe acts/unsafe condition (UA/UC) or Stop Work Authority (SWA) is documented with the UA/UC/SWA form.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated results in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.

1.3 Short Service Employee

The Short Service Employee (SSE) is identified as having less than 6 months employment and requires supervised training while working in the field. The individual is required to wear a fluorescent orange hardhat, a reflective safety vest, or another obvious indicator of SSE status. Training and mentoring allows them to gain knowledge and experience in procedures and methods. In order for a new employee to work in the field, the following minimum training requirements must be met:

1. GHD New Employee Safety & Health Orientation training (on-line).
2. GHD HAZCOM (US)/WHMIS (Canada) training (on-line).
3. On-boarding completed with Human Resources.
4. Compliance training defined on the QSF-20 as it applies to field work to be conducted.
5. Client specific safety training.

A SSE's primary mentor is their direct Supervisor. GHD Supervisors are responsible for ensuring that a SSE completes the safety, field method, and quality training as appropriate to the work they are assigned. A SSE requires an On-site Mentor for all fieldwork. The On-site Mentor must have experience in the work they are mentoring and they are responsible for the close monitoring of the SSE.

Project team SSE make-up requirements are:

- A one-person project team cannot be a SSE.
- A two-person to four-person project team can have only one SSE.

A five-person or more project team cannot have more than 20 percent SSE without a written variance from the GHD Corporate Manager of Safety & Health.

New hire employees that can provide sufficient documentation supporting previous experience in working under Behavior Based Safety Systems similar to GHD's system may be exempt from GHD's SSE Program. These exemptions are handled on a case-by-case basis and must be authorized by one of the following staff: the Corporate Manager of Safety & Health or a Senior Regional Safety & Health Manager. Details of the exemptions are covered in the full SSE Policy.

Clients may define specific SSE requirements for work at their facility or on their project. It is the responsibility of the Project Manager to communicate a client's specific requirements to the appropriate staff within GHD and project subcontractors. Client-specific SSE standards shall be posted on the Safety & Health Portal SSE Folder.

1.4 Project Management And Safety Organization

Project Manager – GHD – David Steele

The GHD Project Manager (PM) is responsible for the overall implementation, review, and approval of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out. The PM will also ensure that appropriate resources are provided to support the project.

Site Supervisor – GHD – Alissa Cannon

The Site Supervisor (SS) is responsible for:

- Ensuring that the HASP is reviewed, approved, and implemented.

- Communicating site requirements to site project personnel and subcontractors through site orientation.
- Consulting with the client/site representative regarding appropriate changes to the HASP.
- Conducting a daily tailgate safety meeting that communicates the site specific hazards. This meeting must be documented on the Tailgate Safety Meeting form in the appendix.
- Ensuring that all necessary cleanup and maintenance of safety equipment is conducted by project personnel.
- Verifying emergency phone numbers and services, including hospital and clinic locations.
- Completing, filing, and correctly submitting the forms attached to the HASP, including daily tailgate meetings, job safety analysis, and daily inspection checklists.
- Implementing behavior-based safety procedures on all activities and enforcing safe work practices for project employees.
- Observing ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure.
- Overseeing the safety of visitors who enter the site.
- Maintaining communication with the client/site representative(s) and/or government inspectors/agencies.
- Providing and enforcing the use of safety equipment, personal protective equipment (PPE), and other items necessary for employee or community safety.
- Conducting job site inspections as a part of quality assurance for safety and health.
- Ordering the immediate shutdown of site activities in case of a medical emergency, unsafe condition, or unsafe practice.
- Reporting safety and health concerns to site and/or project management as necessary.

Regional Safety and Health Manager GHD – William (Bill) Doyle

The Regional Safety and Health Manager (RSHM) is a full time GHD employee who is trained as a safety and health professional and serves in a consulting role to the PM and SS regarding potential safety and health issues. A RSHM or trained designee must review, coordinate required changes with PM and provide the final approval of the HASP prior to work beginning on site.

Site personnel

All employees have a role in GHD's SMART program and a responsibility to implement the program. GHD personnel are responsible for:

- Engaging in all aspects of their tasks and jobs when they are prepared to do the job safely, well rested, and mentally prepared for work.
- Utilizing the STAR process before initiating work.
- Implementing Stop Work Authority for any operations that may cause injury, illness, or unsafe conditions to employees, subcontractors, or others.
- Assisting in the development and revision of Job Safety Analysis (JSA) forms that are appropriate to their current scope of work.
- Use, inspect and maintain PPE as required by JSA and site conditions.
- Preparing, submitting, and reviewing behavior-based safety observations using the Safe Task Evaluation Process (STEP) form.
- Inspecting tools and other equipment before each use or as manufacturer dictates and documenting any defects.
- Correcting job site hazards when possible without endangering life or health.
- Reporting safety and health concerns to the SS, PM, RSHM, or SHO (if appointed).

Subcontractors

Subcontractors are responsible for:

- Developing and implementing their own HASP and complying with its contents.
- Attending an initial site orientation and subsequent safety meetings.

- Ensuring that their employees adhere to all site personnel requirements.
- Submitting required documentation to the SS regarding federal, state, or provincial requirements before beginning any work.
- Obtaining approval for the use of GHD's equipment.
- Observing and obeying all GHD/client requirements as well as any specific direction given by GHD's management team.
- Wearing any personal protective equipment required by their HASP and GHD at all times.
- Meeting all governing legislation/regulation/industry standards for equipment used on GHD projects.
- Verifying that all subcontractor employees have required training, medical clearance, and substance abuse testing as required by project.
- Not being in possession or under the influence of alcohol, incapacitating drugs, or medications.

In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, noncompliance with safety and health policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with GHD.

Equipment Operators

All equipment operators must meet all the requirements of site personnel listed above and are responsible for the safe operation of heavy equipment. Operators are responsible for conducting documented daily inspections on their equipment to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Daily inspections must be provided to the GHD site supervisor prior to the equipment being used.

Authorized Visitors

Authorized visitors, as approved by **David Steele**, are provided with all relevant information regarding site operations and hazards as applicable to the purpose of their visit. Visitors may be required to be accompanied by authorized personnel.

1.5 Safety And Health Officer

The safety and health officer (SHO) is responsible for assisting in the communication of site requirements to site project personnel and subcontractors and for carrying out the health and safety responsibilities include the ones listed under the site supervisor. The SHO has prior experience in working at similar sites. The SHO operates under the supervision of the PM, SS, and RSHM.

1.6 Recordkeeping

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks.
- Air monitoring/sampling results and instrument calibration logs.
- Records of training acknowledgment forms (site specific training, toolbox meetings, etc.).
- Documentation of site inspections, results of inspections, and corrective actions implemented.
- Emergency reports describing any incidents or accidents.

1.7 Site HASP Amendments

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already-documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA, or PPE that does not involve a change in respiratory protection. Amendments must be documented on the Site Health and Safety Plan Amendment Form located in Appendix, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite by the PM and review/approval of the HASP by a RSHM.

1.8 Training Requirements

All personnel conducting work at this site shall have completed the appropriate safety and health training and behavioral-based safety(BBS) training, as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified on each JSA form

1.9 Site Specific Training

An initial site specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site specific training session. Personnel successfully completing the training session shall sign the HASP Acknowledgement Form, which is presented as an Appendix.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

1.10 Safety Meeting/ Hasp Review

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site specific pre-entry briefing. The safety meetings will be documented each day with written sign in sheets containing a list of topics discussed. To assist with the compliance of documentation of the Tailgate safety meetings, there is a Tailgate Safety Meeting form located in the Appendix.

1.11 Fatigue Management

GHD employees and subcontractors are responsible for ensuring they are both physically and mentally fit to perform their job functions safely as part of GHD's Fatigue Management Program. GHD will use the following control measures to minimize fatigue during the project:

- Alter the work schedule to reduce the overall time a worker will perform physically demanding work.
- Monitoring employee behaviors for signs of fatigue.
- Eliminate or reduce where practicable the need to work extended hours, night shifts, or overtime.
- Use work-rest patterns during repetitive tasks to control fatigue and increase mental fitness.

GHD's work/rest balance requirements are referenced based on weight of the vehicle. Less than 10,000 lbs/4536 kg (passenger cars, pickup trucks, SUV) will follow the following guidelines:

- Maximum working time and/or driving and working time within one work day: 14 hours (extendable up to 16 hours if drive time < 4 hours and/or airplane travel is involved; this approach can be taken three times in a 7 day period)
- Maximum continuous drive time: 3 hours followed by a 15 minute break
- Maximum drive time per day: 9 hours (extendable up to 10 hours twice in 7 day period)

Employees that drive vehicles greater than 10,000 lbs/4,536 kg must meet the requirements of the transportation agency for which they work and travel.

Management, as represented by an employee's manager, Project Manager or any Principal, may grant a documented variance to the standard work/rest balance for specific employees for a period covering no longer than one week. Additional variances can be issued after for each week. For further information see Fatigue Management Program on the portal.

1.12 Management Of Change

Safety incidents are known to occur when key changes are not communicated to all stakeholders related to a project. Management of Change is covered by the GHD Quality Manual Section 7.3.7 Control of Project Changes and is documented using QSF-006 Management of Change Form (see Appendix).

The types of changes that are to be documented and communicated are:

- Project management/Resources (key personnel)
- Equipment
- Safety – this would not include daily changes to JSA when dirtied in the field.
- Field Operations/SOP

Form QSF-006 is the tool to document and communicate the change. The completed QSF-006 is to be filed in the GHD field folder of the project file.

1.13 Field Notes

All activities undertaken in the field must be correctly and completely recorded in bound field books, Quality System Field Data Record Forms (QSF 200, QSF 400 , and QSF 500 Series D), or in some other GHD approved format (i.e., electronically, loose paper). All records will be kept in the GHD approved format specified for the activities undertaken. The formats have been established to ensure completeness and to provide consistency amongst the field staff regardless of which office they are from. Refer to Section 7 - Control of Monitoring and Measuring Equipment of the GHD Quality System Manual and Section 3.4.1 – Field Notes of the GHD Field Training Manual for more information regarding field note content requirements.

These field notes may be called as evidence in a court of law.

In addition to the formal field notes, field personnel are expected to keep running tables that summarize the field activities so that when questioned at any time during the program, a detailed status of the work completed and that yet to be done can be provided. These lists also serve as checklists to confirm that the correct number and sequence of samples, wells, boreholes, etc. have been collected or completed.

Upon completion of each project, all of the field documentation is brought back and suitably stored at the GHD office in which the field staff who performed the field work are located.

> *GHD demands that all field note entries are factual and accurate. Everyone recognizes that errors and omissions will be made on occasion. While GHD does not condone a level of effort that is incomplete or inaccurate, it is recognized that it may happen and most of our clients will understand these situations. However, anyone who is caught falsifying any record, no matter how small, will be immediately dismissed.*

2. History & Scope

2.1 Site History/Background

Evergreen Resources Management (ERM) is responsible for the environmental liability at the Site, and Philadelphia Energy Solutions (formerly Sunoco) owns the property. Tasks are being performed to delineate soil and groundwater contamination within AOIs 7, and to monitor indoor air pollution in buildings throughout the facility. Oil refining activities at the site began in 1866 and have continued to the present day. Today, the site is separated into two processing facilities: Girard Point and Point Breeze. Together, they constitute the largest oil refining operation on the eastern seaboard, processing over 350,000 barrels of crude oil per day.

2.2 Scope Of Work Tasks

The scope of work includes the installation of 3 monitoring wells and the collection of soil samples during the clearance, the sampling of 42 monitoring wells (including the 3 newly installed wells) and soil sampling from 37 soil borings.

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. These activities listed here, and in the attached JSAs cover the tasks being performed onsite.

Driving, Site Reconnaissance and Walk through Activities, Mob/Demob of personnel, material, and equipment, Oversight of Monitoring Well Installation, Monitoring Well Sampling, Collection of Soil Samples, Collection of Soil Samples from an Excavator bucket, Excavation Oversight, Vacuum Truck Operation Oversight, Decontamination of Sampling Equipment and Personnel, Soil Boring (Drilling)

If site operations are altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

All addendums will be required to be developed in conjunction with project management and a GHD safety professional.

3. Chemical Hazards

3.1 Introduction To Chemical Hazards

Chemical exposures occur via four major routes of entry: absorption, inhalation, ingestion, and injection. The chemical hazards of concern that may be encountered during the tasks are identified in the projects scope of work. A listing of the contaminants of concern is found in the **Chemical Table** and the **Safety Data Sheets (SDSs),** which include exposure limits, signs and symptoms of exposure, chemical properties, and physical characteristics.

3.2 Control Measures

Before the proper control(s) can be selected, GHD personnel conduct a hazard evaluation of the process, activity, or material. A hazard evaluation may include reviewing information from a chemical container label, MSDS, manufacturer, National Institute for Occupational Safety and Health (NIOSH) website, and other resources as needed; identifying route(s) of exposure; and evaluating the process/activity to determine if an exposure evaluation is needed. If necessary, a RSHM conducts and documents exposure evaluations.

Exposure to potential on site contaminants/chemicals, such as those listed in Table 1.0 and MSDSs, include the following methods:

- Engineering controls such as wetting methods, ventilation, elimination, or substation.
- Administrative controls such as work rotation, training, or proper hygiene practices (washing facilities).
- Monitoring air concentrations with appropriate equipment in the breathing zone.
- Selecting and using personal protective equipment (PPE) such as gloves or respiratory protection.

JSAs are developed and revised to list the associated hazard controls on a task-specific basis.

3.3 Safety Data Sheets

SDSs are documents created by the chemical manufacturer that describe the substance. Some information found on an SDS includes: hazardous and physical characteristics, handling requirements, storage and disposal information, and signs and symptoms of exposure.

When working with hazardous chemicals, readily available and up-to-date SDSs are required for each chemical. GHD personnel and its subcontractors are responsible for obtaining and maintaining SDSs for their controlled products and for products that they are bringing onto site. All projects maintain an inventory of SDS and are made readily available to all employees and visitors.

3.4 Container Labels

All hazardous materials, hazardous waste, chemical containers, and chemical storage areas are appropriately labeled indicating the chemical identity, hazards present, and any relevant regulatory requirements. Labeling of all chemical containers assists emergency personnel and others in identifying hazards if a spill occurs or emergency situation arises.

Chemical container labeling is the responsibility of the individual who fills and/or uses the chemicals. All containers into which chemicals are transferred are legibly labeled in the language that can be understood by the employees who work with or in proximity (English, French, Spanish, etc.) and include the name of the chemical and appropriate hazard warnings.

3.5 Workers Training

All employees who may work in proximity to controlled products has and maintains current applicable training as appropriate to client, state, provincial or federal requirements, which may include: HAZCOM, WHMIS, TDG, or DOT. Records of training are readily available upon request.

4. Physical Hazards

4.1 Introduction To Physical Hazards

Physical Hazards are factors within the environment that can harm the body without necessarily touching it. Vibration and noise are examples of physical hazards. Physical hazards for this site have been identified in the following section. If the hazards change due to site condition or additions to the scope of work, a Stop Work must be implemented and the conditions identified to the PM and RHSM.

In addition, personnel must be aware that the protective equipment identified in the JSA may limit dexterity and visibility and may increase the difficulty of performing some tasks.

4.2 Heavy Equipment

The following practices are adhered to by personnel operating heavy equipment (such as backhoes, excavators, bull dozers, rock trucks) and personnel working in the vicinity of heavy equipment.

- Heavy equipment is only operated by authorized, qualified operators.
- All equipment is inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and legislative specifications. Documentation of maintenance records must be available upon request.
- The operator inspects the equipment prior to each use and documents the first use on a daily basis. Documentation of this daily pre operational inspection is available upon request, and, if required, filed with the project files.
- Ensure operator conducts a 360-degree walk around of the equipment prior to entering the equipment
- Seat belts/restraining devices are used on heavy equipment that is not designed for stand up operation.
- Equipment/vehicles that are loaded by crane, excavator, loader, etc. have a cab shield and/or canopy to protect the operator.
- Personnel only ride in equipment that is designed for transporting individuals and have a fully functional seat and available restraining devices. “Piggybacking,” such as riding on fender steps or any place outside the cab, is not allowed.
- Personnel are not raised/lowered in buckets.
- Before leaving the equipment controls, the equipment is in its safe resting position or cribbed in a “dead” or neutral position. No controls are abandoned while under load.
- Before raising any booms, buckets, etc., overhead obstructions are checked.
- A competent spotter is used when moving heavy equipment, working within 10 feet of a stationary object, encroaching overhead utilities clearance minimums, in tight quarters, or with limited visibility.
- Employees involved in the operation do not wear any loose fitting clothing, as it can be caught in moving machinery.
- Personnel must wear an approved high-visibility safety vest where any vehicular traffic occurs.
- The work site should be designed to limit the operations being performed in reverse.
- Working areas are properly delineated to keep unauthorized individuals out. All personnel should never proceed into a work zone without making eye contact and receiving authorization by the operator or spotter to cross the path of any heavy equipment. Authorization is given from outside the blind or crushing zones of the equipment.

4.3 Drilling Equipment

GHD field staff should minimize time spent in close proximity to an operating drill rig, including during set-up/teardown time. It is critical to maintain a safe work distance from the drill rig crew to allow them the necessary room to perform their tasks. GHD field personnel should only be near the drill rig when their work activity, such as air monitoring, soil sampling, and confirmation of borehole locations, dictates.

Drill staff are responsible for all activities related to drill rig setup and operations. The drilling contractor briefs GHD personnel and crew during the tailgate safety meeting on the rig's critical safety features and identifies known hazards when working near the rig.

The GHD site supervisor ensures the following:

- All PPE and protective hazard mitigation is in place prior to work starting.
- JSAs are reviewed and applied.
- The Daily Pre-Use Inspection checklist is completed by the operator to ensure that the equipment is functioning as intended.
- The emergency switches are functional and verified to be operational during the documented daily equipment check.
- **The QSF-019 Property Access/Utility Clearance Data Sheet is signed and that all utility clearances are obtained, reviewed, understood, and confirmed before drilling activities begin.**
- No rig operators are wearing any loose fitting clothing, including untied shoe/boot laces, drawstrings, etc., due to the potential of being caught in rotating machinery.
- Overhead hazards including utility lines are checked .
- Before the mast of a drill rig is raised, the drill rig is first leveled and stabilized with leveling jacks and/or cribbing, the drill rig is re-leveled if settling occurs after initial setup, the mast is lowered only when the leveling jacks are down, and the leveling jack pads remain deployed until the mast is lowered completely.
- The work area is properly demarcated with rope, caution tape, and fencing, and marked or posted to keep the area clear of pedestrian traffic or spectators.
- Before leaving the controls, the operator shifts the transmission controlling the rotary drive into neutral and places the feed lever in the neutral position.
- Before leaving the vicinity of the drill, the operator shuts down the drill engine.

4.4 Excavations

All GHD excavation and trenching operations that employees shall enter will be observed by a designated competent person. The competent person shall be responsible for evaluating and inspecting excavation and trenching operations to prevent possible cave-in and entrapment, and to avoid other hazards presented by excavation activities.

Each employee in an excavation shall be protected from cave-ins by one of three systems:

- Sloping and benching systems
- Shoring
- Shielding systems

All excavation and trenching operations shall be conducted in accordance and in compliance with OSHA's Standards for the Construction Industry, specifically outlined in GHD's Safety and Health Program for excavation and trenching activities. At a minimum, the following safety guidelines shall be adhered to while conducting excavation and trenching activities:

- Excavation and trenching operations require pre planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the estimated location of all underground installations must be determined before digging/drilling begins. Necessary clearances must be observed.
- If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, or where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.
- Excavations may not go below the base of footings, foundations, or retaining walls unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. Civil engineers or those with licenses in a related discipline and experience should be consulted in the design and use of sloping and shoring systems. PE qualifications must be documented in writing.

Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel.
- All ladders shall extend 3 feet above the top of the excavation.
- Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design or by a licensed professional engineer.

Atmosphere Monitoring and Testing

Air quality is measured using three parameters: oxygen concentration, flammability, and the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, the atmosphere shall be tested by a competent person. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the site and arrange for an air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed in excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

- Prior to the start of work, after each extended halt in work, and as needed throughout the shift, as new sections of the excavation or trench are opened.
- After every rainstorm and other natural or man made event that may increase the load on the walls of the excavation, or otherwise affect their stability.

The inspections shall be documented using the GHD Excavation Inspection Checklist attached to this HASP.

The competent person shall stop the work and instruct all employees to leave the excavation or trench when any potential hazards are detected. The competent person has the authority to immediately suspend work if any unsafe condition is detected.

4.5 Utility Clearances - Osha

Extreme caution is needed when working around electrical power lines. Electricity flows through metal, wood, and many other conducting materials, including human beings. Elevated equipment such as drill rigs, backhoes, scaffolding, ladders, etc must remain the required distance according to the local/state/provincial regulations.

These minimum requirements are:

Occupational safety and health act 1926.550(a)(15)	
Operating voltage of overhead power	**Operating voltage of overhead power safe limit of approach distance forpersons and equipment**
<50 kv	10 feet
>50 kv	20 feet
For lines rated over 50 kv, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kv, over 50 kv, or twice the length of the line insulator, but never less than 10 feet.	

- If any part of a machine may encroach these parameters, SWA is implemented, a review of the SOW is conducted with the PM and RHSM, and a spotter is used.
- If the client has requirements that exceed the above minimums, then the client requirements are used.

Underground Utilities

Underground utilities, if present, are to be clearly marked and identified prior to commencement of work. Follow applicable regulations and client requirements with regards to utility-locating requirements (e.g., One Call).

Personnel involved in intrusive work will:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to GHD's Subsurface Utility Clearance Protocol SOP at a minimum. Use air

knifing or vacuum truck digging techniques inside 36 inches of the outside edge of an underground facility; this distance can vary based on regulations, legislation, facility/client requirements, etc.

- **Complete the Property Access/Utility Clearance Data Sheet (QSF 019) prior to initiating excavation activities.**
- On private property, request that the owner of the service, locate and mark the service.
- If a service may pose a hazard and cannot be shut off or disconnected, request that the owner of the service supervise the uncovering of the service during the work.
- Identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines.

The following are the Uniform Color Codes for utility locates

white	proposed excavation
pink	temporary survey marking
red	electrical power lines,cables, conduit and lighting cables
yellow	gas,oil, steam,petroleum or gaseous material
orange	communication, alarm or signal lines,cables or conduit
blue	potable water
purple	reclaimed water, irrigation and slurry lines
green	sewers and drain lines

4.6 Vacuum Truck

Working around vacuum trucks can be dangerous because of the operator's limited field of vision and the noise levels that can be produced by the truck. The following practices shall be adhered to by operators and GHD employees when working around vacuum trucks:

- All vacuum trucks must arrive on site empty of any product in the cargo tank. Product in the tank can cause cross contamination and a potentially explosive atmosphere within the tank.
- Vacuum trucks cargo tank will be depressurized.
- Before beginning operations, operators shall conduct an inspection and document their findings on the inspection checklist.
- Vacuum trucks shall be operated in accordance with manufacturers specifications.
- Parking brakes shall always be applied on parked equipment.
- All personnel shall leave the vacuum truck cab during loading and off loading operations.
- All personnel around the vacuum truck shall wear hearing protection while the vacuum truck is in operation.
- Atmospheric air monitoring shall be conducted prior to and during operations involving hazardous materials.
- The vacuum transfer system shall be bonded to achieve a continuous conductive path from the truck through the hose and nozzle to the tank or other container and grounded to earth. Grounding may be achieved by connecting to any properly grounded object like a metal building, tank frame, a fire hydrant, or a metal light post.
- Vacuum truck operators shall monitor the transfer operation and be ready to quickly close the product valve and stop the pump in the event of a blocked line or release of material.
- All vacuum trucks being used in the exclusion zone shall remain in the exclusion zone until decontaminated.

4.7 Railroad

Main Track And Sidings

Machinery and equipment cannot be operated within 25 feet (8.12 meters) of a main track (nearest rail) or siding without Railroad authority and protection. Written authority and Safety Guidelines for Contractors as per specific company can be found in the Appendix. Materials, snow piles, equipment, or other obstructions must not be left where they can affect the ability to see approaching train traffic at public or private railroad crossings. This applies to all manner of equipment, including snow clearing equipment. Contract railroad site representative in advance to arrange protection.

Train Movements and Working Near Tracks

Be alert to train movement. Expect the movement of trains, engines, cars, or other equipment at any time, on any track, and in either direction, even cars on sidings that appear to be stationary, and never climb on, under, or between cars.

- Never rely on others to protect you from train or car movement. Watch for yourself!
- Do not stand on the track in front of an approaching engine, car, or other equipment.
- Be aware of the location of structures or obstructions where clearances are close.
- Never stand or walk on railway tracks, either between the rails or on the ends of ties, unless absolutely necessary. Stay clear of tracks whenever possible. Trains can approach with little or no warning. You may not be able to hear them due to atmospheric conditions, terrain, noisy work equipment, or passing trains in multiple track territory.
- Increased vigilance is required near railway tracks when visibility is poor, such as during fog or blizzard conditions.
- Before undertaking any work on or about railway infrastructure, or that will encroach within 25 feet (8.12 meters) of any railway track prior notification and approval is required.

Protection of Railway Traffic and Work Site

Signs, signals, and flags are necessary for the safe operation of the railway, and shall not be obstructed, removed, relocated, or altered in any way without proper authorization. Blue flag protection on tracks signifies railway employees are on, under, or between rolling equipment. Blue flags are important safety devices and must not be touched or obstructed.

Anyone other than qualified railroad employees, unless specifically authorized by the rail company, you are prohibited from handling track switches, derails, electric locking mechanisms, or other appliances. Personnel operating equipment of any type on the railway tracks must comply with all applicable federal rules and regulations, including but not limited to Canadian Railway Operating Rule (CROR) qualifications.

4.8 Material Handling

Material handling and storage practices are conducted at the project site. Proper lifting reduces the hazard out of moving objects. No one person should handle, lift, or move 50 pounds or more by themself. Even if the object weighs less than 50 pounds, the configuration or shape of the object should be evaluated to see if two people should be used to lift the object.

Manual Lifting

Consider the following prior to a lift.

- Establish that you can lift the load safely.
- Inspect route to be travelled, confirming sufficient clearance.
- Look for any obstructions or spills.
- Inspect the object to determine how it should be grasped.
- Select and use containers with handles where practical.
- Look for any sharp edges, slivers, or other things that may cause personal injury.
- Do not move any object that will obstruct your field of vision when transporting the load.
- When lifting objects, use proper lifting techniques. Position the body so that the weight of the body is centered over the feet, which provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

General Storage Practices

Storage of materials and supplies must not create a hazard. General storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers must be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. must be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects are to be corrected as they are detected.
- Storage areas must be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas have provisions to minimize manual lifting and carrying. Aisles and passageways provide for the movement of mechanical lifting and conveyance devices.
- Stored materials do not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- Hazardous materials are stored in accordance with the details outlined in the MSDS, or accepted guidelines from reputable agencies. Guidelines include details about the materials reactivity, corrosivity, flammability, etc., as well as appropriate signage.

4.9 Noise

Hearing protection is required for project activities when working in close proximity to machinery, drilling operations, or impact/power tools where noise levels may exceed the decibel range of 85 dBA.

When hearing a coworker at normal conversation distance is difficult or the noise level is approaching or exceeding 85 dBA, hearing protection such as earplugs or muffs must be available/worn by all site personnel and visitors that may be exposed to elevated levels of noise. Individuals who wear hearing protection are to be adequately trained in the safe use and handling of hearing PPE.

GHD employees who have the potential to be exposed to noise exceeding 85dba in the work environment will be enrolled in the GHD Hearing Conservation Program.

4.10 Fall Hazards

Personnel that will use ladders and have the potential hazard of working on elevated surfaces or platforms of 6 feet or greater during project activities shall follow GHD's Safety and Health Program for fall protection. The program requirements can be located in the Appendix. The fall protection program includes leading edge work, rooftop work, aerial lifts, ladders, and scaffolds. Specific guidelines for portable ladders are outlined below.

The emergency rescue plan for retrieving any worker who has fallen and is suspended in air is to be done any way possible without putting other employees in danger. Time is of the essence to prevent the development of a life threatening condition, such as orthostatic intolerance or suspension trauma, due to being suspended for a period of time. Rescue methods and equipment will be specific to the project site; however, the following information provides examples of typical rescue methods/equipment:

- A scissor lift or articulating boom already on site.
- Lower/raise worker by an acceptable physical and/or mechanical means (self rescue not acceptable as primary rescue method).
- A rescue team trained in above ground rescue techniques.
- A rope or cable system to lower employee to ground (requires point of attachment for rigging tackle).
- A crane man basket setup in advance for rescue.

4.11 Working Near Water

The procedures outlined in this section are to be implemented by all GHD and subcontractor personnel when there is the potential for slipping or falling into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- When working in or around water implement the buddy system
- When working at ground level, a 5 foot "no entry zone" can be established between the work area and the water hazard. The no entry zone is to be clearly defined and/or demarcated. Personnel will not be permitted to enter into this area unless the other provisions of this section are in place.
- Standard guardrails are required on any walking/working surface over or near water.
- Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used (see GHD's Fall Protection SOP).
- If providing fall protection is not feasible due to the scope of work or location, personnel will be required to wear U.S. Coast Guard/Transport Canada approved life jackets or buoyant work vests. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects that would affect strength and/or buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.
- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If work on wet or slippery surfaces above water is necessary, non slip tape or other methods are to be used to increase traction.
- Ring buoys with a minimum 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.
- Due to the anticipated scope of work, a life saving skiff may be necessary. However, the SS in conjunction with the RSHM will evaluate current site conditions to determine if a skiff is required.

4.12 Electrical Safety

Employees do not accept unnecessary exposure to hazards, such as working on energized electrical installations. When possible, circuits are de - energized according to the GHD Lockout/Tagout program and client requirements to achieve safe working conditions. When it is not possible to de - energize circuits, the Workplace Electrical Safety Program (WESP) requirements ensure that safe conditions and work practices are implemented.

The WESP is the electrical safety program that covers all electrical work performed at GHD facilities and work performed by GHD at client facilities. It also provides mandatory program requirements and is used in conjunction with all other procedures and practices on the site to ensure that electrical work is accomplished safely.

To protect employees from shock and/or arc flash hazards, only individuals who are "qualified" in accordance with the NFPA 70E or CSA Z462 Standards will be allowed to perform Arc Flash Hazards Analysis, LOTO, diagnostic testing, work on live electrical circuits or perform electrical work on equipment. The term "qualified" does not relate to a job title or job assignment, but rather to the activity being performed. Employees who perform electrical work must successfully complete the “Electrical Safety for Qualified Persons” training to be authorized as “qualified”. Only persons who have received this training and are knowledgeable in the construction and operation of equipment or a specific work method, and are trained to recognize and avoid the electrical hazards that may be present with respect to that equipment or work practice are allowed to perform this type of work. Consult the GHD Workplace Electrical Safety Program for additional program requirements and permits.

4.13 Control Of Hazardous Energy(Loto)

Hazardous energy sources may be encountered during the servicing and maintenance of machines and equipment, in which the unexpected energization or start-up of the machines or equipment could cause injury to employees.

The minimum performance requirements to control hazardous energy requires that employers develop and implement an energy control program. The elements of an energy control program are as follows:

- Lockout/tagout
- Employee protection
- Energy control procedure
- Protective materials and hardware
- Periodic inspections
- Training and communication
- Energy isolation
- Employee notification

Project personnel who are required to conduct operations and maintenance activities that will require the isolation of an energy hazard through the use of a lockout/tagout device shall follow the GHD program requirements and written procedures for that operation. The program requirements can be located in the Appendix.

Employee Training

Employees authorized to attach and remove lockout/tagout devices shall be provided with initial training regarding the safe application, usage, and removal of such devices. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the associated energy, and the methods necessary for energy isolation and control.

All authorized employees will be provided with refresher training annually, or at more frequent intervals whenever the following conditions apply:

- A job assignment change.
- A change in machinery or equipment, or a process change that presents new hazards.
- A change in the energy control procedures.
- Possible deficiencies in the employee's understanding of the following:
  - The hazards associated with the energy that controls the machinery or equipment in the employee's work area.
  - Application and removal procedures for lockout/tagout devices.

Employees who work in areas where lockout/tagout procedures are used shall receive initial and annual refresher training in the purpose and use of lockout/tagout devices and principles behind their use.

4.14 Heat Stress

Heat stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity.

Prevention

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring.
- Acclimatization.
- Sun exposures.
- Work/rest regimes (schedule of breaks) in accordance with Occupational Health Clinics for Ontario Workers (OHCOW).
- Humidex Heat Stress Response Plan – mandatory breaks scheduled in summer months or during high risk activities for heat stress (based on ACGIH)
- Heat stress safety PPE (e.g., cool vests, bandanas)
- Cool potable water available
- Use of buddy system
- Seek shade - Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.

OHCOW Humidex Heat Stress Response Plan		
°F	**°C**	**Response**
77-84°F	25-29°C	•supply water to workers on an "as needed" basis
86-91°F	30-33°C	•post "heat stress alert" notice •encourage workers to drink extra water •start recording hourly temperature and relative humidity
93-98°F	34 37°C	•post "heat stress warning" notice •notify workers that they are drinking extra water •ensure workers are trained to recognize symptoms
100-102°F	38 39°C	•provide 15 minutes relief per hour •provide adequate cool (10 15°C) water, at least 1 cup (240 ml) of water every 20 minutes •workers with symptoms should seek medical attention
104-107°F	40 42°C	•provide 30 minutes relief per hour in addition to the provisions listed previously
109-111°F	43 44°C	•if feasible provide 45 minutes relief per hour in addition to the provisions listed above •if a 75% relief period is not feasible then stop work until the humidex is 42°C or less
113°F	45°C or over	•stop work until the humidex is 44°C or less
Note: Humidex plan is a simplified way of protecting workers from heat stress which is based on the 2007 ACGIH heat stress TLV® (threshold limit value®) which uses wet bulb globe temperatures (WBGT) to estimate heat strain. These WBGT's were translated into humidex		

Sun Exposure

Overexposure to sunlight is a common concern when field activities occur during warm weather

conditions. Overexposure can occur on clear, sunny days, as well as on overcast and cloudy days. The following steps should be taken to protect against overexposure to sunlight:

- Always use sunscreen on exposed body parts.
- Cover up.
- Wear safety rated sunglasses.
- Limit time in the midday sun.

4.15 Cold Stress

Cold stress is similar to heat stress in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual.

Prevention

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders.

- Acclimatization.
- Fluid and electrolyte replenishment.
- Eat a well balanced diet.
- Wear warm clothing.
- Follow work/rest regimes.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

TLVs Work/Warm Up Schedule for 4 Hour Shift

THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT*

Air Temperature Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx)	°F (approx)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease ↓	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease ↓			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease ↓					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease ↓							
-43° to below	-45° & below	Non-emergency work should cease									

*2008 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2008

4.16 Hand And Power Tools

Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools are not to be altered in any way.
- At a minimum, appropriate eye and face protection that meets current applicable standards (ANSI/CSA) must be used.
- Wrenches, including adjustable, pipe, end, and socket wrenches, are not used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges, and chisels are kept free of mushroom heads.
- Wooden handles are free of splinters or cracks and secured tightly to the tool.
- Any damaged or defective tools are immediately removed from service and tagged for destruction.

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities.
- Electric tools are not used in areas subject to fire or explosion hazards, unless they are approved for that purpose.
- Corded portable electric tools are connected to a ground fault circuit interrupter (GFCI) when working in wet areas.
- Coiled cords/extension cords are uncoiled when plugged in to allow for dissipation of heat.
- Cords/extension cords rated appropriately for the temperature are used.
- Appropriate eye and face protection that meets current applicable standards (ANSI/CSA) are used.
- Personnel are trained in the proper use of the tool.
- Any damaged or defective power tools must be immediately tagged and removed from service.
- Repairs to hand or power tools are only made by qualified individuals and in accordance with the manufacturer’s standards.
- Field or shop modifications to tools or equipment are only made by qualified individuals and in accordance with either manufacturer or engineer-approved specifications.

4.17 Slip, Trip, Hit, Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot-check the work area to identify hazards and communicate hazards to on site personnel.
- Update/dirty the JSA to reflect changes.
- Keep work areas clean and free of clutter, especially in storage areas and walkways.
- Secure all loose clothing and ties, and remove jewelry that may pose an entanglement hazard.
- Establish, maintain, and utilize walkways that are free of slip and trip hazards.
- Utilize/install appropriate lighting for walking paths and working areas.
- Beware of slip/trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads you can see over (Refer to Material Handling for additional information).
- Refrain from the use of portable communication devices (cell phones, two-way radios) while traversing the site.
- Keep a safe buffer zone between workers using equipment and tools.

4.18 Special Conditions

GHD may be asked to conduct work that requires special precautions/considerations. Potential exposure factors are identified on the left, with associated mandatory conditions identified on the right.

• Remote work locations	• Working alone is not permitted. Submit a Journey Management Plan. Use call-in procedure to include use of satellite phone if no cell or direct line access.
• Project site is in an area known for high crime or violence activity	• Working alone is not permitted. A police or security escort is required.
• Entry into abandoned buildings	• Working alone is not permitted. Use call-in procedure.
• Entry into wooded areas during hunting season	• Working alone is not permitted. Use a reflective vest. Submit a Journey Management Plan. Use call-in procedure.
• Project work involving single employees (lone worker)	• Use call-in procedure.

If these situations are possible, please consult with your RSHM to develop a plan prior to your project's start date.

4.19 Aggressive Or Menacing Behavior

When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, piercings, scars, hair color, and weapon, if any.

Contact the Emergency Hotline and file an incident report with your immediate supervisor as soon as it's safe to do so.

4.20 Adverse Weather Conditions

Adverse weather is the existence of or impending weather conditions such as heavy rain, freezing rain, sleet, snow, high winds (50km/30mph), dust storms, tornadoes, hurricanes, lightning, or any combination of weather that is either not reasonable or not safe for employee exposure. Stop Work Authority (SWA) is executed prior to these conditions as reasonably possible. The site is evacuated according to the emergency plan developed and listed in this Health and Safety Plan.

Based on their expertise and knowledge of manufacturer's recommendations for the equipment being operated, heavy equipment operators such as crane and drill rigs are responsible for advising the site supervisor whether it is safe to continue operations.

The site supervisor decides on the continuation or discontinuation of work based on current and pending weather conditions, the equipment manufacturer recommendations, and the equipment operator's recommendations.

4.21 Flammable & Combustible Liquids

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100 ºF (37.8ºC). Combustible liquids have flash points above 100 ºF (37.8 ºC) and below 200 ºF (93.3 ºC).

Storage

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release vapors that are explosive and hazardous to employee health. Exposure to heat can cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be stored in cool, well ventilated areas away from any source of ignition. Always consult the MSDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable – Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

General Requirements:

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5 gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.
- Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

Transferring Flammable/Combustible Liquids

This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring containers/barrels/drums one to another.

- Drums should be grounded to a grounding rod using a #4 copper conductor.
- Bonding is necessary between conductive containers (e.g., a barrel/drum and a 5 gallon container).

5. Biological Hazards

5.1 Introduction To Biology

GHD employees conduct numerous project activities where they may encounter biological hazards such as listed in the following table. This section identifies the problems associated with these biological hazards and the precautions to be taken if these hazards are encountered.

The biological hazards identified are applicable to this site. If you are bitten, stung, or attacked by any of the listed hazards, contact the GHD Emergency Hotline at 1-866-529-4886

5.2 Wildlife

Flying, Stinging, Biting Insects: Bees, Wasps	•Avoid wearing perfume, hairspray, cologne, and scented deodorant while working outside •If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects •Never swat or swing at the insect; wait for it to leave, softly blow it away, or gently brush it aside •Inspect areas carefully as bees, wasps, and hornets can nest both in the ground and above ground •If the nests pose a threat, have them professionally removed	•Apply AfterBite containing antiseptic to affected areas or place an ice cube or ice pack over the sting to reduce pain •Remove the stinger with tweezers or scratch with a credit card (catch barbs with card and pull out) •Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, and shortness of breath •Call GHD Incident Reporting Hotline
Mosquitoes	•Wear light colored clothing •Keep your body covered as much as possible; wear a hat or mosquito screen •Apply repellant containing 30% DEET to clothing and exposed skin	•Apply AfterBite containing antiseptic to affected areas •If moderate to extreme itchiness is experienced, use over the counter antihistamines
Venomous Spiders - Brown Recluse, Black Widow	•Shake out clothing and shoes before getting dressed •Practice good housekeeping skills •Exercise care when handling materials that have been undisturbed for some time; wear leather gloves •Check voids and dark cluttered areas before inserting hands •Always wear gloves	•Retain specimen of spider if possible •Apply AfterBite containing antiseptic to affected areas •Seek medical attention immediately •Do not drive if bitten by a black widow •Call GHD Incident Reporting Hotline
Threatening Dogs	•Stop walking, face the dog, and be relaxed •Keep the dog in your peripheral vision as it circles •If it tries to bite – yell "NO" in a loud stern voice •If you have an item such as a briefcase or field book, keep it between you and the dog •If the dog continues to nip or attacks, fight back; protect your throat and if possible hit the dog in the nose, or kick it in the rib cage, which may stun it and deter it from continuing the attack	•If bitten and the skin is not broken, clean with antiseptic •Notify Supervisor/PM •If skin is broken, clean with antiseptic, cover, and seek medical attention •Notify Supervisor/PM •Call GHD Incident Reporting Hotline
Canadian Geese	•Easily recognized by black head and grey breasts •Weigh up to 13 lbs and territorial and aggressive •Be aware of nesting areas •Bird and dropping carry several diseases that affect humans	•Remain calm and do not act aggressive or afraid •Gradually back away while keeping eye contact •Wear appropriate PPE when handling nests or dead animals •Wash hands with soap and warm running water •Disinfect hands with sanitizer •If attacked and injured, call GHD Incident Reporting Hotline

5.3 Poisonous Plants

Poison Ivy/Poison Oak	•Learn to identify poison ivy and poison oak (leaves of three, let them be) •Urushiol oil is in the wood portion of the plant and is active all year long •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) •Proper hygiene extremely important to prevent ingestion and eye contact	•You may only have 30 minutes to get the oil off skin before it absorbs, and less time in hotter climates •Rinse with cold water, as hot water will open your pores •Apply alcohol to dissolve oils •Watch for an itchy red skin rash, which is the most common reaction; over time, large blisters may form •Use topical cream to assist with the itching (consult your pharmacy) •In severe cases, contact your doctor •Call GHD Incident Reporting Hotline

6. Personal Protective Equipment

6.1 Introduction To PPE

Controlling a hazard at the source is the best way to protect employees. When engineering, work practice, and administrative controls are not able to protect our employees, GHD provides personal protective equipment (PPE) to its employees and ensures that the PPE is used appropriately. PPE is equipment worn as a barrier to minimize exposure to a variety of hazards.

This section covers applicable PPE requirements, which include eye, face, hand, head, foot, and respiratory protection.

6.2 Types of Personal Protective Equipment (PPE)

The type of PPE required for work varies based on the task being performed. The specific PPE required for each individual task is documented in the appropriate task-specific JSA. The recommended minimum PPE for GHD site work is as follows:

- Shirts with a minimum 6-inch sleeve.
- Long pants made from suitable sturdy material .
- Grade 1 protective footwear meeting CSA Z195 M92 (Canada)/ ANSI Z41.1 (US), green patched (triangle), steel-toed/puncture-resistant and electric shock-resistant sole with a 6-inch cuff, fully laced and secured, in material appropriate for weather and task.
- Safety glasses or goggles (based on the type of hazard – dust, splash, etc.), meeting CSA Z94.3 (Canada) or ANSI Z87.1 (US) standards.
- Hand protection such as gloves meeting standards EN 388 and ANSI 105-2000 as appropriate for the task as per JSA, with selection based on the hazards (abrasion, blade cut, tearing, puncture, and impact) associated with the task being performed.
- Reflective garment meeting CSA Z96 02 or ANSI 107 (as required).
- Type 1 Class E hardhat, meeting either CSA Z94.1 05, Z94.1 92, ANSI Z89.1, or Z89.1.
- Hearing protection meeting CSA/ANSI approved NRR of at least 20 dBA if noise levels exceed 85 dBA.

Additional minimum requirements for PPE include:

- All PPE are maintained in good condition with no rips, tears, or damage that compromise integrity.
- PPE is not loose fitting as to avoid entanglement issues.
- All PPE is disposed of and/or decontaminated at the conclusion of each workday. The most contaminated PPE is decontaminated first.
- All disposable equipment is removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Reusable equipment (safety glasses, hard hats, goggles, etc.) is cleaned and sanitized according to GHD and/or manufacturer guidelines.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

6.3 Types Of Protective Material

No universal protective material exists. All materials will decompose, be permeated, or otherwise fail to protect under certain circumstances. Protective clothing can be constructed from a variety of materials for protection against exposure to specific physical, chemical, or biological hazards.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation, which is failure to maintain structure. A protective material may not necessarily degrade, but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they are used in conjunction with degradation tables.

To obtain optimum usage from PPE, the following procedures are followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for:
  - Imperfect seams
  - Non uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for:
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above are discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals are not reused.

6.4 Respiratory Protection

Respiratory protection is sometimes required for personnel during project activities when action levels exceed the occupational exposure levels. When respirators are required, personnel identify and select the appropriate air purifying respirator and supporting cartridge medium, and follow the procedures and guidelines in their respective written Respiratory Protection program.

At a minimum, all personnel required to use this equipment are:

- Instructed in how to properly fit a respirator to achieve the required face piece to face seal for respiratory protective purposes.
- Medically cleared for the use of respiratory protection.
- Appropriately fitted for the selected respirator through established recognized fit testing methods (quantitative/qualitative), and documentation of fit is readily available.
- Free of beards, sideburns, eyeglasses, and upper or lower dentures that could affect the face seal.

Further regulations for the use of respiratory protection include:

- Cartridges are changed prior to breakthrough, daily, or when personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.
- Respiratory equipment and other non disposable equipment are fully decontaminated.
- Appropriate action levels are established and documented based on the applicable occupational exposure limits.

NOTE: This HASP is not intended for the use of supplied air operations. For supplied air operations, the project manager and a GHD safety professional conduct a review of the scope of work.

GHD identifies the type of respirator and cartridge and documents on the applicable JSA for the affected tasks and on Table 2.

6.5 Respirator Cleaning

Respirator decontamination is conducted once daily at a minimum. Face pieces are disassembled, the cartridges are thrown away, and all other parts are placed in a cleansing solution. After an appropriate amount of time in the solution, the parts are removed and re seated with tap water.

Face pieces are allowed to air dry before being placed in sanitized bags and stored in a clean area.

6.6 Levels Of Protection

Protection levels provided by PPE selection are upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment monitoring program, if one was conducted.

When a significant change occurs, the hazards are reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase.
- Change in job tasks during a work phase.
- Change of season/weather.
- Temperature extremes or individual medical considerations limiting the effectiveness of PPE.
- Chemicals other than those expected to be encountered are identified.
- Change in ambient levels of chemicals.
- Change in work scope that affects the degree of contact with areas of potentially elevated chemical presence MUST be re-evaluated.

All proposed changes to protection levels and PPE requirements are reviewed and approved prior to implementation by the SS.

7. Air Monitoring

7.1 Introduction To Air Monitoring

Inhalation hazards are caused from the intake of vapors and contaminated dust. Air monitoring shall be performed while intrusive activities are taking place to detect the presence and relative level of those air contaminants that are inhalation hazards. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, but the determination of its concentration (quantification) must await subsequent testing.

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real time measurements will be kept in a bound field logbook or documented via air monitoring and calibration log sheets.

Correction factors have been determined by the air monitoring equipment manufacturers that enable the user to quantify a large number of chemicals using only a single calibration gas, typically isobutylene for PIDs and methane for LEL. Applicable Correction Factors (CF) for either LEL or PIDs must be applied for known chemicals of concern. These CFs and how to apply them can be found in the air monitoring instrument operating manual or online from the manufacturers website under “Technical Notes”.

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, when necessary, area samples at the following locations will be taken daily. Record time, location, and results of monitoring and actions taken based on the readings:

- Upwind of work areas to establish background concentrations.
- In support zone to check for contamination or migration of emissions.
- Downwind of work area to track any contaminants/emissions leaving the site.

The data collected throughout the monitoring effort shall be used to determine the appropriate levels of protection. Action levels for upgrading or downgrading of PPE have been established on Table 2 and supplied by the Safety Department.

7.2 Types Of Devices

Air monitoring equipment to be used during site activities shall consist of:

COLORIMETRIC DETECTOR TUBES

Detector tubes are one of the most frequently used measuring methods for detecting contaminants in the work area. They are used so often because no other simple system is currently able to cover such a wide range of gases and vapors quantitatively. The major limitation of detector tubes is that their accuracy is only within 25 percent of the true concentration of the contaminants sampled. Detector tubes are also known as "colorimetric tubes" or "indicator tubes." Detector tubes are small glass tubes filled with solid absorbents such as silica gel, activated alumina, or inert granules, and impregnated with detecting chemicals through which air is aspirated at a controlled rate. Common types of detector tubes include Draeger, Gastec, RAE, MSA, Sensidyne, etc.

FLAME IONIZATION DETECTOR

Exposure to VOCs can also be monitored with a Flame Ionization Detector (FID). The FID has the ability to measure the concentration of airborne organic, combustible gases and vapors from 0.1 ppm to 50,000 ppm. However, the meter will not detect inorganic gases and vapors. If using an FID to detect high concentrations of combustible gases, then the monitor must be intrinsically safe. It does not distinguish between individual pollutants. The reading displayed represents the total concentration of all ionizable chemicals present; however, its sensitivity will vary according to compound present. An FID should not be used below 40° Fahrenheit (4°C) or by an untrained individual.

HYDROGEN SULFIDE (H2S) PERSONAL MONITOR

A number of manufacturers produce hydrogen sulfide personal monitors. These monitors possess different characteristics (e.g., diffusion type, built in pump, external pump) between the manufacturers, and even the models from the same manufacturer may have different functions; therefore, the user is required to read and understand the manufacturer's user manual prior to using a personal H2S monitor. Basic characteristics requirements of H2S monitors include:

- Periodic calibrations required (typically daily prior to use)
- Compact, durable construction
- Ease of use
- Fast, accurate readings

PHOTOIONIZATION DETECTOR (PID)

Exposure to volatile organic compounds (VOCs) shall be monitored with a photoionization detector (PID) with required eV lamp as per Table 1. The PID has the ability to detect organic vapor concentrations from 1 part per million (ppm) to 2,000 ppm. All PID monitoring shall be conducted in the breathing zone.

7.3 Monitoring Frequency

Monitoring will be conducted continuously during ground intrusive activities or during any activity where airborne hazards (e.g., organic vapors) may be present. The monitoring equipment listed in this HASP for the work activity, relates to the initial levels of protection listed on the TABLE 2. If the results of the first hour of monitoring indicates contaminant concentrations are non detect, and no differing site conditions are observed, then the monitoring frequency may be decreased.

Monitoring results will be legibly documented each work day. They will note project name/number, date, time, serial number, date of last calibration, and the name of person performing calibration, name of person performing monitoring, monitor location within the site, and monitoring results. Daily documentation will be kept with the SS and included in the project file.

7.4 Safety And Health Action Levels

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants in the work area. All activities shall be initiated as per JSA requirements. The appropriate actions are to be taken at designated action levels. The initial action level(s) for site work can be located in **Table 2**.

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described on the Table 1 Signs and Symptoms
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.

8. Site Control

8.1 Introduction To Site Control

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control also includes site security for the protection of GHD employee and subcontractor when working in public areas. Site Control is especially important in emergency situations.

Site control, work area demarcation, and site security will be achieved through posting of signage and placement of barricades and or personnel. All controlled areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade the work area and protect both public and GHD:

- High Visibility Tape, Rope or Chain
- Flagging
- Warning Signs
- Traffic Cones

Approved pedestrian and vehicle traffic paths will be determined during Tailgate Safety Meetings based upon current site conditions and work locations. When applicable, one pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

8.2 Work Zone Demarcation

When performing work that could put yourself or others at risk, you must demarcate an exclusion zone around your work. This is typically done with yellow and black plastic "barricade tape." Use signs, placards, and other postings as necessary to warn others not to enter the demarcated area unless they have business in the area and have authorization to enter. Where appropriate, post special requirements for entry.

The levels and requirement for work zone demarcation is based on the task being performed or the requirement of the client.

8.3 Work Zone Demarcation Level 1

Task such as:

- Monitoring Well Sampling
- Inspection of Equipment
- Tasks that Distract Attention from Vehicle Traffic

These task require the use traffic cones, high visibility tape or temporary barricades such as sawhorses.

8.4 Two-Person Crew/Buddy System

A Two-Person Crew or Buddy System shall be implemented to protect the employees and public when conducting high risk activies such as:

- Working near traffic
- Working ON or NEAR water
- Excessive noise to which hearing traffic or communication is difficult
- Confined or restricted spaces
- In an isolated area such as landfills or wooded areas
- Areas with high crime rates

When using the buddy system, visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination
- Excessive salivation and pupillary response
- Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

8.5 Communication

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of an

- Cell Phones/Smart Phones
- Hand Signals

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone
- Have the necessary telephone numbers readily available

Note: The authorized use of cellular phones must be cleared by the client prior to entering site.

The following procedures will be followed by all site workers when using a cell phone on site:

- No cell phone use while driving or operating equipment.
- No cell phone use while in the exclusion zone.
- If using a cell phone on site, find a location where you can safely use the phone. Do not walk around the site while using a cell phone.

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat — Cannot breathe
- Hands on top of head — Need assistance
- Thumbs up — OK, I'm alright, I understand
- Thumbs down — No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach) – Leave area immediately

8.6 Decontamination And Hygiene

Decontamination

In general, everything that enters the site must either be decontaminated or properly discarded upon exit from the site. Prior to demobilization, potentially contaminated equipment will be decontaminated on a wash pad (decontamination pad), drum, or containment pad which then will be placed into appropriate container and labeled as hazardous waste and will be stored in a designated area until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Alconox/Liqui nox soap. The MSDSs for Alconox/Liquinox will be located in the Appendix.

Personnel Decontamination Procedures

Personnel decontamination will be completed in accordance with the GHD Safety and Health Program for personnel decontamination. Wash water and sediments will be collected and stored with any runoff water collected for subsequent treatment/disposal. PPE, trash, etc. will be sent

off-Site for disposal. It will be kept separate from trash generated in clean areas of the Site.

All disposable equipment shall be doffed before meal breaks and at the conclusion of the workday and replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure.

Personnel - Decontamination will take place prior to exiting the contaminated work area.

Decontamination procedures are as follows:

Step 1 Remove all visible contamination and loose debris by washing with clean water.

Step 2 Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse.

Step 3 Remove protective clothing; dispose of in disposable container.

Step 4 Remove respirator, sanitize prior to reuse.

Step 5 Remove inner gloves, dispose of in disposable container.

Step 6 Wash and rinse hands.

General Safety and Personnel Hygiene

1. Eating at the site is prohibited, except in specifically designated areas. Designation of eating areas will be identified to each employee. The location of these areas may change over the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the site is prohibited.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands, face, neck, and other exposed areas must be washed with soap and water before eating, drinking, smoking, before using toilets, and before leaving the site.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the SHO. Wastes will be stored until proper disposal arrangements have been made.
6. Personnel working on site will not be permitted to wear facial hair that interferes with the mask to face seal on air purifying respirators.
7. All personnel performing or supervising work within the EZ must wear appropriate PPE, observe, and adhere to the personal hygiene related provisions of this section.
8. Personnel found to be disregarding the personal hygiene related provisions of this HASP will, at the discretion of the SHO, be barred from the site.

8.7 Social Protection

Security Measures

A site assessment should be made prior to performing work in high risk areas for violent crime. Additionally, it may be important to gather as much information as possible from the client, describing the location and social conditions of the area where work will be performed.

In the event it has been determined that this work will occur in an area of high risk, consideration

shall be given to providing on site security for the protection of the employee. This option may include services from a security agency, local law enforcement (if available), or the services of an off duty law enforcement officer. The Project Manager and/or Project Coordinator shall be contacted and provide authorization prior to making these arrangements.

Anti-social behavior means different things to different people – noisy neighbors who ruin the lives of those around them, 'crack houses' run by drug dealers, loitering by drunkards, people begging by cash points, abandoned cars, litter and graffiti, young people using airguns to threaten and intimidate or people using fireworks as weapons.

When in this situation, there is no single strategy that always works. Remember these tips when faced with work conditions in volatile neighborhoods:

Street Precautions

When walking to and from your vehicle, or in and around the work site:

- Be alert to your surroundings and the people around you, especially if you are alone or it is dark
- Whenever possible, travel with a colleague
- Stay in well lighted areas as much as possible
- Walk close to the curb; avoid doorways, bushes, and alleys where someone could hide
- Walk confidently, and at a steady pace; make eye contact with people when walking
- Do not respond to conversation from strangers on the street, continue walking

Harm Reduction

Do as much as you can to avoid a confrontation "anticipation and avoidance" are the key words.

- If you get caught up in a situation, try to talk to an aggressor without provoking them.
- Practice relaxation, as appearing fearful or stressed can actually provoke an attack.
- Remember that body language is important in aggressive situations, so maintain a comfortable distance between you and the aggressor.
- It may be more advisable to submit than to resist and risk severe injury or death. You will have to make this decision based on the circumstances. Be especially careful, if your attacker has a weapon.
- Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.
- Steady yourself if danger threatens. Panic can disable you, so again it's useful to learn how to keep control in a difficult situation.
- If you must fight back, adopt what police term the "bash and dash" approach. Primary targets are the eyes, nose, mouth, ears, throat, groin, knees, or shins; choose whichever is easiest to get to.
- Be aware that your attacker might be stronger than you, or may take what you are using in self defense and use it against you. It is often better just to shout loudly and run away.
- When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. If you are physically unable to break away from an attacker, shout for help.
- The use of physical force is justified when a person believes that such force is necessary to protect him or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co worker, who is being subjected to unlawful physical force. You can use any technique of legal self defense in order to halt or distract an attacker until law officers arrive on the scene.

- Should an aggressor only be interested in taking or damaging property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercing, scars, hair color, and weapon, if any.
- Shout 'fire' rather than 'help' – it can get more results.
- Stay alert and observant so that you can better describe your attacker and the assault to the police.
- Report to the GHD Hotline and work with your PM and Regional Safety and Health Manager (RSHM) to complete the investigation.

Drug Activity

The safe retrieval and disposal of used hypodermic needles and syringes:

- GHD employees must not handle or remove any hypodermic needles or syringes. You should contact the local Police Department, Fire Department, or Health Department for removal from the job site.
- **If you are injured by a discarded needle, you can receive a vaccination against Hepatitis B within 48 hours of the incident. Call the GHD Hotline, seek medical attention.**
- If an accident occurs where a needle or other sharp object has punctured the skin, then the injured person should:
  - Encourage the wound to bleed gently
  - Wash well with soap under cold running water
  - Cover the wound with a waterproof dressing
  - Seek medical attention as soon as possible
  - Inform the SS and/or PM
  - Complete a GHD Incident Reporting Form

Car Jacking

You can help prevent yourself being a victim of car jacking by:

- Keeping your doors locked in built up areas, and trying to keep the windows wound up, especially at traffic lights
- Being aware of what people are doing around you
- Using the middle lane, if there is one, when waiting at junctions or lights, so that your car is harder to get to from the pavement
- Not stopping to help someone who has broken down (if you really want to help, pull over at the next garage or police station and call for help)
- Driving to the next garage or police station and reporting them if someone tries to pull you over for no reason

A car jackers may 'accidentally' bump into your car, aiming to get you out of the car so they can steal it. If this happens, you may choose not to get out of the car – especially if you do not think it is a genuine accident. Wind the window down a little bit to talk to them if you want to.

Aggressive or Menacing Behavior

Report to the GHD Hotline and work with your PM and RSHM to complete the investigation.

8.8 Site Security

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s). Members of the general public are to be protected from site hazards.

9. Traffic Control

9.1 Introduction To Traffic Control

Temporary traffic control (TTC) procedures standardize and clarify minimum expectations for practices of TTC when performing field activities on or within 3 meters (10 ft) of active roadways. Following the requirements of this procedure helps to reduce the risk posed to employees from distracted drivers.

Responsibilities of supervisors and project managers include the following:

- Identify and communicate areas on site that require proper TTC
- Identify personnel who complete the work and verify that they are adequately trained in TTC procedures, including documentation of training records
- Coach and guide personnel on the proper use and care of equipment required for TTC
- Provide and maintain required TTC equipment
- Complete work site inspections to ensure compliance with TTC procedures
- Prevent unauthorized entrance into the work zone

Responsibilities of employees working on active roadways consist of the following:

- Cooperate and comply with the TTC procedures contained herein and with procedures outlined by supervisor
- Inspect road area for hazards and revise JSA/JHA as needed
- Maintain equipment used for TTC
- Communicate any issues, including equipment condition, to supervisor
- Issue a Stop Work Authority (SWA) when unable to adhere to this program

The levels of TTC are based on the task on hand, the proximity of the roadway, and the duration of the activity.

9.2 Traffic Control Level 2

Level 2 includes general street conditions that are not a highway, or tasks such as monitoring, drilling, or inspection within 3m or 10ft of a active roadway. Basic requirements for Level 2 include:

- Develop a JSA that follows the MUTCD or provincial equivalent for lane closures and redirection of traffic
- Obtain a permit from the municipality if necessary
- Adhere to a maximum speed limit of 50km or 30mph
- Complete a safety and health review
- Use equipment per MUTCD or provincial equivalent

10. Emergency Procedures

10.1 Introduction Emergency Procedures

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

Field employees will identify the primary (on site) and secondary (off site) evacuation routes to evacuation locations prior to initiating work. An evacuation map is provided in the Appendix if necessary.

At client facilities, site emergencies may be indicated by a fog horn or other loud audible sound. If an adjacent facility's alarm is activated, work will stop immediately, equipment will be de energized and/or secured as necessary for safety reasons and personnel will go immediately to the secondary evacuation location as indicated in pre-start and tailgate meetings.

Emergency evacuation drills will be conducted as deemed necessary by the SS, and documentation of the drills will be maintained by the SS in project file.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in the Appendix.

10.2 Incident, Injury, Illness Reporting And Investigation

Any work related incident, injury, illness, exposure, vehicle accident, property loss and or security issues must be reported to your supervisor, the SS immediately. Stop Work Authority will be implemented. Provide care for any injured persons and secure the scene.

GHD will call the GHD PM and the GHD Incident Hotline. Personnel on site should maintain the work area as it was at the time of the incident until further directions are given by the GHD PM, a GHD Safety Professional. No GHD person on site has the authority to call a regulatory agency (environmental or OSHA); this shall be completed by GHD Leadership Team in conjunction with the client. Emergency medical care or support of fire departments is not a restricted call if immediately necessary to protect life and property.

The GHS PM, RSHM, will coordinate with onsite personnel to gather critical information. The GHD PM is responsible to contract the client which a positive verbal contact is required. The GHD Staff listed above will coordinate the completion and submission of the GHD First Report of Incident and Near Miss form to the GHD PM. This same group of GHD staff will manage further communications with the client.

The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee.
- Injury of a subcontractor.
- Damage, loss, or theft of property.
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.
- Any sting, involving a puncture of the skin must immediately be reported to Work Care and follow all GHD reporting requirements
- Security Issues
- Environmental releases or loss of containment.

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

10.3 Emergency Equipment/First Aid

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site.

- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

10.4 Emergency Procedures For Contaminated Personnel

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- Skin Contact: Remove contaminated clothing, wash immediately with water, and use soap, if available.
- Inhalation: Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- Ingestion: Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

10.5 Site Evacuations

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified by established communications to evacuate the area. In the event of an emergency, GHD personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the Tailgate Safety Meeting (TGSM) as part of the site specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points will be identified in the site map attached to the HASP.

10.6 Spill And Release Contingencies

If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. GHD personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

11. Environmental Control Program

11.1 Introduction

This section of the HASP outlines measures to be implemented at the Site to prevent hazards associated with environmental conditions.

11.2 Weather Monitoring

The Site Supervisor will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) many cause unsafe conditions at the site and in some situations work may have to be stopped.

11.3 Tornado Safety Policy And Procedures

Tornadoes occur most frequently between April and October from 3:00 to 7:00 p.m. but can occur any time. In most cases, tornadoes move from a west/southwest direction. A typical tornado is a swirling storm of short duration with winds up to 300 miles per hour and a near vacuum at its center. It appears as a rotating funnel shaped cloud, from gray to black in color, extending towards the ground from the base of a thundercloud.

Tornadoes usually only cover a limited geographical area and give off a roaring sound. A tornado is the most concentrated and destructive potential weather event at the Site. Tornadoes are usually the result of the interaction of a warm, moist air mass with a cool or cold air mass. Secondary effects of tornadoes include flash flooding, electric power outages, transportation system and communication system disruption, and fires.

Whenever weather conditions develop that indicate tornadoes are expected, the National Weather Service will issue a tornado watch to alert people in a designated area for a specific time period (normally 6 hours) to remain alert for approaching storms. The tornado watch is upgraded to a tornado warning when a funnel cloud (tornado) is actually sighted or indicated by weather radar.

When a tornado is approaching, Site personnel will only have a short time to react. Therefore, Site personnel must be prepared to react during periods of severe weather. Memorize the following tornado danger signs:

i) Approaching clouds of debris can mark the location of a tornado even if a funnel cloud is not visible

ii) Before a tornado hits, the wind may die down and the air can become very still/calm

iii) It is not uncommon to see clear, sunlit skies behind a tornado as they usually occur at/near the trailing edge of thunderstorms.

Tornado Evacuation Procedures

GHD and contractor personnel monitor weather related information provided by National Weather Service. If the National Weather Service issues a tornado warning, Site supervisor will activate the emergency response plan.

The "take shelter" warning signal is a "slow wail" of the alarm system. GHD Site personnel will evacuate the work zone(s) when a tornado watch has been issued by the National Weather Service. Personnel will contact the Project Management team to inform them they are leaving the site and provide them a location of the muster point (shelter) they are going. The Site Supervisor are responsible for work areas, they will check remote areas of the work zone(s) to ensure personnel have reacted to the alert. Personnel must proceed to the Site mustering point (shelter) and wait for further instructions. If a tornado watch is upgraded to a tornado warning, personnel will proceed to the designated tornado shelters. Once inside the shelter, conduct a head count to ensure that personnel are accounted for. In general, stay away from all windows and doors that lead to the outside. Remain in the shelter until the "all clear" signal is given by the Site Supervisor.

The tornado shelter most accessible to GHD personnel should be noted on the site map attached to this HASP

Directions to the shelter are to be communicated to Site personnel during initial Site safety orientation and throughout the tornado season during subsequent safety meetings.

If unable to reach the designated shelter, the best protection in a tornado is usually an underground area. If an underground area is not available, consider small interior rooms on the lowest floor without windows, hallways on the lowest floor away from doors and windows, rooms constructed with reinforced concrete/brick/block with a heavy concrete floor and roof, and protected areas away from doors and windows.

11.4 Rain And Snow

Excessive amounts of precipitation may cause potential safety hazards for work tasks. The hazards that would be most commonly associated are slipping, tripping, or falling due to slippery surfaces.

Severe weather conditions will result in work stoppage and the implementation of further emergency measures.

11.5 Temperature

Site activities are expected to be conducted year round. Temperature extremes may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

11.6 Wind

High winds may be encountered at the Site and these can cause hazards that may affect Site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i) Restrict Site activities.

ii) Batten down light equipment or building materials.

iii) Partially enclose work areas.

iv) Reduce or stop work activities.

11.7 Lightning & Thunder

Light travels at a faster speed than sound, you can see a lightning bolt before the sound of thunder reaches you.

To judge how close lightning is, count the seconds between the flash and the thunder clap. Each second represents about 328 yards/300 meters. If you can count less than 30 seconds between the lightning strike and the thunder, the storm is less than 6.2 miles/10 km away and there is an 80 percent chance the next strike will happen within that 6.2 miles/10 kilometers.

Lightning may strike several miles/kilometers away from the parent cloud and therefore precautions should be taken even if the thunderstorm is not directly overhead.

If you hear thunder or see lightning, stop work immediately and seek safe shelter.

Remain sheltered for 30 minutes after hearing the last thunder before returning to work.

11.8 Outdoor Precautions During Severe Weather

- Keep a safe distance from tall objects, such as trees, hilltops, and telephone poles.
- Avoid projecting above the surrounding landscape. Seek shelter in low lying areas such as valleys, ditches, and depressions, but also be aware of flooding.
- Stay away from water. Don't go boating if a storm threatens. Move to land as quickly as possible if you are on the water. Lightning can strike the water and travel some distance from its point of contact. Don't stand in puddles even if you are wearing rubber boots.
- Stay away from objects that conduct electricity, such as tractors, metal fences, motorcycles, lawnmowers, and tall metal objects.
- Avoid being the highest point in an open area. Holding a conductive tool, holding an umbrella, can make you the tallest object and a target for lightning.
- You are safe inside a car during lightning, but don't park near or under trees or other tall objects, which may topple over during a storm. Be aware of downed power lines, which may be touching your car.
- In a forest, seek shelter in a low lying area under a thick growth of small trees or bushes.
- Be alert for flash floods, which are sometimes caused by heavy rainfall, if seeking shelter in a ditch or low lying area.
- If caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you. Kneel on the ground immediately, with feet together, place your hands on your knees and bend forward. Don't lie flat.
- If you are in a group in the open, spread out, keeping people several yards/meters apart.

11.9 Indoor Precautions During Severe Weather

- Before the storm hits, disconnect electrical appliances including radios and television sets. Do not touch them during the storm.
- Don't go outside unless absolutely necessary.
- Stay away from doors, windows, fireplaces, and anything that will conduct electricity, such as radiators, stoves, sinks, and metal pipes. Keep as many walls as possible between you and the outside.
- Don't handle electrical equipment or telephones. Use battery operated appliances only.

11.10 Flash Flooding

FLASH FLOODS

Floods are one of the most common hazards in low lying areas, however not all floods are alike. Some floods develop slowly, while others such a flash floods, can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods often have a dangerous wall of roaring water carrying rocks, mud and other debris.
Be aware of flood hazards no matter where you live or work, but especially if you are in low-lying areas, near water, behind a levee or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds or low-lying ground that appear harmless in dry weather can flood.

During the flood

- If any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
- Be aware of stream, drainage channels, canyons and other areas known to flood suddenly.

If you must prepare to evacuate, you should do the following:

- Do not walk through moving water. Six inches of moving water can make you fall.
- If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely.
- Observe weather in the distance, rain in the hills can cause flooding in the valleys..Do not park your vehicle along streams, rivers or creeks, particularly during threatening conditions.

APPENDIX DOCUMENTS

Chemical Table

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Benzene CAS-71-43-2	Benzene Benzol CAS-71-43-2	TLV: 0.5 ppm [skin] PEL: 1 ppm STEL: 2.5 ppm IDLH: 500 ppm	Inhalation Absorption (skin) Ingestion	ACUTE: Irritation to eyes, skin, respiratory tract; dizziness; headache; nausea; staggered gait; fatigue, abdominal pain. CHRONIC: Defatting of the skin, may have effects on bone marrow and immune system, decrease in blood cells. Carcinogenic to humans.	(FP) 12°F (VP) 75 mm (IP) 9.24 eV (UEL) 7.8% (LEL) 1.2%	Colorless to light-yellow liquid with an aromatic odor. Solid below 42°F.	
Diesel Fuel #2 CAS-68476-34-6	Diesel Fuel #2 Heating Fuel #2 CAS-68476-34-6	TLV: 100 mg/m3 (IFV) PEL: NE STEL: NE IDLH:	Inhalation Ingestion Skin contact Eye contact	ACUTE: Eye irritation and burning, euphoria, dizziness, headache, discoordination, ringing in ears, convulsions, skin irritation and burning sensation, vomiting CHRONIC: Coma, respiratory arrest, defatting of the skin, central nervous system depression, possible kidney and liver damage.	(FP) > 104 F (VP) 0.40 mm (IP) NA (UEL) 10.0% (LEL) 0.3%	Colorless to straw or red oil liquid with characteristics kerosene-like odor. NOTE: Refer to MSDS for additional information.	

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Ethylbenzene CAS-100-41-4	Ethylbenzene Ethylbenzol EB CAS-100-41-4	TLV: 20 ppm PEL: 100 ppm STEL: NE IDLH: 800 ppm	Inhalation Ingestion Skin contact Eye contact	ACUTE: Causes irritation of the eyes, skin, mucous membranes, and respiratory tract. Effects on CNS. CHRONIC: Defatting of the skin, narcosis, and coma.	(FP) 55°F (VP) 7 mm (IP) 8.76 eV (UEL) 6.7% (LEL) 0.8%	Colorless liquid with an aromatic odor.	
Gasoline CAS-86290-81-5 8006-61-9	Gasoline Motor fuel Petrol Natural gasoline CAS-86290-81-5 8006-61-9	TLV: 300 ppm PEL: NE STEL: 500 ppm IDLH: NE	Inhalation Ingestion Skin contact Absorption Eye contact	ACUTE: Irritation to eyes, skin and mucous membranes. Dermatitis, headache and fatigue. Blurred vision and slurred speech. CHRONIC: Possible liver and kidney damage. Carcinogen.	(FP) -45 °F (VP) 38-300 mm (IP) NE (UEL) 7.6% (LEL) 1.4%	Clear mobile liquid with a characteristic odor. It is recommended that atmospheric concentrations should be limited by the aromatic hydrocarbon content.	
Hydrogen Sulfide CAS-7783-06-4	Hydrogen Sulfide Sulfur Hydride CAS-7783-06-4	TLV: 1 ppm PEL: 20 ppm (C) STEL: 5 ppm IDLH: 100 ppm	Inhalation Skin contact Eye contact	ACUTE: Irritation of eyes and respiratory tract. May effect CNS. Unconsciousness, death. CHRONIC: NA	(FP) NA (gas) (VP) 17.6 atm (IP) 10.46 eV (UEL) 44.0% (LEL) 4.0%	Colorless gas with a strong odor of rotten eggs. (Note: sense of smell becomes rapidly fatigued).	

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Lead (metal) CAS-7439-92-1	Lead (metal) CAS-7439-92-1	TLV: 0.05 mg/m3 PEL: 0.05 mg/m3 STEL: NE IDLH: 100 mg/m3	Inhalation Ingestion Skin contact Eye contact	ACUTE: Lead is a cummulative poison, however, it may cause eye and skin irritation. CHRONIC: Effects blood, bone marrow, CNS, PNS and kidneys resulting in anemia, convulsions, peripheral nerve disease and kidney impairment. Toxicity to human reproduction or development.	(FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA	A heavy, ductile, soft, gray solid. Turns tarnished on exposure to air.	
PAHs CAS-65996-93-2	Polyaromatic Hydrocarbons PAHs Coal Tar Pitch Volatiles CAS-65996-93-2	TLV: 0.2 mg/m3 PEL: 0.2 mg/m3 STEL: NE IDLH: 80 mg/m3	Inhalation Ingestion	ACUTE: Bronchitis. CHRONIC: Dermatitis, may cause damage to bladder, kidneys and lungs. Potential occupational carcinogen.	(FP) Varies (VP) NA (IP) Varies (UEL) NA (LEL) NA	Black or dark brown amorphous residue. Properties vary depending upon specific compound.	

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
PCB (54%) CAS-11097-69-1	Polychlorinated Biphenyls PCB (54%) Chlorodiphenyl (54% chlorine) Aroclor 1254 CAS-11097-69-1	TLV: 0.5 mg/m3 [skin] PEL: 0.5 mg/m3 [skin] STEL: NE IDLH: 5 mg/m3	Inhalation Absorption (skin) Ingestion	ACUTE: Eye irritation. CHRONIC: Dermatitis, chloracne, liver damage, reproductive system damage. Potential occupational carcinogen.	(FP) NA (VP) 0.00006 mm (IP) NA (UEL) NA (LEL) NA	Colorless to pale yellow viscous liquid or solid (<50°F) with a mild hydrocarbon odor.	
Toluene CAS-108-88-3	Toluene Methylbenzene Toluol CAS-108-88-3	TLV: 20 ppm PEL: 200 ppm STEL: NE IDLH: 500 ppm	Inhalation Ingestion Absorption	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. Unconsciousness and cardiac dysrhythmia at high level exposures. CHRONIC: Defatting of the skin. Affects CNS. Enhanced hearing damage.	(FP) 40°F (VP) 21 mm (IP) 8.82 eV (UEL) 7.1% (LEL) 1.1%	Colorless liquid with a sweet, pungent, benzene-like odor.	

Chemical/CAS #	Chemical Name (Synonyms)	Exposure Limits	Routes Of Entry	Symptoms/Health Effects	Chemical Properties	Physical Characteristics	Concentration at Site
Xylene (o;m;p isomers) CAS-106-42-3	Xylene (o;m;p isomers) CAS-106-42-3	TLV: 100 ppm PEL: 100 ppm STEL: 150 ppm IDLH: 900 ppm	Inhalation Absorption Ingestion	ACUTE: Irritation to eyes and respiratory tract. Ingestion may cause chemical pneumonitis. Affects CNS. CHRONIC: Defatting of the skin, lung damage resulting in chronic bronchitis. Affects CNS and blood.	(FP) 90/82/81°F (IP) 7/9/9 mm (IP) 8.56eV (UEL) 6.7% (LEL) 0.9%	Colorless liquid with an aromatic odor. (p-isomer solid <56°F).	

Tailgate Safety Meeting Form
Large Group Format - Single Day

Date:		Time:		Project No.:	
Presenter:			Project Name:		

Safety topics/items discussed:

Site personnel in attendance:

Print Name	Signature	Company

Tailgate Safety Meeting Form
Small Group Format – Multiple Days

Date:		Time:		Project No.:	
Presenter:			Project Name:		

Safety topics/items discussed:

Print Name	Signature	Company

Date:		Time:		Project No.:	
Presenter:			Project Name:		

Safety topics/items discussed:

Print Name	Signature	Company

Date:		Time:		Project No.:	
Presenter:			Project Name:		

Safety topics/items discussed:

Print Name	Signature	Company

Field Safe Task Evaluation Process (F-STEP)

Report status: (insert date)	Initial report	Updated report	Final report	Verification/validation	Report input to SMART database

Observer's name:	Date:	Time:
Client:	Project name :	
Observer's office:	Site location:	
Observer's supervisor:	Project no. (if applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor company name:	

Feedback conducted by:	Date:
Observee's supervisor:	Time:

Check task being observed (if not listed here, go to columns at right)		If checking this column, write in the specific task	
☐ Air knifing	☐ Mob/demob	☐ Agricultural services	
☐ Clearing	☐ Project oversight	☐ Construction	
☐ Demolition	☐ Soil sampling	☐ Landfill	
☐ Drilling	☐ Stack testing	☐ Office operations	
☐ Electrical work	☐ Surveys & audits	☐ O&M	
☐ Excavation	☐ Traffic control	☐ Pipeline	
☐ General site cleaning	☐ UST removal	☐ Refinery	
☐ Heavy equipment operations	☐ Water sampling	☐ Treatment plants	
☐ IH sampling	☐ Well management	☐ Other	
☐ Manual lifting			

Background information (Give a brief description of task being performed and your surroundings)

Observer's positive comments

1.

2.

3.

Feedback session conclusion:
If no questionable Items: brief recap of positive actions/comments
If questionable Items: brief recap of positive actions/comments and why did the questionable item(s) occur?

Personal protective equipment	Meets work standards	???	N/A	Evaluation comments
1. Hearing protection (e.g., ear plugs)			☐	
2. Head protection (e.g., hard hat)			☐	
3. Eye protection (e.g., safety glasses/goggles)			☐	
4. Hand protection (e.g., gloves)			☐	
5. Foot protection (e.g., steel-toe boots)			☐	
6. Respiratory protection			☐	
7. Fall protection (e.g., lanyard/harness)			☐	
8. High visibility clothing (e.g., work vest)			☐	
9. First aid kit/fire extinguisher			☐	
10. Other (be specific)			☐	
Body position	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
11. Proper body positioning when exerting force (lifting/pushing/pulling)			☐	
12. Pinch points/moving equipment - hands/body placement			☐	
13. 3-points of contact			☐	
14. Other (be specific)			☐	
Work environment	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
15. Work/walk surface clear (free and clear pathway)			☐	
16. Housekeeping/equipment storage			☐	
17. Controlled work zone (e.g., warning devices, barricades, cones, flags)			☐	
18. Emergency stop/safety switches			☐	
19. Materials labeled correctly			☐	
20. Storage/disposal of waste			☐	
21. Other (be specific)			☐	
Operating procedures	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
22. Star performed/job planning			☐	
23. Stop work authority process – understood and considered			☐	
24. JSA/JLA/risk assessment reviewed and followed			☐	
25. Daily site inspection			☐	
26. High risk task specific (hot work, confined space, LOTO, excavation/ trenching)			☐	
27. Inspect work zone for hazards			☐	
28. Coordinate/communicate with site rep and/or others on site			☐	
29. Spotters used appropriately			☐	
30. Underground/overhead utilities identified			☐	
31. Other (be specific)			☐	
Tools/equipment	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
32. Hand/power tool - selection, condition, and use			☐	
33. Field/test equipment - selection, condition, and use			☐	
34. Heavy equipment - selection, condition, and use			☐	
35. Other (be specific)			☐	
Observation total occurrences			☐	
% observations to meet work standards			☐	
Item specific to work task	**Meets works standards**	**???**	**N/A**	**Evaluation comments**
Insert task/JSA/SOP Step			☐	
Insert task/JSA/SOP Step			☐	
Insert task/JSA/SOP Step			☐	

Causative factors and corrective actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	**CF**	**Corrective actions (Must match Causative Factor)**	**Responsible party**	**Date due**	**Date completed**	**Verified by/ Validated by**	**Date**	**Details**
						Verified by: **Validated by:**		
						Verified by: **Validated by :**		
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		

Causative factors

Personal factors		Company factors		External factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

Driving Safe Task Evaluation Process (D-STEP)

Report status:					
(insert date)	Initial report	Updated report	Final report	Verification/validation	Report input to SMART database

Observer's name:	Date:	Time:
Client:	Project name:	
Observer's office:	Site location:	
Observer's supervisor:	Project no. (if applicable):	
Subcontractor: ☐ Yes ☐ No	Subcontractor company name:	

Feedback conducted by:	Date:
Observee's supervisor:	Time:

Driving conditions			
☐ Freeway/interstate	☐ Wet	☐ Day	☐ Raining
☐ Surfaced street	☐ Dry	☐ Night	☐ Windy
☐ Dirt road	☐ Snow/ice		☐ Snowing
	☐ Mud		☐ Fog

Vehicle condition			
☐ Car	☐ Truck	☐ Van	☐ Pulling trailer
☐ Company owned	☐ Rental	☐ Personal	

Background information (Give a brief description of where you are driving from and to and your surroundings)

Observer's positive comments

1.

2.

3.

Feedback session conclusion:
If no questionable Items: brief recap of positive actions/comments
If questionable Items: brief recap of positive actions/comments and why did the questionable item(s) occur?

Pre-driving	Meets work standards	???	N/A	Evaluation comments
1. JMP/JSA/Risk Assessment developed and/or reviewed			☐	
2. STAR performed/job planning			☐	
3. Stop Work Authority – understood and considered			☐	
4. Registration/insurance/last maintenance report			☐	
5. Tire inflation and tread			☐	
6. Wipers and washer fluid/clean windows/mirrors			☐	
7. Horn/lights operation/instrument panel			☐	
8. Body damage/overall vehicle appearance			☐	
9. Under-vehicle check for leaks/obstructions			☐	
10. Secure loose items			☐	
11. Check fluid levels			☐	
12. Fire extinguisher/triangles/first aid kit/jack/spare			☐	
13. Verifies area is clear before moving vehicle			☐	
Body positioning	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
14. Adjust seat			☐	
15. Adjust head rest			☐	
16. Adjust mirrors to minimize blind spots			☐	
17. Seat belts (driver/passengers)			☐	
18. Locks doors			☐	
Operating procedures	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
19. Yields right-of-way and allows other vehicles to merge, change lanes, turn			☐	
20. Respects pedestrians, cyclists, other drivers			☐	
21. Is courteous/tolerant of others' poor driving			☐	
22. Two hands on wheel no higher than 9 and 3			☐	
23. Skill in handling distractions			☐	
24. Adjusts to traffic conditions (speed / traffic)			☐	
25. Uses turn signals (for turns and lane changes)			☐	
26. Following distance is appropriate (4-second rule)			☐	
27. Avoids sudden acceleration and deceleration			☐	
28. Before backing up, looks behind vehicle/checks for traffic, pedestrians, parked vehicles, uses spotter			☐	
29. Scans the road ahead (15-second eye lead or 2-3 blocks-1/4 mile) and anticipates actions of others to avoid sudden swerves, stops, lane changes			☐	
30. Checks mirrors every 5-8 seconds			☐	
31. Checks for hazards on the road (e.g., animals, debris, road conditions)			☐	
32. Reads and obeys traffic signals			☐	
33. Makes complete stops at signals, at a safe distance			☐	
34. Scans intersection left and right/anticipates intent of other vehicles before reaching "point of no return"			☐	
35. Covers brakes safely and adjusts speed			☐	
36. Does not use cell phone during operation of vehicle			☐	
37. Other (be specific)			☐	
Operating procedures - Parking	**Meets work standards**	**???**	**N/A**	**Evaluation comments**
38. Looks for pull through parking before backing in			☐	
39. Uses signals, leaves adequate space before pulling back into lane			☐	
40. Obeys signs and uses signals in parking lot			☐	
41. Maintains proper speed inside the lot			☐	
42. Ensures vehicle is legally/properly parked			☐	
43. Sets parking brake and secures vehicle			☐	
44. Other (be specific)			☐	
Observation total occurrences			☐	
% Observations to meet work standards			☐	
Item specific to work task				
Insert Task/JSA/SOP Step			☐	
Insert Task/JSA/SOP Step			☐	

Causative factors and corrective actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	**CF**	**Corrective actions (Must match Causative Factor)**	**Responsible party**	**Date due**	**Date completed**	**Verified by/ Validated by**	**Date**	**Details**
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		

Causative factors

Personal factors		Company factors		External factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

Unsafe Act / Unsafe Condition / Stop Work Authority (SWA) Report

Reported by:		Employee's office:	
RSHM:		Date:	Time:
Employee's supervisor:		Employee's principal:	
Project related:	☐ No ☐ Yes	If yes, name of client:	
Client contact (if applicable):		Project no (if applicable):	

Re: (check all that apply) ☐ **Unsafe act** ☐ **Unsafe condition** ☐ **Stop work authority (SWA)**

Location: (check one) ☐ Driving ☐ Field ☐ Office

Date reported to supervisor/PM:		Date corrected:	
Time reported to supervisor/PM:		Time corrected:	

Describe the unsafe act, unsafe condition or SWA situation

List corrective action(s) implemented

Did the corrective action(s) mitigate the unsafe act/unsafe condition?

For SMART administrators use only:

Category:

- ☐ **PPE** Personal Protective Equipment
- ☐ **BP** Body Positioning
- ☐ **WE** Work Environment
- ☐ **OP** Operating Procedures
- ☐ **TE** Tools and Equipment
- ☐ **CU** Computer Usage
- ☐ **PD** Pre-Driving
- ☐ **OPP** Operating Procedures – Parking

Chevron category:

- ☐ **A** Person or People
- ☐ **B** Equipment
- ☐ **C** Environmental
- ☐ **D** Procedures/ Processes/
  - ☐ JSA-review/revise
- ☐ **E** Visitors

Causative factor:

- ☐ **1** Insufficient training for task
- ☐ **2** Hurrying to complete the task
- ☐ **3** Easier if proper process not followed
- ☐ **4** Took shortcuts without prior incident
- ☐ **5** Incomplete or no procedures
- ☐ **6** Procedures not known or enforced
- ☐ **7** Improper PPE
- ☐ **8** Improper tools
- ☐ **9** Improper workplace layout
- ☐ **10** Exposure to conditions

Energy source:

- ☐ **G** Gravity
- ☐ **M** Motion
- ☐ **ME** Mechanical
- ☐ **E** Electrical
- ☐ **P** Pressure
- ☐ **T** Temperature
- ☐ **B** Biological
- ☐ **C** Chemical
- ☐ **R** Radiation
- ☐ **S** Sound

Are additional actions required? ☐ No ☐ Yes If yes, what?

Near Miss Reporting Form

Note: A Significant Near Miss must be called into the Incident Reporting Hotline: 1-866-529-4886

Instructions:
1) Employee completes the Near Miss Report and submits to Supervisor.
2) Supervisor reviews and makes other comments.
3) Employee discusses Near Miss with Project Manager.
4) Submit to applicable SMART Reporting submission address

Report status:					
(insert date)	Initial report	Updated report	Final report	Verification/validation	Report input to SMART database

Section 1

A. Employee Identification ☐ GHD Employee ☐ Temporary Employee ☐ Subcontractor			
Employee No.	Last Name	First Name	Employee's Company - if Subcontractor
Date of Hire	Position/Title	Supervisor	Home Office Location - if GHD Employee

B. General Information					
Where did the Near Miss occur? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States ☐ UK			Type of Near Miss (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage ☐ Environmental		
Address of Near Miss (City, State/Province/County, Postal/Zip Code)			Specific Location of Near Miss (e.g., where on site)		
Date and Hour of Near Miss Month Day Year	a.m. p.m.		Date and Hour Reported to GHD Month Day Year	a.m. p.m.	Time Employee Began Work a.m. p.m.
Witnesses? ☐ Yes ☐ No	Witness Name and Telephone Number				

C. Project Information (Project Related Near Miss Only): Project Related: ( ) Yes ( ) No				
Project #	Project Name	GHD Project Manager	Client	Client Contact
Was the Client Advised of the Near Miss? ☐ Yes ☐ No ☐ N/A	Name:		Date and Time Month Day Year Time	

Section 2

A Details of the Near Miss
1. What job/task was being performed when the Near Miss occurred? (Example: collecting groundwater samples).
2. Provide a detailed description of the employee's specific activities at the time of the Near Miss. Include details of equipment/materials being used, including the size and weights of objects being handled, and weather conditions at time of the Near Loss. If necessary, attach additional pages to the report.

Section 2 (continued)

B. Near Miss Investigation	
Conduct a 5-Why Root Cause Analysis Investigation. In addition, if there was the potential for a significant injury or loss, report the Near Miss to the Incident Hot Line (this will determine if a Tap Root Cause Analysis is necessary).	
HASP prepared? ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP to Investigation Team. If yes, was the HASP on site? ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks being performed when the Near Miss occurred? ☐ Yes ☐ No If no, why not? (Explain) _____ Did the employee utilize the STAR process before initiating the task? ☐ Yes ☐ No If no, why not? (Explain) _____

5-Why Root Cause:	Additional information: Attach photos, witness statement(s), affected employee statement, as applicable, to the end of this document.
1. Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	
5. Why did "4" happen?	See Section 3 Below: Corrective Actions/ Verification and Validation
6. Why did "5" happen?	

C. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

D. Stewardship		
Will a Near Miss Summary be Prepared? ☐ Yes ☐ No If yes, by:		
Quality Review By:	Date:	Findings:

Section 3 (continued)

Corrective Action					Validation & Verification		
CF	**Corrective Actions (Must match Causative Factor)**	**Responsible Party**	**Due Date**	**Date Completed**	**Verified By/ Validated By**	**Date**	**Details**
					Verified By		
					Validated By		
					Verified By		
					Validated By		
					Verified By		
					Validated By		

Causative factors

Personal factors		Company factors		External factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

Incident Reporting Form

Note: Incidents must be called into the Incident Reporting Hotline: 1-866-529-4886

Instructions: *1) For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2*
2) For Motor Vehicle Accidents, complete Sections 1, 2, and 4.
3) ***Initial report must be submitted within 24 hours.***

Report status:					
(insert date)	Initial report	Updated report	Final report	Verification/validation	Report input to SMART database

Section 1

A. Employee Identification ☐ **GHD Employee** ☐ **Temporary Employee** ☐ **Subcontractor**

Employee No.	Last Name	First Name	Middle Name/Initial	☐ Male ☐ Female
Area Code ( ) Telephone Number	Employee Home Address (Street, City, State/Province/County, Postal/Zip Code)			
Date of Hire Month Day Year	Position/Title	Supervisor	Employee's Company/Home Office Location	

B. General Information

Where did the Incident occur and which country? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States	Type of incident (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage Only
Address of Incident (City, State/Providence/County, Postal/Zip Code)	Specific Location of incident (e.g., where on site)

Date and Hour of Incident	Date and Hour Reported to Employer	Date and Hour Last Worked	Time Employee Began Work
Month Day Year a.m. p.m.	Month Day Year a.m. p.m.	Month Day Year a.m. p.m.	a.m. p.m.

Normal Work Hours From: To:	Witnesses? ☐ Yes ☐ No	Witness Name and Telephone Number

C. Project Information (Project Related Incident Only) Project Related? ☐ Yes ☐ No

Project #	Project Name	Project Manager	Site Telephone Number ( )	Project Manager Cell Number ( )
Client Name	Was the Client Advised of the Incident? ☐ Yes ☐ No	Name of Person Contacted	Date and Time Contacted	

Section 2

A. Details of the Incident

1. What job/task was being performed when the incident occurred? (Example: collecting groundwater samples).
2. Provide a detailed description of the employee's specific activities at the time of the incident. Include details of equipment/materials being used, including the size and weight of objects being handled, and weather conditions at time of the incident. If necessary, attach additional pages to the report.
3. For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part.
4. Identify the object or substance that directly injured the employee and how. Include size, weight, and shape of object, quantity of substance, etc.
5. Identify property damaged and how it was damaged (include owner of property, nature and source of damage, and model and serial number, if appropriate).

B. Health Care/Medical Treatment

Employee received health care? ☐ Yes ☐ No	Identify the type of health care provided and where it was performed. **(Check all that apply).** ☐ First Aid ☐ Medical treatment other than first aid (sutures, etc.) ☐ Hospitalized ☐ Clinic ☐ Hospital emergency room ☐ On location by self or GHD employee ☐ On site by EMT
Name of Health Care Provider, Physician Name, Phone Number, Address (Street, City, Province/State/County, and Postal/Zip Code)	

Section 2 (continued)

C. Incident Investigation ☐ **5 Why Root Cause Analysis Investigation [Non-OSHA Recordable, <$5,000/£3,000 damage]** ☐ **Tap Root Cause Analysis [OSHA Recordable, and/or >$5,000/£3,000 damages]**	
HASP prepared? ☐ Yes ☐ No ☐ N/A Submit a PDF of HASP and relevant JSA(s)/Risk Assessment to Investigation Team. If yes, was the HASP on site? ☐ Yes ☐ No	Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured? ☐ Yes ☐ No If no, why not? (Explain) _____ Did the employee utilize the STAR process before initiating the task? ☐ Yes ☐ No If no, why not? (Explain) _____ Was the employee drug & alcohol tested post incident? ☐ Yes ☐ No

5-Why Root Cause: Incident Statement	Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document.
1. Why did "above" happen?	
2. Why did "1" happen?	
3. Why did "2" happen?	
4. Why did "3" happen?	See *Corrective Actions/Verification and Validation* Section (Page 4)
5. Why did "4" happen?	
6. Why did "5" happen?	

D. Accountability		
Initial Report Date Month Day Year	Initial Report Prepared by: (please print)	Initial Report Prepared by: (signature)
Investigation Team	Company	Position/Title
Final Report Date Month Day Year	Final Report Prepared by: (please print)	Final Report Prepared by: (signature)

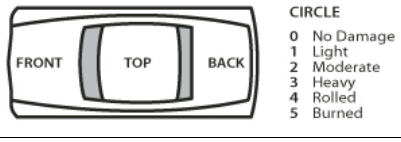
E. Stewardship		
Will an Incident Summary be Prepared? ☐ Yes ☐ No By:		
Quality Review By:	Date:	Findings:

Section 3

A. Agency Reporting and Recording Information (To be completed by an HSE Team Member)			
CANADA			
Provincial Regulatory Agency Reporting Required? ☐ Yes ☐ Not required	Employee Injury Information (Injury met the following criteria): ☐ First Aid ☐ Medical Treatment ☐ Critical Injury ☐ Modified Duty ☐ Lost Time Injury If medical treatment, what?		
Joint Safety and Health Committee Notified? ☐ Yes ☐ No	Total days of modified duty If exceeds 7 days, report to WSIB	Total days of lost time (if any)	Date employee returned to work Month Day Year
UNITED STATES			
OSHA Recordable Injury? ☐ Yes ☐ No OSHA Recordable.pdf	Employee Injury Information (Injury met the following OSHA 300 Log criteria) ☐ First Aid ☐ Medical Treatment ☐ Restricted Duty ☐Lost Time Injury If medical treatment, what?		
Total days of restricted duty:	Total days of lost time (if any)		Date employee returned to work Month Day Year

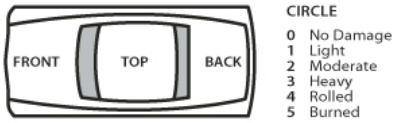
Section 4

A. Vehicle GHD Employee was Operating ☐ Personal ☐ GHD-Owned ☐ Rental - Rental Company:			
License Plate No.	State/Province/County	Police Department City	State/Province/County
Vehicle Year/Make/Model	Odometer Reading at Time of Accident	Police Report Number	Weather Conditions

Name of Person Operating Vehicle	"X" IN AREA OF VEHICLE DAMAGE
Address	
City State/Province/County Postal/Zip Code	
Telephone: Area Code ( )	
Description of Vehicle Damage:	

B. Other Vehicles Involved

Name of Owner	Address	City/State/Prov./County/Postal/Zip	Area Code and Telephone Number ( )
Operator's Name (if different from above)	Address	City/State/Prov./County/Postal/Zip	Area Code and Telephone Number ( )

Year/Make/Model	Description of Property Damage:	"x" IN AREA OF VEHICLE DAMAGE
Insurance Co. Name & Telephone		
License Plate No./State/Province		

C. Injured Persons

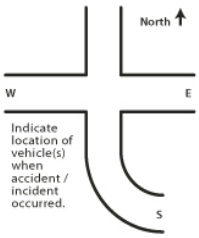
Name	Address Street, City, State/Prov./County/Postal/Zip Code	Phone Number	Nature of Injury	Indicate if Injured was a Vehicle Driver/ Passenger, GHD Employee, Other, or Pedestrian
1.				
2.				
3.				

D. Witnesses

Name	Address Street, City, State/Prov./County/Postal/Zip Code	Area Code and Telephone Number
1.		( )
2.		( )

E. Description of Accident

PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM



Was Ticket Issued? Reason:

☐ Other Operator

☐ GHD Operator

Report Date Month Day Year	Report Prepared by: (please print)	Report Prepared by: (signature)

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach.

Causative factors and corrective actions						Verification (Did we do what we said we would do?) and Validation (Is it working?)		
Item No.	**CF**	**Corrective actions (Must match Causative Factor)**	**Responsible party**	**Date due**	**Date completed**	**Verified by/ Validated by**	**Date**	**Details**
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		
						Verified by: **Validated by:**		

Causative factors

Personal factors		Company factors		External factors	
1	Insufficient training for task	5	Incomplete or no procedures	10	Exposure to conditions
2	Hurrying to complete the task	6	Procedures not known or enforced		
3	Easier if proper process not followed	7	Improper PPE		
4	Took shortcuts without prior incident	8	Improper tools		
		9	Improper workplace layout		

Form initiated by: _____ Date initiated: _____

Initiator's role/responsibility: _____ Project number: _____

Affected location(s): _____

Client's management of change documentation attached, if required or applicable: ☐ Yes ☐ N/A

Type of change:

- ☐ Field operations/SOPs
- ☐ Equipment
- ☐ Safety
- ☐ Project management/resources

Duration of change:

- ☐ Permanent
- ☐ Temporary (specify how long change will be in place): _____
- ☐ Emergency

Describe the change:

Describe the procedure/task(s) required to complete the change:

Who needs to know about the change and how will you communicate this to them?

Is additional training for GHD people required as a result of this change? ☐ Yes ☐ No

If yes, please describe training needs and those who require it:

Coordination with Business School Learning Centre underway: ☐ Yes ☐ No

Identify any associated risks/hazards/impacts as a result of this change:

This completed form is a quality record

Does the change need to be approved by a client? ☐ Yes ☐ No

If Yes, state client's name: _____

Client role/responsibility: _____

Date authorized by client: _____
(mm/dd/yyyy)

Change approved by project manager: _____
(please print)

_____ _____
(signature) (approval date – mm/dd/yyyy)

Summary:

Item	Completion date	Confirmed by
1. Task(s) to execute change have been completed		
2. Those who need to know have been notified		
3. Additional training has been completed		
4. Risk(s) have been mitigated		
5. Change has been approved by all required parties		

Notes:

Scope: GHD may use the Management of Change Form (QSF-006) to identify and record project additions, revisions, changes, or updates regarding field operations, field SOPs, equipment, safety, resources, or project management.

Detail: The level of detail to a documented project change is ultimately determined by the project manager and/or any client expectations.

File location: Correspondence folder of the project file.

Underground Utilities Checklist

(QSF-019)

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Project number:	**Project name:**
Date:	**Project location:**
Public utility locator:	**Public utility locator phone number:**
Date of public utility locator request:	**Public locator call reference number:**
Private utility locator (If applicable):	**Private utility locator phone number:**

Utilities (indicate that location/utility presence was checked)

Borehole/ Excavation location	Date (mm/dd/yyyy)	Telephone	Water	Storm sewer	Sanitary sewer	Process sewer	Gas	Electrical	Cable	Overhead utilities	Other	Comments/Warnings
Utility owner												

Instructions: This checklist is to be completed by GHD personnel prior to initiation of field activities as a safety measure, to ensure that all underground utility lines, other underground structures, and above-ground power lines are clearly marked in the area selected for boring or excavation.

Notes: _____

Client: _____ **Client representative:** _____ **Phone number:** _____

Client or property owner acknowledgement of utility clearance: _____ **(Client, property owner, or authorized agent signature)**

Subcontractor acknowledgement of utility clearance: _____ **(Subcontractor or subcontractor representative signature)**

GHD field representative name: _____ **Signature:** _____

GHD project manager's review/confirmation of locate completion: _____

In the event that client or property owner acknowledgement cannot be obtained, all boreholes shall be hydro vacuumed and the costs passed on to the client. Attach any clearance documentation from utility owner/operator to this document.

Underground Utilities Checklist for GHD Personnel

Pre-Drilling/Excavation Checklist and Utility Clearance Log

Drilling or excavation work may not proceed if any of the questions answered below are answered "No." Implement stop work authority and contact the GHD project manager to discuss and resolve any concerns or issues. Document the reason for a "No" answer in the comments section below.

Yes	No	N/A	Pre-Mobilization
☐	☐	☐	1. Has a utility locator request been completed within the last 30 days (verify time limit with state or provincial law)? If no, stop work and comment below.
☐	☐	☐	2. Is a scaled site plan, map or drawing showing the proposed borehole locations attached to this form?
☐	☐	☐	3. Does each borehole and excavation location allow for clear entry and exit, adequate workspace, and a clear path for raising the mast (or boom) and operating the drill rig and all support equipment? Ensure that the minimum OSHA/state/provincial utility clearance requirements between the mast or boom and the power line(s) are met. For instance, OSHA requires a minimum approach distance of 10 feet for systems below 50 kV and an increase of 4" for every 10 kV over 50 kV. Confirm if additional permits are required if the boom or mast will be working 5 meters (15 feet) or less from the electrical lines.
☐	☐	☐	4. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on client's building plans? Check here ☐ if plans not provided by client (therefore not applicable to this job.
☐	☐	☐	5. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on public right-of-way street improvement or other public property plan or site map?
☐	☐	☐	6. Has the site representative, familiar with the site, indicated no knowledge of any subsurface or above-ground utilities within 3 metres (10 feet) of the proposed borehole and excavation locations? (Review locations with site representative)
☐	☐	☐	7. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface utilities identified during a geophysical survey? Check here ☐ if no geophysical survey has been completed (therefore not applicable to this job).
☐	☐	☐	8. Have all utility locating service providers, notified by the public line locator, marked out their facilities in the vicinity of the borehole and excavation locations or otherwise notified us that they do not have any facilities near the proposed locations? (Attached confirmation and utility locate sheets from public locator)
☐	☐	☐	9. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line connecting two similar looking manhole covers?
☐	☐	☐	10. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line perpendicular to the street from the water, gas, and electrical meters?
☐	☐	☐	11. Are all proposed boring and excavation locations clear of pavement joints, curbs, crash posts, or other engineered structures?
☐	☐	☐	12. Does the ground surface/pavement lack signs of previous excavation (e.g., no pavement subsidence, no differences in pavement texture or relief, no pavement patching)?
			Pre-Drilling and Excavation
☐	☐	☐	13. Has it been verified that the proposed drilling or excavation work will not affect any work currently in progress?
☐	☐	☐	14. Has the drill rig or heavy equipment been inspected prior to use and documented? (See Drill Rig Inspection Checklist or Mobile Equipment Safety Inspection Checklist)
			15. Have barricades been erected to prevent unauthorized access, where applicable?
☐	☐	☐	16. Have all known live electrical or product lines within 3 meters (10 feet) of the dig path been visually verified? If no, comment below.
			17. For boreholes that have not been cleared or are within 3 meters of a utility:
☐	☐	☐	a. Before drilling have you cleared a hole to 2.4 meters (8 feet) below grade using an air-knife, or equivalent, before drilling and is the diameter of this hole greater than the final outside diameter of the boring? If not required comment below.
☐	☐	☐	b. Does the soil you encountered in the hand-dug hole appear to be native material (i.e., free of clean gravel, clean sand, aggregate base [gravelly sand ~ 10% fines] or other non-native looking material)? If not required comment below.

Have the above concerns been discussed with the GHD project manager?	☐ Yes	☐ No	☐ Not Applicable
Has the start of subsurface work been communicated to the GHD project manager?	☐ Yes	☐ No	☐ Not Applicable
Have the above concerns been discussed with the client?	☐ Yes	☐ No	☐ Not Applicable
Has the scope of work been approved by the client?	☐ Yes	☐ No	☐ Not Applicable

Comments: _____

_____

_____

_____

_____

GHD field representative name: _____ **Date:** _____

Site Health and Safety Plan Amendment Form

This document is to be completed for ANY changes that occur within the Site Health and Safety Plan (HASP). This document is to be sent to the Regional Safety & Health Manager (RSHM) for review, verification and sign off of the HASP.

Amendment #	
Site Name/Project ID	
Date	
Client Contact (same/change)	
Reason for Amendment (SOW change, JSA addition, Chemical, etc.)	
Alternate or Additional Safeguard Procedures	
Required changes in PPE	
Additional Comments:	

Project Manager Notified	☐
RSHM Notified	☐
Client PM Notified (if necessary)	☐

Site HSE Officer (sign above)	Date

The Project Manager is ultimately responsible for the accuracy of the information on this amendment and ensuring any changes to the original HASP is discussed with all affected site personnel prior to commencing work

This original form must be placed in the project file and a copy needs to be attached to the Site Health and Safety Plan (HASP).

HASP Acknowledgment Sheet

Project Name:_____ Project Number: _____

This is to certify that I have received a pre-entry briefing regarding this HASP, and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

Print Name	Signature	Date

Job Safety Analysis (JSA)

Insert Name: Environmental-Soil Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:27	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Air monitoring equipment, PPE Additional PPE: Tyvek if Level C initiated; gloves dependent on the task and chemical contamination present or suspected present				
Task-specific Training:	CRA Field Method Training on Soil Sampling Procedures				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☑ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☑ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment	• Lost time from improperly functioning equipment • Incorrect sampling procedures/ collection due to malfunctioning equipment	• Ensure all equipment is functioning properly • Complete Quality Control documents	Sampling Technician
3	Prepare to collect soil samples	• Lifting hazards • Back injury • Manual material handling • Pinch points • Cuts • Punctures • Sample misidentification	• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • No bending or twisting while under load • Refer to the HASP for additional lifting information • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/CRA site supervisor/subcontractor	Sampling Technician
4	Opening the sample sleeve (if applicable)	• Cuts due to sharp edges of sample sleeve • Contaminant exposure	• Use sleeve cutter for opening the sample sleeves • Keep hands clear of the sleeve when cutting • Wear nitrile gloves • Maintain awareness of sharp edges of sample sleeve	Sampling Technician
5	Sample collection	• Contaminant exposure • Cuts from container breakage • Sample misidentification	• Wear nitrile gloves and replace between soil samples • Inspect glass bottles for breaks/cracks • Do not attempt to use any suspect containers • Close glass sample containers carefully to avoid breakage • Check sample labels for accuracy prior to placing in cooler	Sampling Technician
6	Headspace screening of samples	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves • Ensure proper calibration of equipment	Sampling Technician
7	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)	Sampling Technician

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Lifting hazards • Back injury • Manual material handling • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques as discussed in step 3 • If possible use a dolly or cart if cooler is heavy or has to be moved over a long distance • Ensure equipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
9	Investigation derived waste (IDW) management	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling • Pinch points • Slips/trips/fall hazards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techniques as discussed in step 3 • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non hazardous material	Sampling Technician

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Environmental-Soil Sampling From Excavator Bucket

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:27	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Air monitoring equipment, PPE, Excavation equipment Additional PPE: Tyvek if Level C initiated; gloves dependent on the task and chemical contamination present or suspected present				
Task-specific Training:	CRA Field Method Training on Soil Sampling Procedures; Mobile Equipment or Heavy Equipment Safety;				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☑ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA.	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	Site Personnel
2	Inspect and calibrate sampling and monitoring equipment.	• Lost time from improperly functioning equipment • Incorrect sampling procedures/collection due to malfunctioning equipment	• Ensure all equipment is functioning properly • Complete Quality Control documents	Sampling Technician
3	Prepare to collect soil samples: Technician will choose the location of the sample and communicate sample location to the operator.	• Back strain • Pinch points • Cuts • Punctures • Sample misidentification	• Use proper lifting techniques and buddy system if needed • Avoid placing hands/fingers in pinch point locations • Use proper tools when opening container packaging • Do not use fixed open blade knives when opening boxes or containers • Ensure the sample id label matches sample location with site plan/CRA site supervisor/subcontractor • Setup a safe area for technician to obtain sample from bucket	Sampling Technician
4	Obtaining the soil sample from the excavation via remote means – use the hydraulic excavator: Operator will place bucket on ground in a safe location after obtaining the sample from the agreed location.	• Excavation collapse • Contaminant exposure • Heavy equipment operation	• Stay clear of the edge of the excavation; demarcate areas that were undermined • Wear nitrile gloves and follow air monitoring program as per HASP • Follow JSAs specific for excavation and heavy equipment activities; maintain excavation safety • Be aware of swing radius of heavy equipment	Sampling Technician
5	Sample collection from excavator bucket: Operator will place heavy equipment in a zero energy state via lockout (interlocks) and placing bucket on ground. If not equipped with interlocks or equivalent safety devices then operator will shut off engine with bucket on ground. Technician will collect soil sample from the bucket once heavy equipment is in a zero energy state and leave the area.	• Contaminant exposure • Cuts from container breakage • Sample misidentification • Struck by/crushing injuries	• Wear nitrile gloves and replace between soil samples • Inspect glass bottles for breaks/cracks • Do not attempt to use any suspect containers • Communicate to all present not to distract the excavator operator • Establish eye/hand contact with excavator operator and approach when safe • Have operator activate hydraulic system kill switch if equipped and maintain two thumbs up visible to technician • If excavator is not equipped with a hydraulic system kill switch, then the operator must leave the cab prior to sample collection • Do not stand in front of or behind the bucket; stand to either side to collect sample • Close glass sample containers carefully to avoid breakage • Signal operator with thumps up when clear of swing radius • Check sample labels for accuracy prior to placing in cooler	Sampling Technician
6	Headspace screening of samples	• Contaminant exposure • Incorrect headspace readings	• Wear nitrile gloves • Ensure proper calibration of equipment	Sampling Technician

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Sample selection	• Bottle breakage • Contaminant exposure • Pinch points • Lost time due to incorrect sample selection	• Wear nitrile gloves when handling sample containers • Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)	Sampling Technician
8	Packing samples in cooler(s)	• Bottle breakage • Contaminant exposure • Cuts • Pinch points • Back strain • Lost time due to incorrect sample packaging or hold time exceedances	• Wear nitrile gloves when handling sample containers • Pack glass containers in bubble wrap • Check COC against sample labels and SSOW for accuracy before shipping • Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) • Use proper lifting techniques and buddy system if needed • Ensure equipment and supplies are loaded correctly and do not shift during transport	Sampling Technician
9	Investigation derived waste (IDW) management	• Contaminant exposure • Heavy lifting • Pinch points • Slips/trips/fall hazards • Mislabeled waste	• Wear nitrile gloves when handling IDW • Use proper lifting techniques to transport/dispose of IDW into drums and use buddy system if needed • Avoid placing hands/fingers in pinch point locations • Maintain awareness of walking surfaces • Label IDW with generator, a contact number, identification of contents, and site location • Specify IDW as either hazardous or non hazardous material	Sampling Technician

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:28	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Alconox/Liquinox, brushes				
Task-specific Training:	Decontamination/Site Control; Quality Control/Sampling Plan				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☑ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☑ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☑ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Decontamination of sampling equipment (including pumps, bailers, tubing, etc.)	• Contaminant exposure • Pinch points • Slip/trip/hit/fall hazards • Lifting hazards • Back injury • Manual material handling	• Set up decon station to capture any spills to avoid cross contamination and manage wastes • Wear appropriate PPE • Scrub equipment clean then rinse and verify it is clean and free of contamination • Avoid putting hands in or near pinch points • Maintain good housekeeping and be aware of surroundings • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Refer to the HASP for additional lifting techniques	Sampling Personnel
2	Decontamination of personnel	• Contaminant exposure • Slip/trip/hit/fall hazards	• Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left • Dispose of used PPE in accordance with site requirements • Wash hands and face before eating, drinking, or using tobacco products • Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary	Sampling personnel
3	Management of waste derived from decontamination activities	• Contaminant exposure • Lifting hazards • Back injury • Manual material handling	• Containerize decon waste (e.g., water, used PPE) as required • Properly dispose of decon fluids (e.g., sediments) • Refer to step 1 and the HASP for additional lifting information	Sampling personnel

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Driving

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:28	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Vehicle, valid driver's license, 360 degree topper				
Task-specific Training:	Defensive Driving				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Discuss route, concerns, and alternate routes with passenger and drivers of other vehicles • Use SWA to stop any work that is unsafe • Ensure proper vehicle selected for travel (use a truck if going to construction site or area with rough conditions that would damage a small vehicle?)	Driver and passenger
2	Check weather	• Unexpected storm • Fog; rain; snow; lightning/thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting • If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Driver or Passenger
3	Complete CRA Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a properly inflated spare tire and associated tools to install • Assure windshield and window glass is clean and free from obstructions • Assure all fluids are topped off (e.g., windshield wiper fluid) and scheduled routine maintenance has occurred (e.g., oil changes). • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • If the vehicle contains a first aid kit, fire extinguisher, and road hazard kit, verify that all items with expiration dates are current and that fire extinguisher has had documented monthly check • Do not use vehicle if any safety device is found not functioning	Driver or Passenger

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach Ensure mirrors are properly adjusted	Driver or Passenger
5	Fasten seat belt(s) and ensure passengers' seat belts are fastened	• Serious injury, ejection, or death from collision and/or traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	Driver or Passenger
6	Ensure vehicle doors are locked	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	• Manually lock all doors to vehicle prior to starting the vehicle	Driver
7	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	Driver
8	Driving – Use defensive driving techniques and stay alert	• Arriving late • Collision • Blind spots of other vehicles • Injury or death to occupants or other parties	• Acknowledge and comply with all traffic regulations, laws, and ordinances • Do not use two way communicating devices or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Recognize other vehicle's blind spots and minimize time spent within these zones • Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance (add an extra second for each hazardous condition, triple following distance in poor weather conditions) • Signal well in advance before changing lanes or turning • Utilize all driving defensive techniques	Driver
9	Arrive at site	• Pedestrian injury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone	Driver
10	Park vehicle – assign a spotter if necessary (when in doubt use a spotter)	• Pedestrian injury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull through parking space or facing the exit • Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle • Use caution and mirrors/spotter when backing vehicle • Set parking brake	Driver

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
11	Demobilization – conduct a vehicle walk around inspection paying particular attention to path(s) of travel	• Collision • Injury or death to occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utilize defensive driving techniques • Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Driver or Passenger
12	Report maintenance or mechanical problems upon returning vehicle	• Conditions worsen leading to mechanical failure resulting in collision and injury	• Report vehicle problems immediately to company representative or rental car agency • Schedule and/or perform repairs as soon as possible	Driver

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Construction-Excavation Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:28	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Excavator; shoring with tabulated data sheet(s); ladder; air monitoring equipment (PID and 4-gas); Excavation Safety Checklist Additional PPE: Class II vest; leather gloves; Noise Reduction Rating (NRR) 20 hearing protection				
Task-specific Training:	40-Hour and 8-Hour HAZWOPER; PPE; Mobile Equipment Operations; Excavation Safety Training; Excavation Competent Person; Confined Space Entry				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Perform the STAR process; discuss SWA; verify Permit to Excavate and Utility Clearance Form is completed (overhead and underground); verify excavation layout	• Underground utility strike • Overhead utilities	• QSF 019 and Permit to Excavate Forms completed and signed off • Utility Locate Ticket number on file within 10 days of excavation startup? • Mark work area and safe distances for overhead lines; use spotter as necessary	CRA Construction Oversight Person
2	Set up necessary work area and traffic controls	• Fall in • Caught between • struck by • Lifting hazards • Manual material handling • Back injury	• Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly • Stockpile and laydown area are set up properly • Perform a pre start meeting, inform subcontractor of safe lifting practices • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves when setting up barricades • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing	CRA Construction Oversight Person
3	Hand digging and potholing activities (where/if necessary based on utility locates)	Underground utility strike	• Use preventive techniques • Maintain proper utility clearances with heavy equipment and use hand digging/potholing when necessary • Refer to step 2 and the HASP for additional lifting information	CRA Construction Oversight Person
4	Heavy equipment operations to excavate and handle soils and waste materials	• Caught between and struck by hazards • Underground/overhead utilities	• Stay out of swing radius • Use spotters to verify clear route of travel and work area • Maintain eye contact with operator and/or signal operator • Keep soil 2 feet from edges • Inspect heavy equipment and document inspection • Ensure the above utility clearances and safe work protocols are followed	CRA Construction Oversight Person
5	Excavating activities	• Soil cave in • Noise hazard • Struck by/against hazards • Potential contact with chemical waste material, organic vapors, and particulate	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use hearing protection as necessary • Wear designated PPE and conduct air monitoring	CRA Construction Oversight Person

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Excavation entry activities (if required)	• Soil cave in • Struck by/against hazards • Hazardous atmospheres • Slip/trip/fall hazards • Emergency egress	• Keep proper distances from edge of excavation • Limit equipment operations in trench area • Keep work area free of trip hazards • Perform necessary soil classification • Use daily inspection form to document/meet competent person inspection requirements • Inspect trench after any change in conditions (e.g., rain, equipment vibrations) • Provide fall protection measures • Utilize shoring equipment properly – ensure that tabulated data sheet is on site • Use 4 gas monitor and PID to screen excavation air prior to and during entry • Ladder safety and proper slope of ladder • Use harness and lifeline when entering trenches over 5 feet deep	CRA Construction Oversight Person

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Environmental- Monitoring Well Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:29	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:					
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☑ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☐ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☐)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Coordinate site access	• Delays or added work	• Notify Station Manager of schedule • Notify other required personnel if applicable (city, regulators, private property owners, etc.)	
2	Mobilize with proper equipment/ supplies for sampling	• Delay or improper/unsafe performance of work due to improper equipment on site • Cross contamination of wells	• Review work plan to determine equipment/supply needs • Make sure all sampling/gauging equipment is decontaminated • Bring ice for sample storage • Review THE HASP and gather necessary PPE	
3	Notify other personnel on site	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Meet with station attendant or other site personnel and explain planned activities	
4	Determine sampling order	• Cross contamination of samples and wells due to incomplete decontamination of sampling equipment	• Review prior analytical results and set sampling order from lowest to highest concentration wells	
5	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst case scenario (including weather conditions)	• Review HASP with co workers • Highlight aspects identified by HASP and, if necessary, add to HASP • Get signature of all co workers on HASP	
6	Set up exclusion zone(s)	• Injury or exposure to public or other on site personnel • Slip/trip/fall hazards	• Implement exclusion zone setup instructions of THE HASP (barricades, caution tape, cones, etc.) • Set up work area free of trip hazards	
7	Gauge water levels and product thickness (where applicable) in wells	• Back strain • Inhalation or dermal exposure to chemical hazards	• Don any additional PPE and initiate air quality monitoring in accordance with the HASP • Maintain safe distance from well head • Bend at knees, not waist	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
8	Purge well(s) and collect purge water	• Cross contamination • Lifting hazards • Back injury • Manual material handling • Inhalation or dermal exposure to chemicals • Slip/trip/fall hazards • Spilling contaminated water	• Decontaminate purging equipment between each sampling location • Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Use PPE and monitoring in accordance with the HASP • Keep work area clear of tripping or slipping hazards • Store purge water in appropriate containers	
9	Collect samples in accordance with sampling plan	• Cross contamination • Lifting hazards • Back injury • anual material handling • Inhalation or dermal exposure to chemical hazards • Slip/trip/fall hazards • Improper labeling or storage • Injury due to acid burn (unsealed or leaking sample bottle) • Injury from broken sample bottle (cuts or acid burn)	• Use PPE in accordance with the HASP • Use PPE whenever handling or labeling samples • Decontaminate sampling equipment between each well (unless disposable) • Refer to step 9 and the HASP for additional lifting methods • Label samples in accordance with sampling plan • Keep samples stored in proper containers, at correct temperature, and away from work area • Wear nitrile gloves when handling bottles • Handle bottles carefully	
10	Dispose or store purge water onsite	• Lifting hazards • Back injury • Manual material handling • Exposure to chemicals • If disposing through on site treatment system, damage or injury from improper use of equipment • Improper storage or disposal	• Use proper equipment to transport water (pumps, drum dollies, etc.) • Refer to step 9 and the HASP for additional lifting methods • Where PPE in accordance with the HASP • Review any necessary instructions for use of on site treatment systems • Label storage containers properly and locate in isolated area away from traffic and other site functions • Coordinate off site disposal (where applicable)	
11	Clean site/demobilize	• Traffic • Nuisance or safety hazard left on site • Back strain	• Use buddy system as necessary to remove traffic control • Leave site clean of refuse and debris • Notify station personnel of departure, and note any purge water left on site • Exercise caution when lifting coolers out of the trunk of a car; use the buddy system if justified	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
12	Package and deliver samples to lab	• Bottle breakage • Improper temperature • Exceeding hold times • Improper completion of Chain of Custody (COC)	• Pack samples in ice, use bubble wrap/bags for sample bottles • Use standard COC forms and labels • Submit samples to lab as soon as possible (no more than 3 days, but check sampling plan for any special requirements such as rush turnaround or special hold time restrictions)	

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Name/Company	Sign	Date

SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Environmental-Oversight of Monitoring Well Installation and/or Soil Boring

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:29	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Air monitoring equipment; safety cones/fencing/barricades (not needed in vacant, fenced areas)				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☐ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Markout underground utilities	• Property damage • Explosion • Electrocution • Injury • Death	• Call public underground utility agency (One Call) at least 5 or more days prior to work activities • Review State Law pertaining to underground pipe line safety and have private utility mark out performed • Expose lines if warranted (i.e., hand dig, test pit, or daylight)	Project Manager and Site Supervisor
2	Conduct site walk,identify unsafe conditions and determine sample point locations	• Traffic hazard • Slip/trip/fall hazards • Biological hazard • Overhead/underground hazards • Property damage	• Maintain awareness of on site traffic and walking surfaces • When selecting soil boring locations, be aware of biological hazards (e.g., ants, poison ivy, wasps) and overhead/underground hazards (e.g., overhead utilities, concrete scarring, station canopy) • Use a walking stick, probe, or other such device to check for soil integrity/softness	Site Personnel
3	Equipment inspection	• Pinch points • Property damage • Lost time due to damaged equipment/parts	• Discuss pinch points on equipment (e.g., drill rig, air knife, pressure washer, etc.) • Familiarize all personnel with location/operation of fire extinguisher(s) and kill switch on drill rig • Visually inspect equipment/parts for damage and document inspections	Site Personnel
4	Set up work zone for drilling	• Traffic hazard • Slip/trip/fall hazards • Property damage • Overhead hazards • Environmental impact • Unstable ground conditions • Property damage	• Maintain awareness of on site traffic, work zones, walking surfaces, overhead hazards (e.g., canopy and low hanging overhead lines) • Utilize barricades/cones/caution tape to define work zone and direct traffic • Wear leather/cotton when setting up barricades • Be aware of any potential sensitive receptors and verify all personnel are aware of the location of spill kit • Inspect soil for loose, soft or unstable conditions under rig jacks or outriggers • Place mats or plywood in areas where drill rig will make ruts or depressions (i.e., under tracks or outriggers)	Site Personnel

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
5	Set up staging area	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back injury • Manual material handling • Pinch points • Heat/cold stress	• Maintain awareness of on site traffic and walking surfaces • Utilize barricades/cones/caution tape to define work zone and direct traffic • Reduce distance needed to travel when carrying materials and or equipment • Wear leather/cotton gloves when setting up barricades • Size up the load, If the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required. • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Site Personnel
6	Contractor oversight/ management of hole clearance/drilling activities	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back injury • Manual material handling • Damage to underground utilities • Contaminant exposure • Heat/cold stress • Injury to personnel and public • Cross contamination • Equipment failure	• Maintain awareness of on site traffic and practice good housekeeping • Perform a prestart meeting, inform subcontractor of safe lifting practices • Refer to step 5 and the HASP for additional lifting information • Ensure subcontractors don proper PPE (e.g., face shield, leather/cotton gloves, hearing protection). No loose clothing. • Complete and sign off utility clearance. If non native material (e.g., pea gravel, sand, fill material) or underground utilities are observed, utilize SWA and assess situation. • Monitor breathing zone and refer to HASP for action levels • Monitor all personnel for signs and symptoms of heat/cold stress and refer to HASP for recommendations • Be aware of unsafe hoisting and material handling practices • Be aware of proper augering and auger handling techniques. Visually monitor performance and functioning of drill rig for signs of failure. Monitor safe drill movement/positional setup. • Decontaminate sampling equipment after collecting a sample and decontaminate drilling equipment after each borehole • Watch where you step, look for debris which may be covered by brush or rubble	Site Personnel

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Construct well	• Lifting hazards • Back injury • Manual material handling • Cross contamination • Non approved construction • Slip, trip, and fall hazards • Eye injury • Cuts	• Use proper lifting techniques as discussed in Step 5 and HASP • Prior to going into the borehole, inspect casing and other materials to ensure they are free of jagged/sharp edges • Confirm construction with project manager • Ensure presence or other authorization by any required inspectors for well installation/grouting • Keep pathways and work area clean of debris and possible tripping hazards • Use PPE and monitoring in accordance with the JSA • Use safe cutting tools (no fixed open blade knives)	
8	Site/boring security, clean site, demobilize	• Traffic hazard • Slip/trip/fall hazards • Lifting hazards • Back safety • Manual material handling	• Use buddy system as necessary to remove traffic control • Do not work with your back to traffic • Wear leather/cotton gloves when moving barricades • Maintain awareness of on site traffic and walking surfaces • Maintain proper lifting techniques as described in Step 5 and HASP. • Ensure good house keeping methods are practiced. Work area is kept clean of debris. • Leave site clean of refuse and debris • Clearly mark/barricade any borings that need later topping off or curing • Notify property personnel of departure • Secure boring location if open overnight	

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Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Vacuum Truck Operation Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 15:06:30	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\MMarcus	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Vacuum Truck. High visibility vest, fit for purpose hand protection, hard hat, safety glasses, steel toes with chem or oil resistant soles, and long sleeved clothing.				
Task-specific Training:	CRA SMART (BBS) training; 40-hour HAZWOPER, 8-hour Refresher, Hazard Communication. Supervisor shall be trained in CPR, First Aid, and have Supervisor Training.				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☑ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☑ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☑ Required	☐ Hazard Category 4	☐ R95		☑ Other*

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Obtain necessary permits, agreements and bonds; coordinate inspections and subcontractors, and notify stakeholders	• Fines, law suits, delays, or added work	• Coordinate with project manager to ensure all approvals are obtained (well, encroachment, access agreements, traffic control plans, etc.) and owner, tenant, subcontractors, and agencies are notified of start date.	Project Manager
2	Mobilize with proper equipment/supplies	• Delay or improper performance of work due to improper equipment on site	• Make sure subcontractors are aware of their responsibilities for safety, labor, equipment and supplies. • Provide subcontractor with minimum checklist (they can use their own if more protective) and ensure equipment has been checked and meets expected standards before it mobilizes to the site. • Review the HASP and permit conditions and gather necessary PPE.	Site Supervisor
3	Meet with Property Manager (or designee) on start date before commencing work	• Unknown traffic or other work hazards • Lack of communication between all interested parties	• Explain planned activities • Confirm locations to be cleared and tentative schedule • Locate emergency product shut-off switch for facilities with potential hydrocarbon exposures; communicate that location to all personnel	Site Supervisor
4	Perform STAR and tailgate safety meeting upon arrival at site	• Consider worst-case scenario (including weather conditions) • Loud conditions (hearing protection and communications with crew)	• Review the HASP with coworkers • Highlight aspects identified by SPSA and, if necessary, add to HASP and modify JSAs • Have all coworkers sign the HASP • Discuss crew communication in high noise environments; have communication means on hand (air horn, whistle, etc.) • Ensure that all site workers have donned PPE and it is in good condition • Confirm all necessary subcontractor certifications and keep copies on site	Site Supervisor
5	Verify necessary traffic control	• Accident during placement or as a result of improper traffic control equipment placement	• Use buddy system for placing traffic control • Reference traffic control plan section of the HASP (may include specific requirements based on encroachment permit)	Site Supervisor
6	Verify exclusion zone(s) and establish work areas/heavy equipment pathways	• On-site vehicular accident with heavy equipment • Injury or exposure to public or other on-site personnel • Slip/trip/fall hazards	• Use orange fencing, delineators with flags at least 4 feet tall, and caution tape • Implement exclusion zone setup instructions of the HASP • Set up clear walking paths between workstations	Site Supervisor

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
7	Verify set up of vacuum truck	• Damage caused by vac rig while accessing setup locations • Overhead or underground utilities	• Make sure subcontractor ensures clear pathway to location to be cleared • Provide as-needed hand signals and guidance to driver to place rig • Visually inspect vehicle (fire extinguisher on board, no oil or other fluid leaks, pressurized hoses secured with whip-checks or adequate substitute, water tank not leaking, etc.) • Confirm local utility locations • Visually verify bonding and grounding have been performed • Verify that all gauges work, determine when relief valves were last serviced, that all drains/valves open and close as needed, and document and perform function check of emergency shutdown switch • Post person at one of the emergency shutdown switches to shut down operation if unplanned events happen with the rig or that could impact the project.	Site Supervisor
8	Observe operation of vacuum truck	• Eye injury from flying debris • Exposure to chemical hazards • Hearing damage • Catastrophic equipment failure • Damage to adjacent structures and vehicles • Personal or property damage due to accidental activation of vac rig • Back strain	• Don any additional PPE and make sure all people not associated with work at hand are a safe distance from equipment and far enough away that they are safe from flying debris • Ensure that the stinger is safely secured when not in use by shutting off or blocking pressure supply to prevent accidental activation • Use proper lifting techniques and tools	Site Supervisor
9	Verify the removal of all traffic control devices and inspect site for cleanliness	• Traffic • Nuisance or safety hazard left on site • Possible spills	• Use buddy system as necessary to remove traffic control • Leave site clean of refuse and debris • Clearly mark/barricade any holes that need later topping off or curing • Notify station personnel of departure • Map locations and note any cuttings/purge water left on site	Site Supervisor

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Mobilization-Demobilization

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 18:56:33	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\wjdoyle	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	360 degree topper				
Task-specific Training:					

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☐ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☐ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☐ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
☑)Industrial Grade Safety Boot	☐ Other*	☐ NOT Required for this task	☐ Hazard Category 2	☐ P95		☐ Polyethyene Tyvek
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	
2	Check weather	• Unexpected storm • Fog, rain, snow; lightening/thunder • Heat/cold stress	• Check local weather forecast • If adverse weather conditions are likely, prepare a contingency plan for lodging, etc. with project manager • Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting • If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightening/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	
3	Load equipment into vehicle	• Lifting hazards • Manual material handling • Back injury • Cuts • Pinch points • Hand/foot injury • Forgotten or damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Maintain neutral back posture - Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and make sure to shift with the feet rather than twisting at the back • Maintain neutral wrist posture when lifting, carrying, pushing or pulling. The wrist is the strongest and most stable when it is straight. • Avoid one handed carrying if possible; maintain awareness of footing • Avoid placing hands/fingers in pinch point locations • Wear safety toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
4	Complete CRA Daily Operator Vehicle Checklist	• Damaged vehicle lights, tires, windows, mirrors, horn • Inadequate vehicle documents and/or safety items	• Check for fluid leaks under vehicle • Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers • Visually check the pressure/wear of tires • Ensure the vehicle has a spare tire • Assure windshield and window glass is clean and free from obstructions • Test the windshield wipers and horn • Verify vehicle registration, insurance card, and inspection sticker is present and valid • Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit • Check immediate vehicle perimeter and initial path of travel for obstructions	
5	Check and adjust seat, steering wheel, headrest, and mirrors	• Back/body strain • Blind spot • Impaired vision	• Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach • Ensure mirrors are properly adjusted	
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	• Serious injury, ejection, or death from collision and/or traffic citation	• Verify driver and passenger(s) seat belts are in good condition and properly latched	
7	Ensure vehicle doors are locked	• Serious injury, ejection, or death from collision • Unwanted intrusion • Lost equipment	• Manually lock all doors to vehicle	
8	Start engine and check gauges and warning lights	• Vehicle breakdown	• Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit	
9	Mobilize to site	• Arriving late • Collision • Injury or death to occupants or other parties	• Do not use cell phones or perform other distracting activities while vehicle is in motion • Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale) • Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance • Utilize all driving defensive techniques	
10	Arrive at site	• Pedestrian injury • Collision	• Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone	

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
11	Park vehicle	• Pedestrian injury • Collision • Property damage	• Maintain awareness of pedestrian/vehicular traffic • Park vehicle in pull through parking space or facing the exit • Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle • Use caution and mirrors/spotter when backing vehicle • Set parking brake	
12	Demobilization	• Collision • Injury or death to occupants or other parties	• Check immediate vehicle perimeter and initial path of travel for obstructions • Maintain awareness of pedestrian/vehicular traffic when exiting site • Utilize defensive driving techniques	

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

Site Personnel Participating in JSA Review:
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

Job Safety Analysis (JSA)

Insert Name: Environmental-Site Recon and Walkthrough

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

Date Issued/Revised:	06/06/2016 18:56:33	**Client:**	GHD - CORE		
Project Number:	11109614	**Created By:**	cra\wjdoyle	SIM OPS? YES/NO	SSE on site? YES/NO
Project Address:	3144 W Passyunk Ave Philedelphia				
Key Equipment:	Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens, flashlight. Additional PPE: Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings.				
Task-specific Training:	SMART Safety training (STAR), JSA development, Poison Plant Identification				

Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Type 1 (Top Impact)	☐ Chemical Protective (ie.Nitrile)	☑ ANSI/CSA Safety Glasses	☐ Harness	☐ Full Face Mask	☑ Class II (standard)	☐ Coveralls
☐ Type 2 (Side Impact)	☑ Level 1 - Light Duty	☐ Goggles/Spoggles	☐ Shock Absorbing Lanyard	☐ Half Face Mask	☐ Class III (Night or Highway Traffic)	☐ Fire Retardent Clothing (FRC)
☑ Class E (standard)	☐ Level 2 - Light Duty with Protection	☐ Face Shields	☐ Lifeline		☐ Anti-Static	☐ High Viz Clothing
☐ Class G	☐ Level 3 - Medium Duty	☐ Other*		**Cartridges**	☐ FRC	☐ Long Pants
	☐ Level 4 - Heavy Duty			☐ N95	☐ PFD	☐ Long Sleeve Shirts
Foot Protection	☐ High Viz	**Hearing Protection**	**Arc Flash/Shock Protection**	☐ P100		☐ Paper Tyvek (disposible)
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Hard Hat	Gloves (ANSI/EN 388)	Eye Protection	Fall Protection	APR	Vest	PPE Clothing
☐ Rubber Boots (industrial grade)		☐ Required	☐ Hazard Category 4	☐ R95		☐ Other*
☐ Hip Waders				☐ Organic Vapour		
	* see key equipment			☐ Speciality*		

Project Development Team		Modified by	Reviewed by	Date
Name	Signature			
David Steele				

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
1	Discuss STAR and SWA	• Site personnel not aware of STAR and SWA	• Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting • Use SWA to stop any work that is unsafe	All persons on project team
2	Check weather	• Unexpected storm, fog; rain; snow; lightening, thunder • Heat/cold stress	• Check local weather forecast • Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting • If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation • While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions • In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)	Assessor
3	Sign in	• Site Manager and Operator not aware of CRA staff presence in facility or on grounds	• Sign in at front desk • Ask to speak to Site Manager or alternate designate	Assessor
4	Don necessary CRA and client required PPE	• Contact with recyclable material or equipment	• Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility	Assessor
5	Unload equipment from vehicle	• Lifting hazards • Back injury • Manual material handling • Cuts • Pinch points • Hand/foot injury • Forgotten equipment • Damaged equipment	• Reduce travel distance when there is a need to carry/lift materials • Make sure grip is adequate; wear leather/cotton gloves • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required • Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position • Avoid one handed carrying if possible; maintain awareness of footing • Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations • Wear steel toed boots • Verify requested equipment against warehouse form • Load equipment in an organized manner to prevent shifting during transport or use cargo netting	Assessor

Job steps[1]	Task activity	Potential hazard(s)[2]	Corrective measure(s)[3]	Person responsible (Print first and last names)
6	Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations	• Slip/trip/fall hazards • Insects/reptiles • Pedestrian injury • Poison plants	• Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant]) • Check with site contact to determine safely accessible areas and areas where PPE are required • Wear PPE as directed by site personnel or dependent upon your evaluation of conditions • If building(s) looks dilapidated or in poor condition, do not enter • Watch for vehicles or other mobile equipment moving around • Make sure areas are well lit and you are accompanied by a site representative (if applicable) • Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.) • Do not take photographs while walking • Do not talk on cell phone while walking • If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc.	Assessor
7	Sign out	• Site Manager and Operator not aware that CRA staff have left facility	• Sign out at front desk • Ask to speak to Site Manager or alternate designate	Assessor
8	Demobilization	• Collision • Injury or death to vehicle occupants or other parties	• Perform perimeter vehicle check • Maintain awareness of pedestrian/vehicular traffic when exiting the site • Utilize defensive driving techniques • Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency	Assessor

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Name/Company	Sign	Date



SSE(s) on job: _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**ALCONOX®**
CHEMICAL FAMILY NAME:	Detergent.
PRODUCT USE:	Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	Alconox, Inc.
ADDRESS:	30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE:	**TOLL-FREE in USA/Canada** 800-255-3924
	International calls 813-248-0585
BUSINESS PHONE:	914-948-4040
DATE OF PREPARATION:	May 2011
DATE OF LAST REVISION:	February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS



EUROPEAN and (GHS) Hazard Symbols



Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1
EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 207-638-8 Index# 011-005-00-2
EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):

[Xi] Irritant

Risk Phrases:
R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:
S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS: ACUTE: Eye, respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

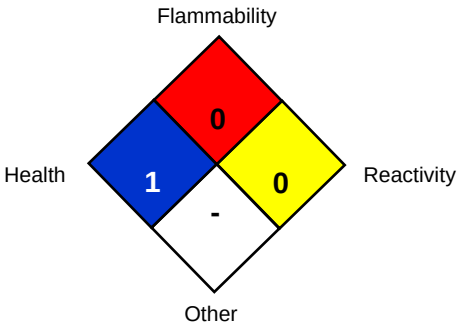
RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not Flammable
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NA Upper (UEL): NA
FIRE EXTINGUISHING MATERIALS: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is non-flammable and has no known explosion hazards.
Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive
SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	1
FLAMMABILITY HAZARD (RED)	0
PHYSICAL HAZARD (YELLOW)	0

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.
SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m³	5 mg/m³	5 mg/m³
Sodium Carbonate	497-19-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable
DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.
IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.
SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No Data available at this time.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable.
DOT LABEL(S) REQUIRED: Not Applicable
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable
MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:
This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

Disclaimer: To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

Records of Training

Date: _____ Project Name:_____Project Number: _____

Project Location: _____

Project Description _____

The Project Manager is ultimately responsible for the accuracy of the information on this Record of Training and ensuring GHD Employees and Subcontractors are familiar with the site and have the required training to do the task

Employee's Name:	Confined Space Entry	Excavation Safety	Fall Protection	GHS (HazCom/WHMIS)	Lock Out Tag Out (LOTO)	Motor Vehicle Safety	Aerial Lift	Other -	Other -	Other -	Other -
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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GHD NA

Standard Operating Procedure – HSE

Excavation Program

026

July 2015

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Attachments

Attachment A Safety Inspection Checklist for Excavations

1. Overview - Excavation and Trenching

Studies show that excavation work is one of the most hazardous types of work conducted in the construction industry. Accidents occur more frequently in excavation work than in construction work in general. The primary type of accident related to excavation work is the cave-in. Cave-ins result in over 100 fatalities a year in North America. When compared to the total number of accidents in all of construction, the actual number of cave-ins is not large; however, they are very serious in nature and much more likely to be fatal than other types of construction accidents.

Excavation activities during GHD projects have the potential to create oxygen-deficient, explosive, and/or toxic atmospheres. Adequate precautions must be taken to prevent employees entering excavations from being exposed to a hazardous atmosphere.

Serious accidents and injury can occur to employees working in excavations and trenches due to cave-ins and hazardous atmospheres. Rescue attempts in any excavation or trench cave-in should be approached with the safety of the rescuers in mind.

2. Policy

All GHD excavation and trenching operations for which employees shall enter or be exposed shall have a safety plan in place and shall be observed by a designated competent person. The competent person shall be responsible for evaluating and inspecting excavation and trenching operations to prevent possible cave-in and entrapment, and to avoid other hazards presented by excavation activities.

Each employee in an excavation shall be protected from cave-ins by one of three systems:

1. Sloping and benching systems
2. Shoring
3. Shielding systems

There is only one situation where such protective systems are not required; the excavation is less than four feet deep, and a competent person has determined that there is no indication of a potential cave-in.

All employees working in and around excavations and trenches shall receive training regarding the safe use of shoring and shielding equipment.

Employees may not design and fabricate their own protective systems. Only manufactured systems and systems designed and certified by professional engineers shall be used. The competent person shall be responsible for recognizing conditions that might result in employees being exposed to hazardous atmospheres, and for monitoring air quality in accordance with this policy.

Prior to initiating work in excavations, the competent person shall outline the emergency procedures to be utilized in the event of an emergency in the excavation. All employees working in or near the trench shall be knowledgeable of these procedures.

In the event of any life-threatening incident, the employee shall immediately contact 911 or Dispatch for emergency assistance.

3. Regulatory Background

The OSHA excavation standard (29 CFR 1926.650-652) sets forth the safety requirements for all excavation and trenching activities including construction, inspection, and entry into excavations or trenches. In addition, HAZWOPER and the OSHA General Industry Standard (29 CFR 1910) include the same requirements for excavation and trenching by referencing the construction standard.

4. Safe Work Practices

4.1 Utility Clearances

Prior to the commencement of any project and/or site work that include intrusive activities, utility clearances must be conducted. Elevated superstructures (e.g., drill rigs, backhoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines. Underground utilities, if present, shall be clearly marked and identified prior to commencement of work.

Personnel involved in intrusive work shall:

- Review and adhere to GHD's subsurface utility clearance protocol.
- Utilize the Property Access/Utility Clearance Data Sheet (QSF-019).
- Be able to determine the minimum distance from marked utilities which work can be conducted with the assistance of the locator line service.
- Contact utility companies prior to the start of excavation work to mark the location of all underground utilities. Utility companies may take up to 4 days to respond to a call, so planning is recommended.

All exposed utility lines in an excavation must be properly supported.

4.2 Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel.
- All ladders shall extend 3 feet above the top of the excavation.
- Structural ramps to be used by employees for access and egress must be designed by a competent person, qualified in structural design, or by a licensed professional engineer.

4.3 Vehicular Traffic

The following safety measures are to be taken by personnel that have the potential to be exposed to vehicle traffic:

- Safety vests shall be worn made of reflectorized or high-visibility material meeting ANSI Class II or III as applicable to traffic speeds.
- Employees shall work using the "buddy system".
- Cones, etc., shall be used to demarcate a safe work zone around the monitoring wells.
- Appropriate signage shall be posted as necessary to inform roadway/parking lot users of any additional control measures necessary to protect the public and GHD employees.

4.4 Falling Loads

Personnel are not permitted to work under or near loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by falling materials.

4.5 Protection from Water Accumulation

Employees must not work in excavations containing accumulated water unless adequate precautions have been taken. These precautions include special support or shield systems to prevent cave-ins, water removal, and/or use of a harness and lifeline.

The use of water removal equipment in an excavation must be monitored by a competent person.

Excavation work that interrupts the natural drainage of surface water shall use diversion ditches, dikes, or other suitable means to prevent surface runoff from entering the excavation. The competent person must inspect the excavation before employees enter the excavation after heavy rains.

4.6 Shoring, Shielding, and Trench boxes

The following are general safety precautions to observe when using shoring, shielding, or trench boxes:

- Manufactured protective systems shall only be used according to the manufacturer's specifications, recommendations, and limitations. Copies of these data shall be made available at the project site.
- Plans and material specifications for manufactured protective systems designed by a professional engineer shall be made available at the project site.
- No manufactured protective system shall be subjected to loads in excess of those for which it was designed.
- Members of protective systems shall be securely connected to prevent sliding, falling, kick-outs, and other predictable failure.
- Installation of protective systems shall be closely coordinated with the progress of excavating or trenching operations.

- Protective systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapse, or being struck by members of the system.
- Excavations and trenches shall be backfilled as soon as possible following removal of the protective system.
- Excavation of material deeper than 2 feet below the support system shall be permitted only if the system is designed to resist the forces for the full depth of the excavation.

In addition to the general considerations above, one special consideration regarding shoring systems is that their removal shall begin at, and progress from, the bottom of the excavation.

The following are special precautions to observe when using shielding systems and trench boxes:

- Shields shall be installed in a manner which restricts lateral or other hazardous movement in the sudden application of lateral loads.
- Employees shall be protected from cave-in when entering or leaving areas protected by shields. This is to include all faces of the excavation (i.e., side walls and end walls).
- Employees shall not ride in shields when they are being installed, repositioned or removed.
- No employee shall be positioned under an elevated load.

4.7 Benching and Sloping

Bench and slope configurations are based on soil properties. With detailed information on soil properties, special benching and slope plans may be developed by the competent person, or professional engineer, that exceed the following minimum slope requirements. No other employees are authorized to make decisions on benching or sloping systems. There are four types of soil classifications as per OSHA. General information on the four types of soil is provided below:

- **Stable rock:**
  - Natural solid mineral matter whose sides remain vertical when excavated.
- **Type A soil:**
  - Cohesive soils (clay, silty clay, sandy clay, clay loam, and sometimes silty clay loam and sandy clay loam) with a compressive strength greater than 1.5 tons per square foot (tsf).
- **Type B soil:**
  - Cohesive soils (granular, cohesive soil or silts) with a compressive strength between 0.5 to 1.5 tsf.
- **Type C soil:**
  - Cohesive soil with compressive strength less than 0.5 tsf, granular soils (gravel, sand, etc.), submerged soil and soil with water seepage, and submerged unstable rock.

4.8 Minimum Slope Requirements

In the absence of detailed information on soil properties, or whenever the soils involved are granular or saturated with water, the following minimum requirements for bench and slope construction shall apply:

- All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1 (34 degrees measured from the horizontal).
- All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or shored to a height of at least 18 inches above the top of the vertical side.
- All excavations deeper than 20 feet shall be designed by a professional engineer with knowledge of soil mechanics and state and OSHA excavation requirements. Copies of this designed system must be maintained at the project site.

4.9 Atmosphere Monitoring and Testing

There are three parameters by which air quality is measured:

1. Oxygen concentration.
2. Flammability.
3. The presence of hazardous substances.

Employees must not be exposed to atmospheres containing less than 19.5 percent oxygen, or having a lower flammable limit greater than 10 percent; and employees must not be exposed to hazardous levels of atmospheric contaminants.

4.10 Air Quality Monitoring

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, the atmosphere shall be tested by a competent person. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the site and arrange for air quality assessment and mitigation if necessary.

Atmospheric testing and monitoring shall be performed in excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

4.11 Air Quality Controls

Air quality can be controlled with proper ventilation and respiratory protection. When such controls are used, atmospheric monitoring shall be conducted as often as needed, but not less than every 30 minutes, to ensure that the atmosphere remains safe.

Employees required to work under such conditions shall receive special training related to hazardous materials and respiratory protection.

4.12 Emergency Rescue Equipment

Emergency rescue equipment, such as breathing apparatus, a safety harness with lifeline, and any other appropriate safety equipment, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work. Communication to outside rescue providers shall be readily available prior to employees entering trenches. Rescue for cave-in situations shall be limited to hand implements, such as shovels, hoes, etc.

4.13 Protective Equipment

Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended to at all times while the employee wearing the lifeline is in the excavation.

5. Competent Person Responsibilities

The competent person shall ensure that all surface structures (buildings, retaining walls, sidewalks, etc.) are removed or supported, as necessary, to safeguard employees. The competent person shall ensure the location of all subsurface structures (utilities, pipelines, underground tanks, etc.) which might reasonably be encountered during the course of the excavation.

The competent person shall ensure that safe access and egress from the excavation or trench are provided. An exit must be provided if the excavation is four feet deeper or greater. This exit must be within 25 feet of every worker.

The competent person shall ensure that all employees exposed to vehicular traffic wear warning vests or other suitably marked clothing.

The competent person shall ensure that all excavations and trenches are properly barricaded, flagged, or otherwise protected, and that a designated spotter is assigned to warn approaching machinery and pedestrians of the hazards.

The competent person shall prevent exposure of employees to hazardous atmospheres in excavations and trenches through the administration of an appropriate Atmospheric Monitoring Program.

The competent person shall prevent employees from working in excavations and trenches where there are hazards associated with water accumulation. The person shall also be responsible for monitoring the proper operation of water removal equipment.

The competent person shall ensure that employees are protected from falling equipment and previously excavated material by keeping such equipment or materials at least 2 feet back from the edge of the excavation.

The competent person shall ensure that walkways with a minimum width of 20 inches are provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with OSHA 29 CFR 1926.502 (b) shall be provided where walkways are 6 feet or more above lower levels.

The competent person shall ensure that when the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

The competent person shall ensure that whenever internal combustion engine-driven equipment is operated inside a shaft, a ventilation system shall be provided.

The competent person shall ensure that when mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

5.1 Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure. Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

- Prior to the start of work, after each extended halt in work, and as needed throughout the shift as new sections of the excavation or trench are opened.
- After every rainstorm and other natural or man-made event that may increase the load on the walls of the excavation or otherwise affect their stability.

The competent person shall instruct employees to report any indications of potential slope failure.

The competent person shall stop the work and instruct all employees to leave the excavation or trench when any potential hazards are detected. The competent person has the authority to immediately suspend work if any unsafe condition is detected.

6. Employee Training

Employees who work in areas where shoring, sloping and benching, shielding, and other protective equipment are used shall receive initial training regarding the hazards associated with excavation and trenching operations.

Such employees shall receive refresher safety training whenever the following conditions apply:

- The hazards associated with their work environment change significantly.
- The supervisor has reason to believe that there are inadequacies in the person's knowledge of excavation and trenching operations.

Employees who work in excavations or trenches where there is a potential for hazardous atmospheres shall be trained to understand the nature of the hazard, to take necessary safety precautions, and to use the air quality controls and PPE.

6.1 Competent Person Training

Competent person training shall consist of formalized classroom instruction with examination and field exercises as permitted. A certificate of course completion indicating course title and names of trainee and instructor shall be issued in order to document successful course completion. Initially, a competent person assigned to excavation and trenching jobs shall be able to:

- Recognize and classify the basic soil types and understand their slope-holding characteristics.
- Select, recognize, and use different types of shoring, sloping and benching, shielding, and other types of protective equipment.
- Recognize confined space situations.
- Understand the basic hazards associated with excavation, trenching, and trenching operations.
- Recognize situations that could result in slope failure, and understand basic slope stabilizing methods.
- Perform atmospheric testing and monitoring.
- Complete excavation checklist.

A competent person shall receive additional training whenever the following conditions apply:

- There is a significant change in the job description or the type of equipment being used.
- There is a new hazard added to the work environment.
- The supervisor has reason to believe that there are inadequacies in the person's knowledge of excavation and trenching safety.

Attachment A **Safety Inspection Checklist for Excavations**

This checklist is to be completed by the competent person at the start of work and as needed throughout the shift (i.e., after rain events, etc.).

(A competent person has been trained in the current OSHA excavation standard, is knowledgeable about soil analysis and protective systems, and has the authority to shut down the job.)

Site Location:			**Project #**	
Date:		Time:	Competent Person:	
Were visual soil tests made? If Yes, what type?	☐ Yes	☐ No	Type:	
Were manual soil tests made? If Yes, what type?	☐ Yes	☐ No	Type:	
Soil Type:				
Soil Classification:				
Excavation Depth:		Excavation Width:		
Protective System Used:				
Signature:				

In the following table, please place a **Y** for Yes**, N** for No, or **N/A** for Not Applicable in the right hand column for each item.

If No, place the date of correction.

Subject		Y, N, N/A	Date Corrected
General Inspection of the Job Site:			
1	Does the competent person have the authority to remove employees from the excavation immediately?		
2	Are surface obstructions removed or supported?		
3	Are employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?		
4	Are hard hats worn by all employees?		
5	Are excavated soil, materials, and equipment placed at least 2 feet from the edge of the excavation?		
6	Are walkways and bridges over excavations 4 feet or more in depth equipped with standard guardrails and toe-boards?		
7	Are warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic?		
8	Are employees required to stand away from vehicles being loaded or unloaded?		
9	Is a warning system established and used when mobile equipment operates near the edge of the excavation?		
10	Are employees prohibited from going beneath suspended loads?		
11	Are employees prohibited from working on the faces of sloped or benched excavations above other employees?		
Utilities			
12	Were utility companies contacted and/or utilities located?		
13	Are the exact locations of the utilities marked?		
14	Are underground installations protected, supported, or removed when excavation is opened?		
Means of Entering and Exiting Trench			
15	Is the distance along the trench to an exit no greater than 25 feet in excavations 4 feet or more in depth?		
16	Is a support system, such as underpinning, being used?		
17	Are ladders used in excavations secured and extended 3 feet above edge of the trench?		
18	Are structural ramps used by employees designed by a competent person?		
19	Are structural ramps used for equipment designed by a registered professional engineer?		
20	Are employees protected from cave-ins when entering or exiting the excavation?		

Wet Conditions			
21	Is water removal equipment monitored by a competent person?		
22	Is surface water or runoff diverted or controlled to prevent accumulation in the excavation?		
23	Are inspections made after every rainstorm or other hazard-increasing occurrence?		
Hazardous Atmosphere			
24	Is the atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible, or other harmful contaminant exposing employees to a hazard?		
25	Are adequate precautions taken to protect employees from exposure to an atmosphere containing less than 19.5 percent oxygen and/or other hazardous atmospheres?		
26	Is ventilation provided to prevent employee exposure to an atmosphere containing flammable gas 10 percent above the lower explosive limit of a gas?		
27	Is testing conducted often to ensure that the atmosphere remains safe?		
28	Is emergency equipment, such as breathing apparatus, safety harness and lifeline, and/or basket stretcher readily available where hazardous atmospheres could or do exist?		
Support Systems			
29	Are materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads?		
30	Are materials and equipment used for protective systems inspected and in good condition?		
31	Are protective systems installed without exposing employees to the hazards of cave-ins (including end walls), collapses, or threat of being struck by materials or equipment?		
32	Are excavations below the level of the base, or footing supported, approved by a registered professional engineer?		
33	Does the removal of support systems progress from the bottom and members are released slowly? Note any indication of possible failure.		
34	Is the excavation of material a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth?		
35	Is there a shield system placed to prevent lateral movement?		

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Standard Operating Procedure – HSE

Fall Protection Program

038

July 2015

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Attachments

Attachment A Preliminary Site Inspection Checklist

Attachment B Daily Inspection Checklist

Attachment C Project Manager/Site Safety Personnel Additional Information

Attachment D Equipment Manager Formal Equipment Checklist

Attachment E Formal Inspection Log

Attachment F Manlift Daily Equipment Checklist

Attachment G Scaffold Inspection Checklist

1. Introduction

The purpose of this Standard Operating Procedure (SOP) is to designate minimum requirements and responsibilities that will be taken to ensure the safety of GHD personnel assigned to work activities with fall hazards, including below grade, at elevations of 6 feet (1.8 m) or more. These precautions are intended to prevent employees from falling off, onto, or through working levels and to protect employees from falling objects.

1.1 Scope and Application

The requirements of this SOP apply to all work activities performed by GHD employees at heights of 6 feet (1.8 m) or greater in locations without standard guardrails or otherwise not designed for continuous human occupancy. Such locations include, but are not limited to, meteorological station towers, stripping towers, excavations, holes or openings, elevated work over dangerous equipment, and rooftops with unprotected/leading edges.

1.2 References

- American National Standards Institute Z359.1.
- American National Standards Institute A10.14 (Canada).
- Occupational Safety and Health Administration 29 CFR 1926, Subpart M, Fall Protection. http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_M.html
- Occupational Safety and Health Administration 29 CFR 1910.21-6.30, Walking/Working Surfaces. http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_D.html
- Occupational Safety and Health Administration 29 CFR 1926, Subpart X, Ladders. http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_X.html
- Occupational Safety and Health Administration, OSHA Directives, CPL 2-1.23 - Inspection Procedures for Enforcing Subpart L, Scaffolds Used in Construction – 29 CFR 1926.450-454. http://www.osha-slc.gov/OshDoc/Directive_data/CPL_2-1_23.html
- OSHA Standards Interpretation and Compliance Letters, 09/28/1999 - Fall Protection, Lifejacket, and Lifesaving Requirements When Working Over or Near Water. http://www.osha-slc.gov/OshDoc/Interp_data/I19990928.html

2. Definitions

Anchorage point	A secure point of attachment for lifelines or lanyards, which is independent from any means of supporting or suspending a work platform and must be capable of supporting at least 5,000 pounds (22.2 kilonewtons [kN]) per person attached.

Fall Protection Systems	A fall protection system is an assembly of components and subsystems, including the necessary connectors, used to arrest the user in a fall from a working height and suspend the user until rescue can be initiated. Climbing protection systems are fall protection systems specially designed for climbing ladders and structures that are designed for climbing. They may be either temporary (portable) or permanent.
Competent person	OSHA regulations define a competent person in several ways, yet each definition has the same basic meaning. For this program, a competent person is a person who, because of training and experience, is capable of identifying hazardous or dangerous conditions, one who knows how to properly use the equipment and related components, and has the authority to implement corrective action(s).
Connector	A component used to couple parts of the system together. It may be an independent component of the system (e.g., carabineers), or an integral component of the system (e.g., buckle or D-ring sewn into body harness, a snaphook spliced or sewn to a lanyard or self-retracting lanyard).
Dangerous Equipment	Any equipment or machine with moving parts (e.g., a conveyor belt, vat or electrical equipment) that is energized or contains parts of a machine which move while the machine is working.
Full body harness	A design of straps secured about the employee in a manner to distribute the fall arrest forces over the thighs, pelvis, waist, chest and shoulders with a means for attaching it to other components of a personal fall arrest system. This attachment point on the body harness should be located in the center of the wearer's back, near shoulder level, or above the wearer's head. GHD requires the use of a full body harness (no body belts).
Guardrails	Barriers erected to prevent employees from falling to lower levels. Guardrails may be constructed with pipe, rails, wood, wire, rope, etc.
Hole	Means a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.
Lanyard	A flexible line of rope, wire rope, or strap, which is used to secure the body harness to a lifeline or anchorage.
Lifeline	A flexible line used for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to an anchorage at both ends to span horizontally (horizontal lifeline). The lifeline serves as a means for connecting other components of a personal fall arrest system to the anchorage. A vertical lifeline usually extends an anchorage point onto which a rope grab is attached.
Qualified Person	Means one who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Self-retracting Lanyard	A device that contains drum-wound line that may be slowly extracted from or retracted onto the drum under slight tension during normal movement of the user. The line has a means for attachment to the fall arrest attachment on the body harness. After onset of a fall, the device automatically locks the drum and arrests the fall.
Unprotected Sides and Edges	A walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level; and shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

3. Elements

3.1 Fall Hazard Control Measures

Activities conducted at elevated heights of 6 feet (1.8 m) or more, or falls that are likely to result in death or serious harm, must employ suitable fall hazard control measures.

Whenever possible, tasks should be planned so that elevated work will not occur. Fall prevention shall be used in place of personal fall arrest equipment when feasible (e.g., administrative controls). When this is not possible, fall hazards should be minimized by installing fixed platforms with railings, guarding of openings, controlling of access, or by working from equipment designed for the job (e.g. engineering controls). Care should be taken so that employees are not required to climb on or stand on piping or other unstable footing in order to accomplish assigned duties. Each jobsite analysis must include the intended work for the potential of falls and address appropriate fall protection measures.

Suitable fall hazard control measures will be taken to protect against the potential exposure of falling into floor openings, permanent or temporary, in elevated walking and working surfaces where a potential fall is likely to result in serious harm. Wall or floor openings from which a potential fall is likely to result in serious harm will be guarded with a barrier or other equally effective system. If guarding or barricading is not feasible, personal fall protection equipment shall be worn. Stairs having four or more risers will be equipped with stair railings or handrails.

To protect against the potential exposure to falling objects, walking, and working surfaces above a work area will be fitted with toe-boards, screens, nets, or a guardrail system. Additional protection can be obtained by installing a canopy or other protective structure over the work area. If falling objects are still a concern, the area will be barricaded, work stopped, or special work procedures implemented to prevent objects from falling from higher levels.

3.1.1 Additional Site Hazard Control Considerations

Prior to selecting a harness or other personal protective equipment, the user must make a workplace assessment of hazards and conditions where the equipment is required. Such assessments must, at a minimum, make an effort to identify the presence of objects and conditions that could damage the integrity of the equipment. A Preliminary Site Inspection Checklist and a Daily Inspection Checklist have been included as Attachment A and Attachment B, respectively. These checklists are to be used when conducting a workplace assessment of hazards and conditions. Users of the equipment should identify: hot objects, spark and heat-producing

operations, flames, chemicals, confined space hazards, electrical hazards, environmental contaminants, sharp objects, abrasive surfaces, moving equipment, moving materials, unguarded openings, climatic/weather factors, unstable/uneven surfaces, and slippery surfaces.

Barricades will be erected where necessary to prevent objects from falling, to keep employees from entering, and to keep objects that may fall, away from the edge of a higher level. Foreseeable changes in any of these conditions, individually or collectively, must be identified, evaluated, and controlled. These materials, the construction of harnesses and associated equipment must be considered in selection so workplace conditions are appropriately addressed. Equipment must match the work situation and workplace environmental factors.

The workplace/job site assessment must identify all paths of intended user movement and all hazards along such paths. The user must identify the required range of mobility in each hazard zone and note the location and distance to all obstructions in potential fall paths. Lateral obstructions that can be contacted by arresting a pendular fall must be noted. An assembly connecting the harness to an anchorage must be selected that will satisfactorily limit total distance and allow for dynamic elongation and activation distance of the assembly.

If a harness is to be used for confined space entry operations, the workplace/jobsite assessment must comply with the requirements of OSHA regulation 29 CFR 1910.146 and ANSI Z117.1.

3.1.2 Qualified Person

The fall protection plan shall be prepared by a qualified person for the specified work site and task.

3.1.3 Competent Person

A trained and authorized individual shall be designated as a competent person or proficient operator for all fall protection control measures.

3.1.4 Fall Arrest Systems

When fall hazards cannot be eliminated or prevented, personal fall arrest systems will be used. A personal fall arrest system is a system to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body harness, and may include a lanyard, lifeline, or suitable combinations of these. Personal fall arrest systems should serve as "backup" protection, acting only to arrest a fall when it occurs. No personal fall arrest system will be used without first analyzing the task to be performed, the need for mobility in performing the task, and personnel recovery after fall arrest. Additional information regarding fall arrest components can be found in Attachment C - Project Manager/Site Safety Personnel Additional Information.

3.1.5 Positioning Device Systems

Positioning device systems (not for use as part of a personal fall arrest system) and their use shall conform to the following provisions:

1. Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet.
2. Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration and defective components shall be removed from service.
3. The use of non-locking snap hooks shall be prohibited after January 1, 1998.

4. Anchorage points for positioning device systems shall be capable of supporting two times the intended load or 3,000 pounds, whichever is greater.

3.1.6 Fall Arrest Components

All personal fall arrest systems, subsystems, and components, will conform to American National Standards Institute (ANSI) Standard Z359.1 and must be bear a tag stating conformance. Fall protection systems will not be used for purposes nor undergo stresses beyond the manufacturer's specified limitations. Examples of these limitations include: personnel whose weight exceeds the component design limitations, conditions that will alter the integrity of the system, such as chemicals, heat, corrosion, abrasion, normal wear, and subject to an impact force from arresting a fall. Components subject to such conditions should be clearly marked and tagged "UNUSABLE" until they are inspected, destroyed, or repaired. Personal fall arrest components will be rigged so employees can neither freefall more than 6 feet (or 5 feet 1.5 m in Canada), nor contact any lower level.

All anchorage points will be designed to support 5,000 pounds for each personal fall arrest system attached. The anchorage should be located (e.g., located above the employee's head) so as to eliminate the hazards of pendulum type swing falls, and whenever possible, be located above shoulder height.

All lanyards will be equipped with an energy (shock) absorber and a self-closing, self-locking snap hook on each end. The shock absorber and attached devices will be selected to limit the maximum arresting force to 1,800 pounds (8 Kn). Lanyards, connectors, and energy (shock) absorber should be kept free of knots. Unless so designed and permitted by the manufacturer, a lanyard should never be wrapped around a structural member and hooked back onto itself as a means of tying off. In some situations, it is necessary to use a tie-off adapter to connect the lanyard to an anchorage. To facilitate fall protection while moving or re-rigging, two lanyards (Y-type) connected to a single shock absorber should be used so that one lanyard is continuously connected to an anchorage or lifeline.

No more than one personal fall arrest system may be attached to a single vertical lifeline.

Persons wearing fall personal fall arrest systems shall **not** be permitted to work alone and shall utilize 100 percent tie-off.

No horizontal lifeline will be rigged without consideration to proper engineering design and an evaluation of the hazards encountered when a fall is arrested. The end anchorages of horizontal lifelines should have the same elevation and should be positioned above the waist (preferably above shoulder level) of an average size user. All lifelines should be protected from abrasion that may occur from suspension over or along a structural member.

Lanyards or shock-absorbing devices will **not** be connected to self-retracting lanyards.

The use of body belts for personal fall arrest purposes is prohibited. A full-body harness shall be used in all instances in which personal fall arrest is required.

3.2 Guardrails, Covers, and Warning Line Systems

3.2.1 Guardrails

Guardrails will be capable of withstanding, without failure, a force of at least 200 pounds applied at any point, in any outward or downward direction. Guardrails must have a top edge member of 39 to 45 inches high above the walking/working level and an intermediate rail approximately half way between the top rail and the floor. Guardrails will be secured when installed to prevent accidental displacement by wind, equipment, or employees, etc.

Examples of guardrail systems are:

- **Pipe railings**—Assumed to meet the requirements if posts, top rails, and intermediate rails are at least 1 1/2-inch nominal diameter (i.e., Schedule 40 pipe or equivalent degree of strength) with posts no more than 8 feet apart on center.
- **Structural steel railings**—Assumed to meet the requirements if posts, top rails, and intermediate rails are at least 2-inch x 2-inch x 3/8-inch angles or equivalent degree of strength, with posts no more than 8 feet apart on center.

Where there is a danger, due to falling materials, to personnel working below the floor or wall opening, control measures, such as adding toe plates to the guardrail system or creating a barricaded area on the lower level that prohibits employees from entering the area to which objects could fall, is required.

3.2.2 Covers

Covers for floor openings or holes will be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed; and secured when installed to prevent accidental displacement by wind, equipment, or employees, etc.

3.2.3 Warning Line Systems

When fall hazards including floor or wall openings are not eliminated or prevented, Controlled Access Zones and Safety Monitoring Systems will be implemented to include employees being protected with personal fall arrest systems. A warning line system will be erected to warn employees of the unprotected floor or wall opening. A warning line system will consist of a rope, wire, chain, or plastic/vinyl tape or fencing, erected around all sides of the floor or wall opening, not less than 10 feet from the outer perimeter of the opening. If the warning line system consists of rope, wire, or chain, the system will be flagged with high visibility material at not more than 6-foot intervals. Signs will be posted to warn unauthorized employees to stay out of the controlled access zone. Employees entering the area between the opening and the warning line will be protected by personal fall arrest systems. A competent person will be designated to monitor the safety of other employees.

3.3 Scaffolding

Use of scaffolding should be consistent with the following guidelines:

- Scaffolding must be designed by a qualified person. Furthermore, scaffold tie-ins, as with all other scaffold component designs, must be designed by a qualified person to keep the scaffold steady and capable of resisting pushing and pulling forces created by wind and load conditions.

- The design load of all scaffolds shall be calculated on the basis of:
  - Light--Designed and constructed to carry a working load of 25 pounds per square foot.
  - Medium--Designed and constructed to carry a working load of 50 pounds per square foot.
  - Heavy--Designed and constructed to carry a working load of 75 pounds per square foot.
- The maximum work level height shall not exceed 3 times the least base dimension below the platform. Where the basic mobile unit does not meet this requirement, outrigger frames shall be employed to achieve this least base dimension, or provisions shall be made to guy or brace the unit against tipping.
- No one will erect, move, dismantle, or alter scaffolding, except under the supervision of a competent person. A competent person may recommend changes or alterations of the scaffolding that are as stringent as or even stricter than regulations to protect employees.
  - Where leveling of the elevated work platform is required, screw jacks or other similar means for adjusting the height shall be provided in the base section of each mobile unit.
  - The screw jack shall extend into its leg tube at least 1/3 its length, but in no case shall the exposed portion of the screw jack exceed 12 inches.
- Warning signs and/or barriers are required for: incomplete scaffolds; erecting, modifying or dismantling a scaffold; and scaffolding exposed to traffic.
- Competent person must ensure scaffolds are safe prior to and during use.
- Unsafe equipment or conditions must be tagged out by the competent person, and must not be used by anyone until corrected. Not complying with this requirement will lead to disciplinary actions.
- Scaffolds will not be altered or moved horizontally while they are in use or occupied.
- All scaffold wheels, casters and swivels shall be provided with a positive locking device, or other effective means to prevent movement of the scaffold
- Scaffolds will not be loaded in excess of the working load they are designed to hold.
- Footing or anchorage for scaffolds will be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.
- Scaffolds and their components are to be maintained in a safe condition. Any broken, bent, excessively rusted, altered, or otherwise structurally damaged frames or accessories will be taken out of service.
- Scaffolds and their components will be inspected before each work shift and after any occurrence that could affect a scaffolds structural integrity (e.g., modification, overloading, damage and extreme weather conditions).
- A clearly defined tag or inspection shall be affixed to the scaffold and updated daily or prior to each shift by the competent person.
  - Only green scaffold tags shall be used.
  - Scaffold tags can be obtained from any safety supply company, such as Dival Safety.
- Scaffolds shall be inspected at other specified frequencies per Client and/or Host Facility OpCo/BU/facility requirement.

- Scaffolds should be tied to or securely braced against the structure horizontally and/or vertically as required for support.
- Scaffolds will be constructed to support at least four times the maximum intended loads.
  - Wheels or casters shall be properly designed for strength and dimensions to support 4 times the design working load.
- Scaffold platforms should be equipped with standard guardrails and mid-rails, be completely decked with safety planks or scaffold decking, and have rigidly secured toe-boards on sides and ends as determined by the scaffolding competent person.
  - All scaffold work levels 6 feet or higher above the ground or floor shall have a toe board at locations where persons are required to work or pass under the scaffold.
  - Guardrail protection shall be required on all scaffold work levels 30 inches or higher above the ground or floor.
- Tools and materials on scaffold platforms must be placed in such a manner that they will not create a tripping hazard or become dislodged and fall.
- Tools, materials, and debris should not be allowed to accumulate in quantities to cause a hazard.
- Slippery conditions on scaffolds should be eliminated as soon as possible after they occur.
- Work on scaffolds will be suspended during storms or high winds:
  - High winds are any wind conditions that adversely affect the stability of the scaffold or the safety of the employees. The competent person, after analysis of all pertinent information, will ensure that the scaffold is safe under high wind conditions that protective measures have been instituted, and that work may safely be done from the scaffold.
- Windscreens (plastic coverings) should be inspected to ensure the system can accommodate the anticipated wind loads and prevent the scaffold from tipping over. In some cases, a structural engineer may need to be consulted to determine wind loads and their effect on the scaffolding.
- A ladder or stairway must be used for proper access to a scaffold platform.
- Personal fall arrest systems are required when erecting, dismantling, or working on scaffolding, unless the employee is sufficiently guarded from falling by other fall control measures.
- Training related to scaffold use shall include all relative information of this section including the hazards of fall protection, electrical safety, falling object protection, scaffold use and load capacity.

3.3.1 Inspections

Scaffolds shall be inspected following the initial erection and weekly thereafter by the competent person using the Scaffold Inspection Checklist found in Attachment G

Scaffolds and scaffold components shall be inspected by the competent person using a green scaffold tag as described in Section 3.3 for visible defects before each work shift and after any occurrence which could affect the structural integrity and to authorize prompt corrective actions per 29 CFR.1926.451(f)(3).

3.4 Ladders

3.4.1 Climbing Ladders

Climbing ladders will be done with the free use of both hands and feet, to allow three points of control at all times. The body will be facing the ladder and centered between the ladder's side rails when climbing.

Materials or tools will **not** be carried in the hands while ascending or descending ladders.

Climbing must be carefully evaluated when fixed ladders are not equipped with cages or ladder safety devices. If the ladder is not routinely used, the method of alternately connecting one of two lanyards to individual ladder rungs is acceptable. This method may provide adequate protection where the ladder support and rungs are capable of supporting twice the anticipated arrest forces. If this method is used, lanyards must be kept as short as possible, and rigged to limit freefall distance to 2 feet or less.

The lanyard length should be less than 3 feet, limiting the freefall distance to less than 6 feet (or 1.5 m in Canada), when climbing with a ladder safety device (i.e., a vertical rail system or vertical lifeline system) where the fall arrester is pulled upward by the lanyard.

Caged ladders may be ascended or descended without fall protection.

3.4.2 Fixed Ladders

A fixed ladder is a ladder permanently attached to a structure, building, or equipment. Fixed ladders will **not** be loaded beyond the maximum intended load for which they were built or beyond their manufacturer's rated load capacity.

All permanent or temporary fixed ladders placed for repeated access and egress to elevations exceeding 20 feet will be equipped with cages or ladder safety devices.

3.4.3 Portable Ladders

Use of portable ladders will be limited to tasks requiring access to an elevated task that is performed infrequently, or when the pre-job safety analysis indicates that redesigning the job or providing work platforms is not feasible.

Portable ladders will **not** be loaded beyond the maximum intended load for which they were built or beyond their manufacturer's rated load capacity.

Ladders shall be used only for the purpose for which they were designed.

Portable ladder use will be in accordance with the rules below:

- Ladders will be maintained free of oil, grease, and other slipping hazards.
- Ladders will be maintained in good usable condition.
- Ladders will be inspected before climbing or after the ladder is involved in a tip over. Defects shall be marked or tagged and the ladder taken out of service until repairs can be made.
- The ladder base will be placed with a secure footing to prevent slipping, or it will be lashed, or held in position.

- Non-self-supporting ladders will be placed at an angle such that the base is located a distance from the vertical wall equal to one-fourth the working length of the ladder (i.e., the base of a 12-foot ladder should be placed 3 feet from the structure needing to be climbed).
- When portable ladders are used to access an upper landing surface, the ladder side rails must extend at least 3 feet above the upper landing surface.
- The top of the ladder will be placed with the two rails supported, unless equipped with a single support attachment, and secured (tied off) as close to the top as possible.

3.4.4 Stepladders

Stepladder use will be in accordance with the rules below.

- The maximum length of a ladder measured along its side rail shall not be more than 6 meters
- When a stepladder is being used as a self-supporting unit, its legs shall be fully spread and its spreader shall be locked
- No worker shall stand on the top of or the pail shelf of a stepladder

3.5 Personnel Platforms

3.5.1 General

A personnel platform refers to any powered platform, manlift, vehicle-mounted platform, and aerial lift or man basket used by employees during work on site. A personnel platform must be capable of supporting its own weight and at least five times the maximum intended load.

A proficient operator will be identified and documented in the site safety plan or in the site project notebook by the supervisor or on-site manager prior to operation of the equipment.

3.5.2 Crane Suspended Work Platforms or Baskets

Crane or derrick suspended work platforms or baskets should only be used when conventional means (e.g., ladders, scaffolds) for reaching the work area would be more dangerous or is not possible due to structural considerations.

General items to be aware of or follow when using crane suspended work platforms or baskets are listed below:

- Hoisting of basket will be slow, controlled, and in a cautious manner, with no sudden movements.
- Load lines will be capable of supporting seven times the maximum intended load.
- Load and boom hoist brakes, swing brakes, and locking devices will be engaged when the occupied basket is in a stationary position.
- Cranes will be level with outriggers, fully deployed, and following the manufacturer's specifications.
- A positive acting device will be used to prevent contact between the load block and boom tip, or a system that deactivates the hoisting action should be engaged before damage occurs.

- The load line hoist drum must have a system or device on the power train, other than the load hoist brake, that regulates the lowering rate of speed of the hoist mechanism.
- Free fall will be prohibited.
- Trial lifts should be performed with an unoccupied basket prior to the manned lift.

Work platforms or baskets will be OSHA-approved or designed by a qualified engineer and be capable of holding five times the maximum intended load. The suspension system will be designed to minimize tipping of the platform due to movement of employees. The platform will have guard rails, grab rails, employee headroom, and a posted load rating plate. Access gates when installed must swing outward.

3.5.3 Work Practices

Safe work practices for working from baskets or personal platforms include:

- Employees must keep all body parts inside the platform during raising, lowering, or positioning.
- Employees being hoisted should remain in sight of and in direct communications with the operator or signal person.
- Tag lines should be used unless they create an unsafe condition.
- The crane or derrick operator must remain at the controls while the engine is running and the platform is manned.
- Work will be discontinued upon indications of dangerous weather conditions or other impending danger.
- Fall protection, including a full body harness with lanyard attached to an approved anchorage, will be used while in the basket or on the platform.

3.5.4 Aerial Lifts

An aerial device or Mobile Elevated Work Platform (MEWP) is any vehicle-mounted device, telescoping, or articulating, which is used to position personnel. Aerial lifts include the following: extendible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and a combination of the above.

The following will be considered when using aerial lifts:

- Lift controls will be tested each day prior to use to verify they are in a safe working condition.
- Only proficient operators will operate an aerial lift.
- Personal fall protection (e.g., harness and lanyard) will be worn and attached to an appropriate anchorage while in the aerial lift basket.
- Employees must always stand firmly on the floor of the basket.
- Boom and load limits specified by the manufacturer will not be exceeded.
- Vehicle brakes, outriggers, and wheel chocks should be used when required and/or available.
- The aerial lift truck will not be moved when the boom is elevated with people in the basket unless the aerial lift is designed to do so (i.e., controls to move truck are located in and may be

operated while in the basket). In these cases, the movement of the lift truck will be for work positioning only and not for movement from one work location to another.

3.5.5 Descent Control Equipment

Descent control equipment (e.g., sky genies, boatswain's chairs) will be used in accordance with the instructions, warnings, and design limitations set by the manufacturers or distributors and with the following procedures and precautions:

- Employees will be trained in the use of the equipment.
- Equipment will be inspected each day before use.
- Emergency rescue will be planned to assure that employees can be promptly rescued or can rescue themselves should a fall occur.
- Employees must utilize proper rigging and anchorage. All lines, knots, splices will be capable of sustaining a minimum tensile load of 5,000 pounds, and ropes are padded where they contact edges or surfaces that might cut or weaken the rope.
- Employees must utilize a separate fall arrest system. Harness, lanyard, anchorage, etc., must be independent of the descent control equipment, so that any failure in a descent control device will not affect the ability of the fall arrest system to operate and stop the employee's fall.

3.5.6 Proficient Operator

A proficient operator is specifically required in the powered platform, manlifts, and vehicle-mounted platform standard of OSHA. This standard states, "Working platforms will be operated only by persons who are proficient in the operation, safe use, and inspection of the particular working platform to be operated." This means that trained and knowledgeable individuals will be selected to operate work platforms.

To become a proficient operator for a powered platform, manlift, MEWP or vehicle-mounted platform, the individual must understand the following concepts:

- Operating parameters of the device
- Weight limitations
- Maximum boom length in the fully extended position
- Maximum slope allowed for safe operation
- Safe operating distances from overhead obstructions, including electrical lines
- Operation of the outriggers and their load limits

3.6 Safety Net Systems

When the elevation is 25 feet or more above the ground, water surface, or continuous floor level below, **and** when the use of personal fall arrest systems, personal fall restraint systems, positioning devices systems or more conventional types of protection are clearly impractical, the exterior and/or interior perimeter of the structure shall be provided with an approved safety net.

Safety nets will be installed, used and inspected by a competent person in accordance with 29 CFR 1926.502(C). Basic requirements are as follows:

- A thorough review of 29 CFR 1926.502 paragraphs (C)(1) through (C)(9) is required prior to installation, use and inspection by all affected parties
- Must extend at least 8 feet horizontally from such perimeter and being positioned at a distance not to exceed 10 feet vertically below where such hazards exist
- Vertical distance up to 5 feet requires 8 feet of horizontal distance
- From 5 to 10 feet of vertical distance requires 10 feet of horizontal distance
- Over 10 feet but not to exceed 30 feet of vertical distance requires 13 feet of horizontal distance

3.7 Inspections

Personal fall arrest systems and equipment will be visually inspected by the user before each use for signs of mildew, wear, damage, or other deterioration, and defective components. Additional inspection of equipment (e.g., self-retracting lanyards) may be required by the manufacturer at suggested intervals. Any component of a personal fall arrest system that may be adversely affected in strength or function must be tagged "UNUSABLE" and removed from service.

Any personal fall protection component(s) will be tagged "UNUSABLE" and removed from service after being subjected to impact loading, and will **not** be used again until inspected by a competent person and determined to be undamaged and suitable for reuse. A formal checklist has been included as Attachment D - Equipment Manager Formal Inspection Checklist. This checklist is to be used by those managing the construction site/facility fall protection components and/or systems to ensure that the necessary inspections are conducted. Attachment E - Formal Inspection Log will be used to document the results of all inspections.

Powered platforms, manlifts, or vehicle-mounted platforms and their components will be inspected for visible defects before every use and after any occurrence that could affect the platform's structural integrity. A maintenance inspection or test will be conducted following the procedures established by the manufacturer of the equipment. Inspections will be conducted and documented by the use of a Manlift Daily Equipment Checklist which is provided as Attachment F.

Rental equipment (platforms and manlifts) will undergo a visual inspection at time of delivery, before each use, and after any occurrence which will affect structural integrity. An example of a manlift checklist is provided as Attachment F. Maintenance inspections will be conducted on rental equipment or requested of equipment owner if the equipment is kept on site for extended use.

3.8 Emergency Rescue Plans

When personal fall arrest systems are used, emergency rescue will be planned to assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment must be evaluated.

Each job safety analysis will cover specific rescue plans (i.e., self-rescue, use of rescue personnel, rescue equipment, etc.). This information will be presented during the pre-job or tailgate safety meeting.

Contractors may provide their own rescue services when hired to perform elevated work. The pre-job safety meeting is the appropriate location to share the contractors' rescue plans.

When project conditions and/or government regulations require the use of third-party rescue services, it will be the responsibility of the GHD Project Manager in coordination with the GHD HSE Team to determine if the selected rescue service will meet the project's rescue needs and requirements as well as applicable regulations.

4. Responsibilities

4.1 Project Manager

It is the project manager's responsibility to ensure that the fall protection requirements of this SOP are adhered to for each of the projects under their direction and control.

The project manager is responsible to coordinate an investigation and root cause analysis in the event of a fall, near loss or other serious incident as covered by the GHD SMART program. The root cause analysis shall evaluate the fall protection plan for potential updates to practices, procedures or training in order to prevent reoccurrence.

4.2 Site Supervisor

It is the responsibility of the site supervisor to ensure implementation of this SOP which includes the following components:

- Appropriate fall protection equipment is available for use.
- Fall protection equipment has been inspected prior to use.
- Provide and/or ensure that all personnel have received the required training in the use and the need for fall protection devices (proper fit, proper use, and proper inspection procedures)
- A pre-job safety meeting is conducted at the start of the project.

4.3 Employees

Employees are required to adhere to the requirements of this SOP as applicable to their specific project duties.

5. Training

All personnel performing work must receive training in the relative aspects of this SOP. The effectiveness of the training will be verified by successful completion of the subject matter quiz.

5.1 Training Provider

Personnel providing this training shall have a thorough knowledge of the relevant SOPs, regulations and the Standard, be proficient in fall hazard control measures, understand the specific application of the Standard to the training audience, and be an effective communicator.

5.2 Training Frequency

Training will be provided prior to initial assignment to any task with potential fall hazards.

Refresher training will be provided on an initial basis, or more frequently, when the following situations occur:

- Changes in the workplace or the type of operations render previous training obsolete.
- Inadequacies in the employee's knowledge or adherence to procedures indicate that the employee has not retained the requisite understanding or skill.
- Regulatory requirements have changed.

Attachment A **Preliminary Site Inspection Checklist**

Site:		Project No.:	
Inspected by:		Date:	

Elevated Work Activity – Construction Sites (Check Appropriate Box)

Yes/True	No/False[1]	Condition
☐	☐	No work will be performed greater than 6 ft. or a freefall of 1.5 m (Canada) above an adjacent surface. If "True", no fall protection is required.
☐	☐	Elevated work will be relocated and performed on the ground. If "True", no fall protection is required.
☐	☐	There will be no required climbing or standing on unstable footing.
☐	☐	The potential for falling in trenches, through floor openings (permanent or temporary) and skylights in elevated walking/working surfaces have been evaluated and abated
☐	☐	Wall openings from which a fall can result in serious harm are guarded with a barrier or other effective system.
☐	☐	Stairs having four or more risers are equipped with stair railings or handrails.
☐	☐	All open-sided floors or platforms four or more feet above the ground have standard railings, except where there is an entrance.
☐	☐	Potential exposure to falling objects, walking/working surfaces above work areas are fitted with toe-boards, screens, nets, or guardrail systems. See SOP for additional protection options.

[1] If any answer is "No/False", action is required.

Section 2: Safety Checklist: Additional Site Hazard Control Considerations (Check Appropriate Box)

Identification of Objects/Conditions Potentially Damaging to Fall Protection Equipment					
Yes[2]	No	Condition	Yes	No	Condition
☐	☐	Hot objects?			Heat-producing operations/
☐	☐	Spark-producing operations?			Flames?
☐	☐	Chemicals?			Confined Space Hazards?
☐	☐	Electrical hazards?			Environmental Contaminants?
☐	☐	Sharp objects?			Abrasive surfaces?
☐	☐	Unguarded Openings?			Unstable/Uneven surfaces?
☐	☐	Climatic/Weather factors?			Slippery?
☐	☐	Moving equipment through the area where a falling person or objects create a hazard?			
☐	☐	Materials are moving through the area where persons/objects might fall			

[2] If any answer is "Yes", action is required.

Attachment B **Daily Inspection Checklist**

Site:		Project No.:	
Inspected by:		Date:	

Section 1: Daily Construction Site Safety Checklist (Check Appropriate Box)

Yes/True	No/False[1]	Condition
☐	☐	Employees have been informed of the nature of any new fall hazards in the work area.
☐	☐	No new work is planned or will be performed greater than 6 ft. (5 ft. Canada) above any adjacent surface, including equipment.
☐	☐	Elevated work will be relocated and performed on the ground.
☐	☐	Climbing or standing on unstable footing has been eliminated.
☐	☐	The potential for falling in trenches, through floor openings (permanent or temporary) and skylights in elevated walking/working surfaces have been eliminated.
☐	☐	Wall openings are guarded with a barrier or other effective systems.
☐	☐	Stairs having four or more risers are equipped with stair railings or handrails.
☐	☐	All open-sided floors or platforms four or more feet above the ground have standard railings, except where there is an entrance.
☐	☐	Potential exposure to falling objects, walking/working surfaces above a work area are fitted with toe-boards, screens, nets, or guardrail systems. See SOP for additional protection options.

[1] If any answer is "No/False", action is required.

Section 2: Daily Safety Checklist (Check Appropriate Box)

Additional Site Hazard Control Considerations					
Yes[2]	No	Condition	Yes	No	Condition
☐	☐	Hot objects?			Heat-producing operations/
☐	☐	Spark-producing operations?			Flames?
☐	☐	Chemicals?			Confined Space Hazards?
☐	☐	Electrical hazards?			Environmental Contaminants?
☐	☐	Sharp objects?			Abrasive surfaces?
☐	☐	Unguarded Openings?			Unstable/Uneven surfaces?
☐	☐	Climatic/Weather factors?			Slippery?
☐	☐	Moving equipment through the area where a falling person or objects create a hazard?			
☐	☐	Materials are moving through the area where persons/objects might fall			

[2] If any answer is "Yes", action is required

Attachment C Project Manager/Site Safety Personnel Additional Information

All harness and fall protection equipment will be inspected prior to use. All persons using the equipment will be trained and competent in the equipment's use. Personnel trained with the equipment should be able to produce a training certificate.

Each piece of GHD equipment should have a unique serial number, should be cataloged, and permanent maintenance records kept by the supplying site equipment manager.

The site HSE officer will be trained specifically on fall protection device use and inspections before jobsite employees are allowed to utilize fall protection equipment.

Stress to the equipment, such as a fall, abrasion, exposure to chemicals, heat, or broken threads will be reported immediately to the jobsite HSE officer. The site HSE officer or the site supervisor will evaluate the equipment and determine if it should be taken out of service. Any device taken out of service will be tagged or otherwise labeled "UNUSABLE." Unquestionably unusable devices will be either physically destroyed/permanently rendered unusable by any means at the site by the site HSE officer or returned promptly to the factory for repairs. No unusable equipment is to leave the jobsite except to be returned to the supplying site's facility equipment manager, directly to the manufacturer, or mutilated and discarded in such a way as to not allow site personnel to remove it for future use as fall protection. Information regarding such equipment that is either unusable, questionably usable, destroyed, or returned to the manufacturer should be documented and a copy of the documentation sent to the supplying site's facility equipment manager. Document date, time, and reason for removal from service. The facility equipment manager will document the information in the equipment inspection log.

Attachment D **Equipment Manager – Formal Inspection Checklist**

All fall protection equipment will be inspected prior to use. All persons using the equipment will be trained and competent in the equipment's use.

Harness Inspection Procedure

1) All harnesses are to be inspected the greater of intervals specified by the manufacturer or every 6 months. If a greater time has elapsed, this procedure will suffice as a "formal inspection".

2) Inspect labels to verify they are present and legible. Check manufacturer's guide for the placement of the labels on the specific harness and for the labels that should be present and the information contained on them. The "inspection grid" showing when the harness was last formally inspected should be part of this label pack. If the label pack or any of its components are missing, the harness is "UNUSABLE" and will be tagged as such.

3) Inspect all webbing (straps) and stitching for cuts, fraying, pulled or broken threads, abrasion, excessive wear, altered or missing straps, burns, and heat and chemical exposures.

4) Inspect all metallic parts (i.e., back D-ring, oval rings, buckles, adjusters, and grommets) for deformation, fractures, cracks, corrosion, deep pitting, burrs, sharp edges, cuts, deep nicks, missing or loose parts, improper function, and evidence of excessive heat or chemical exposures.

5) Inspect all plastic parts (i.e., back D-ring locator, strap collars, labels, tool belt support clips) for cut, broken, excessively work, missing, and loose parts. (Labels are to be additionally checked in accordance with Step 2 above.) Inspect for evidence of burns and excessive heat or chemical exposures.

6) Inspect each component and subsystem of the complete system in accordance with the associated manufacturer's instructions.

Lanyard Inspection Procedure

1) All lanyards are to be inspected the greater of intervals specified by the manufacturer or every 6 months. If a greater time has elapsed, this procedure will suffice as a "formal inspection".

2) Inspect labels to verify they are present and legible. Check manufacturer's guide for the labels that should be present and the information contained on them. The "inspection grid" showing when the harness was last formally inspected should be part of this label pack. If the label pack or any of its components are missing, the harness is "UNUSABLE" and will be tagged as such.

3) Inspect deceleration device to ensure it is intact. If supplied with a cover, verify that both ends are sealed and all tapes and stitching are intact.

4) Inspect all webbing (straps) and stitching for cuts, fraying, pulled or broken threads, abrasion, excessive wear, altered or missing straps, burns, and heat and chemical exposures.

5) Inspect all fiber ropes for cuts, bulled or broken fibers, abrasion, excessive wear or aging, excessive elongation, reduction of rope diameter, altered or missing rope segments, hockling (unlaying and kinking of strands), burns, and damage from heat or chemicals. Inspect knot, loosening or unbraiding of splices, excessive fuzziness of fibers, and for very soft condition that easily allows the rope to unlay (unwind).

6) Inspect all metallic parts for defects, damage, alteration, and missing parts: a) For snaphooks, carabineers, adjusters, and swaged fittings and metal thimbles on wire rope, inspect for deformation, fractures, cracks, corrosion deep pitting, burrs, sharp edges, cuts, deep nicks, loose parts, and evidence of excessive heat or chemical exposures Inspect snaphook and carabineer function by cycling their functions. Gates must automatically close and snugly seat against the nose. The locking mechanism must retain the gate tip within 1/8 inch of the nose when finger pressure is firmly applied to the gate in any direction. Inspect for weak springs, loose rivets and binding of the gate or lock b) For wire rope, inspect for broken wires, kinks, unlaying of strands, corrosion, diameter changes, loosening of thimbles or swaged fittings, and evidence of damage from heat or chemical attack.

7) Inspect all plastic parts (i.e., rope thimbles, labels, and vinyl cover of the wire rope) for cuts, broken parts, alteration, excessive wear, missing, and loose parts.

Other Devices

See manufacturer's instructions.

Corrective Action

When inspection in accordance with the procedure above indicates signs of inadequate maintenance, the fall protection device must be immediately removed from service and marked as "UNUSABLE" until destroyed or subjected to maintenance by GHD or an authorized GHD representative in accordance with this SOP. Defects, damage, excessive wear, and/or aging are not considered repairable. If detected, immediately remove the harness form use and mark it as "UNUSABLE", until destroyed. For final disposition, submit the harness to a competent person who is authorized to perform this procedure. If there is any question as to reparability, contact the manufacturer in writing before further use of the fall protection device.

Recordkeeping

Each fall protection device/piece of equipment has a unique serial number, will be cataloged and permanent maintenance records kept by the supplying site equipment manager. After a formal inspection, the inspection performance will be recorded in a "Formal Inspection Log" and retained for reference (example in Attachment E). See manufacturer Instruction booklet for more detailed inspection forms. Some manufacturers will supply blank forms upon request.) If a fall protection device passes formal inspection, the inspector should punch the date (month/year) of the inspection on the grid supplied in the label packet. Users should never punch this grid, but it should be checked before use to ensure the device has been inspected within the manufacturer's specified time limits or within the last 6 months.

Attachment E **Formal Inspection Log**

Harness

Harness No:		Site:	
Model No:		Inspected by:	
Mfg Date:		Inspection Date	
Disposition (Circle): PASS / FAIL			

Description	Component condition	Comments
Fabric Parts		
Webbing (Straps)		
Shoulder		
Shoulder strap retainer		
Shoulder ring strap		
Thigh		
Sub-pelvic		
Tool belt support		
Stitching		
Shoulder ring strap		
Shoulder strap tip		
Shoulder strap retainer		
Shoulder strap reinforce		
Buckle strap		
Thigh strap		
Thigh strap edges		
Sub-pelvic strap		
Metallic Parts		
D-Rings/Other Rings		
Back		
Hip		
Chest		
Shoulder		
Buckles/Adjusters/ Grommets		
Adjuster, torso sizing		
Buckle tongue		
Buckle		

Description	Component condition	Comments
Grommets, thigh strap		
Plastic Parts		
Back D-ring locator		
Strap collar		
Labels		
Tool belt support clips		

Lanyard

Lanyard No:		Site:	
Model No:		Inspected by:	
Mfg Date:		Inspection Date	
Disposition (Circle): PASS / FAIL			

Description	Component condition	Comments
Fabric Parts		
Webbing (Straps)		
Lanyard leg (single)		
Lanyard legs (double)		
Sewn 9" Loop		
Stitching		
Lanyard leg (single, fxd)		
Lanyard leg (single, adj)		
Lanyard legs (twin)		
9" loop		
9" loop` joint		
Break or Deceleration Device		
Webbing, loop (single)		
Webbing, loop (twin)		
Stitching, strap loops		
Stitching, cover		
Binding Tape		
Cover		
Fiber Rope		
Lanyard leg		
Splices		

Description	Component condition	Comments
Metallic Parts		
Lanyard leg (wire rope)		
Snaphooks, single		
Snaphooks, double		
Large-throat opening snaphook (twin)		
Large-throat opening snaphook		
Adjuster (single)		
Adjuster (twin)		
Swaged fitting		
Thimble		
Hog ring		
Plastic Parts		
Labels		
Thimble		
Vinyl coating, wire rope		
Vinyl coating, 9" loop		

Attachment F **Manlift Daily Equipment Checklist**

Equipment/Vehicle #		Week Beginning:	

1) Check that all functions of the equipment are operating properly. (Forward, Reverse, Up, Down, Horn, etc.)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Note any problems found during check below:

2) Check all hardware for looseness (Hose reels, guard rails, doors, covers, etc.)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Note any problems found during check below:

3) Check for hydraulic line leaks, worn hoses or lines, crimped lines or lines in danger of being damaged.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Note any problems found during check below:

4) Check battery water level, gauge, leads and charger connector.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Note any problems found during check below:

Attachment G **Scaffold Inspection Checklist**

(Competent Person to complete upon initial scaffold erection and weekly thereafter)

Date Observed:		Inspected By:	
Scaffold Location			

Any item marked NO must be addressed prior to scaffold usage

1926.451 General Requirements		Yes	No	N/A
1	Is the Scaffold being erected under the direction of a competent person	☐	☐	☐
2	Are all employees involved with (or near) the scaffold wearing hard hats	☐	☐	☐
3	Are footings sound and rigid-not set on soft ground, frozen ground (that could melt), or resting on blocks	☐	☐	☐
4	Is the Scaffold level	☐	☐	☐
5	Are wheels/ castors locked	☐	☐	☐
6	Is the scaffold able to hold four times its maximum intended load	☐	☐	☐
7	Is the platform complete front to back and side to side (fully planked or decked, with no gaps greater than 1 inch)	☐	☐	☐
8	Are guardrails and toe boards in place on all open sides	☐	☐	☐
9	Are all sections pinned or appropriately secured	☐	☐	☐
10	Is there a safe way to get on and off the scaffold, such as a ladder (without climbing on cross braces)	☐	☐	☐
11	Is the front face within 14 inches of the work (or within 3 feet for outrigger scaffolds)	☐	☐	☐
12	Does the scaffold meet electrical safety clearance distances	☐	☐	☐
13	Has the scaffold been constructed to maintain a safety factor of 4 to 1 base	☐	☐	☐
14	Are all platforms at least 18 inches wide	☐	☐	☐
15	Are platforms that are less than 18 inches protected by guardrail systems or will all employees have personal fall arrest systems	☐	☐	☐
16	Is the scaffold inspected by a competent person before being put into use	☐	☐	☐
17	If the scaffold is over 10 feet high, is personal fall protection provided, or are guardrails over 38 inches high	☐	☐	☐
18	Are hardhats worn by workers on and around the scaffold	☐	☐	☐
19	Are scaffold loads (including tools and other equipment) kept to a minimum and removed when the scaffold is not in use (like at the end of the day)	☐	☐	☐

1926.451 General Requirements		Yes	No	N/A
20	Are employees removed from scaffolds during high winds, rain, snow, or bad weather	☐	☐	☐
21	Are materials secured before moving a scaffold	☐	☐	☐
22	Are employees removed from scaffolds before they are moved	☐	☐	☐
23	Are heavy tools, equipment, and supplies hoisted up (rather than carried up by hand)	☐	☐	☐
24	Has the first vertical tie been installed at a height less than 4 times the minimum base dimension	☐	☐	☐
25	Have vertical ties been repeated every 20 feet or less for scaffolds that are 3 feet or less in width	☐	☐	☐
26	Have vertical ties been repeated every 26 feet or less for scaffolds wider than 3 feet	☐	☐	☐
27	Are ties installed at each end of the scaffold and at horizontal distances not to exceed 30 feet	☐	☐	☐
28	Where eccentric loads are imposed have ties been installed to counteract these loads	☐	☐	☐
29	Are scaffolds erected on adequate firm footings	☐	☐	☐
30	Are footings capable of supporting 4 times the intended load without setting	☐	☐	☐
31	Is the use of unstable objects prohibited for footings	☐	☐	☐
32	Is scaffold plumb and braced to prevent swaying or displacement	☐	☐	☐
33	Was the frame designed and built to be used as an access ladder	☐	☐	☐
34	Are the rungs at least 8 inches in length	☐	☐	☐
35	Are rungs uniformly spaced within each frame section	☐	☐	☐
36	Are rest platforms provided every 35 feet	☐	☐	☐
37	Is the distance between the rungs less than 16 3/4 inches	☐	☐	☐
38	Do rungs and steps of ladders line up vertically between the rest decks	☐	☐	☐
39	Is direct access from other structures prohibited when that distance is more than 24 inches vertically or 14 inches horizontally	☐	☐	☐
40	Has any damaged part of the scaffold been repaired, replaced or removed as required	☐	☐	☐
41	Do scaffolds and any conductive material handled on them observe the proper clearances from power lines (REFER TO DISTANCES AS SHOWN IN 1926.451)	☐	☐	☐
42	Are slippery conditions removed as soon as possible	☐	☐	☐
43	Have falling object hazards been eliminated according to 1926.451	☐	☐	☐
44	Have toe boards been installed to prevent falling objects	☐	☐	☐

1926.451 General Requirements		Yes	No	N/A
45	Are toe boards at least 3 1/2 inches in height	☐	☐	☐
Notes:				
Competent Person Signature:				

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Standard Operating Procedure – HSE

Control of Hazardous Energy – Lockout/Tagout Program

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July 2015

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Attachments

Attachment A – Written Energy Control Procedure Template

Attachment B – Lockout/Tagout Periodic Inspection Form

1. Purpose

The purpose of this Energy Control Program is to prevent personal injury to GHD employees and/or damage to company property during the service/maintenance, repair and/or installation activities involving hazardous energy sources. The program is also designed to prevent accidental, inadvertent or careless starting of machinery, opening of valves or pipelines, energizing of electrical equipment, and other related energy hazards associated with the operation, maintenance or repair activities.

2. Scope

This document establishes an Energy Control Program for GHD.

Only authorized personnel shall be permitted to lockout/tagout equipment and infrastructure (e.g., piping, valves, and wiring). Authorization shall be based on experience, training and the ability to perform repair or maintenance operations, or to recognize the need for repair or maintenance.

Only two people shall be authorized to remove lockout/tagout devices: 1) the person who installed the device; or 2) the supervisor of the person who installed the devices (i.e., as long as all affected employees are notified of this removal and the actions leading up to the removal are documented in full, describing who removed, why it was removed and how employees were notified).

Employees shall receive training regarding the implementation of this Energy Control Program as required by the standard and the use of established lockout/tagout procedures in their work areas.

3. Regulatory Background

The Occupational Safety and Health Administration's (OSHA) "Control of Hazardous Energy Sources" standard, 29 CFR 1910.147, covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment could cause injury to employees.

The standard also establishes minimum performance requirements to control hazardous energy and requires that employers develop and implement an energy control program.

The elements of an energy control program are as follows:

- Lockout/tagout program
- Employee protection
- Energy control procedures
- Protective materials and hardware
- Periodic inspections
- Training and communication
- Energy isolation

- Employee notification

3.1 Definitions

The following definitions are applicable to the Lockout/Tagout program:

Affected Employee – An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout or whose job requires him/her to work in an area where such servicing or maintenance is being performed.

Authorized Employee – A person who locks out or tags out machines or equipment in order to perform servicing or maintenance. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under the standard.

Blanking or Blinding – The absolute closure of pipe(s), lines(s) or duct(s) by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Double Block and Bleed – The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Capable of Being Locked Out —An energy isolating device capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

Energized — Connected to an energy source or containing residual or stored energy.

Energy Isolating Device — A mechanical device that physically prevents the transmission or release of energy including, but not limited to, the following:

- A manually operated electrical circuit breaker.
- A disconnect switch.
- A manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a line valve, a block, and any similar device used to block or isolate energy.

Note: Push buttons, selector switches, and other control circuit-type devices are not energy isolating devices.

Energy Source — Any source of electrical current, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Group Locks — Locks applied to energy isolating devices by multiple crafts, crew, and/or contractors in a specific location or over a large geographical area.

Hot Tap — A procedure used in repair, maintenance, and servicing activities that involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure, to install connections or

appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Line Breaking — Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury. Reliance on valves alone as a means of isolation can result in a catastrophe, since valves can unexpected leak vapours, gases, or fluids.

Lockout — The placement of a lockout device or an energy-isolating-device, in accordance with an established procedure, ensuring that the energy-isolating-device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device — A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Service and/or Maintenance — Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the *unexpected* energization or startup of the equipment or release of hazardous energy.

Tagout — The control of hazardous energy by the placement of a tagout device on an energy isolating device. The equipment being controlled must not be operated until the tagout device is removed.

Tagout Device — A device used to positively secure a valve, switch, circuit breaker, or other control device in a safe position and to prevent energization of the equipment. The energy isolating device and the equipment being controlled must not be operated until the tagout device is removed.

4. Program Administration

The GHD HSE Managers will have the overall responsibility for administrating this program within their geographical area, which will include the following responsibilities:

- Ensure that personnel are trained to implement lockout/tagout procedures.
- Only authorized employees implement lockout/tagout procedures.
- Ensure that energy control procedures have been established.
- Ensure that the proper lockout/tagout devices are available to authorized employees.
- Conduct annual evaluations of this program and periodic inspections of lockout/tagout procedures are completed.
- Ensure contractors are informed of GHD's lockout/tagout procedures.

5. Duties and Responsibilities

5.1 Supervisors and Project Managers

Supervisors and managers will have the responsibility for the following, with respect to this program:

- Ensure that authorized and affected employees are informed about the GHD energy control program, receive the proper training in the implementation of this program, and that proper energy control procedures are followed during project activities.
- Ensure that the proper protective materials and hardware (locks, tags, chains, etc.) are available for use on each project Site or facility.
- Conduct periodic inspections and annual reviews with authorized and affected employees on each of the lockout/tagout procedures that they will be involved in.

5.2 Employees

GHD employees will be responsible for adhering to the safe work practices as outlined in this program. Employees will also obey warning signs for the energy control program.

6. Program Elements

6.1 Energy Hazard Assessment

An energy hazard assessment shall be conducted by qualified technical personnel for each machine and/or equipment where exposure to hazardous energy can be anticipated to occur during repair and/or maintenance activities. The hazard assessment will be documented as part of the GHD written energy control procedure for each machine or equipment. These procedures will be written for each machine or piece of equipment where exposure to hazardous energy can occur during repair and/or maintenance activities. Site specific Energy Control procedures will be written using the approved template located in Attachment A of this document.

6.2 Lockout Devices

Protective materials and hardware (i.e., locks, tags, multilock devices, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware) shall be available for isolating, securing or blocking machines or equipment from their energy sources.

Lockout devices shall adhere to the following guidelines:

- Lockout devices shall be easily identified and not used for other purposes. They shall be capable of withstanding exposure to the environment for the maximum time that exposure is expected.
- Lockout devices shall be standardized within the facility by either colour, shape, or size.
- Lockout devices shall be substantial enough to prevent removal unless excessive force or tools (such as bolt cutters or other metal cutting tools) are used.

6.3 Tags

Tags shall be available for labelling equipment or machinery that has been locked out.

Tags shall adhere to the following guidelines:

- The construction of tags shall be such that environmental exposure will not cause the tag to deteriorate or the message on the tag to become illegible.
- Tags and their means of attachment shall be substantial enough to prevent accidental removal. The tag attachment shall be non-reusable, attachable by hand, and self-locking.
- Tags shall be easily identified and not used for other purposes.
- Tags shall be standardized by either colour, shape, or size.
- At a minimum, tags shall include the following information:
  - The identity of the employee applying the lockout device, the employee's supervisor, and any service or maintenance personnel.
  - The machine or equipment on which the lockout/tagout procedure is being used.
  - The date that the lockout/tagout devices are installed.

Tags will warn of hazardous conditions if the machine or equipment is energized. They shall use wording similar to: DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE, ETC.

Preparation for Shutdown

The authorized employee is responsible for informing affected employees of each occasion when equipment will be locked and tagged out.

The authorized employee is responsible for knowing:

1. The type and magnitude of energy present.
2. The hazards of the energy to be controlled.
3. The method and/or means for energy isolation and control.

The supervisor is responsible for informing authorized employees whenever changes are made to the lockout/tagout procedure.

Machine or Equipment Shutdown

The authorized employee is responsible for turning off or shutting down equipment using the specific established procedures for each machine and/or equipment.

The supervisor is responsible for ensuring that only authorized employees perform machine and/or equipment shutdown.

Machine or Equipment Isolation

All energy isolating devices (disconnects, valves, etc.) are operated in a manner to isolate the equipment from the energy source(s):

- Be sure to follow the written energy isolation procedure.
- Be sure to isolate all secondary energy sources.
- Never pull electrical switches while under load.
- Never remove a fuse instead of disconnecting.

General Procedures for the Application of Lockout/Tagout Devices

The following are general procedures to be adhered to while applying lockout/tagout devices:

- "Authorized" employees affix lockout/tagout devices to each energy-isolating device.
- Locks or other danger tags issued for lockout and/or tagout are not used for any other purpose.
- Each person conducting maintenance and/or repair on the equipment is responsible for attaching his/her personal locks, without exception.
- Lockout devices are affixed in a manner in which they are visible to any person inspecting the equipment for such a device, and also in which they cannot be easily removed.
- Each lockout/tagout device identifies the name of the employee applying the device and his department.
- Tags are only allowed when there are no means for affixing a lock, and it must be able to withstand corrosive environments, must be attached to a non-reusable device, attachable by hand, self-locking, and have a minimum breaking strength of 50 pounds (a nylon cable tie).
- Tags are affixed in a manner that clearly indicates that the operation or movement of the energy isolation device from the "safe" or "off" position is prohibited.
- Whenever a tagout device cannot be affixed directly to the energy isolation device, it shall be located as close as safely possible to the device and in a position obvious to anyone attempting to operate the equipment. Also, additional measures are taken to ensure that equipment cannot be energized, such as: the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or removal of a valve handle.
- No tag but the approved – DANGER DO NOT OPERATE – tag is used for the purpose of tagout. (NOTICE: tags should be used only for information of a general nature.) Include employee name, department, and date on the tagout device.
- Verify that the main disconnect switch or circuit breaker can NOT be moved to the "ON" position once the lockout is in place.

Stored Energy

After applying locks and tags to the energy isolation devices, all potentially hazardous stored or residual energy must be relieved, disconnected, bled, restrained, or rendered safe.

When locking out process or feed lines, a double block and bleed is used. If this method is not possible, an alternate choice is used. (Example: blanking or blinding of all affected lines, opening of

the lines by removal of a spool or disconnecting the lines from the source and capping the ends.) When bleeding the lines, leave vent lines open.

Mechanical parts in hydraulic and pneumatic systems that could move from a loss of pressure shall be blocked or supported.

Verification of Isolation

Prior to starting work on machines or equipment that have been locked or tagged out the "authorized" employee must verify that isolation and de-energization of the machine or equipment has been achieved.

Turn "ON" (TRY) all start buttons and other activating controls on the equipment itself.

When satisfied that equipment cannot be energized without reactivating energy control devices, place all buttons and other activating controls back in the "Neutral" or "Off" position.

Release from Lockout/Tagout Control

Prior to restoring energy to machine or equipment, the following actions must be taken by an authorized employee:

- Inspect the area for removal of tools and/or nonessential items.
- Ensure the equipment is intact and all guards have been reinstalled.
- Ensure the employees working on the machine or equipment have been safely positioned or removed from the area.
- Ensure that the employee who applied the device(s) removes the lockout and/or tagout devices from each energy-isolating device.

Once maintenance and service has been completed, notify affected employees that the lockout/tagout devices are removed and the machine or equipment is released for operation.

Note: In situations in which the service or maintenance of a machine or equipment needs to be energized for testing, the above actions shall be taken prior to the removal of locking devices and energization. Following the testing, the machine or equipment will be de-energized and energy control measures reapplied.

Removal of Lockout/Tagout Device

No one shall attempt to operate any equipment, remove any lockout/tagout (L/T) device, ignore, bypass, or otherwise defeat any device on equipment in which another employee has placed a lockout/tagout device. Examples are as follows:

- Employee A, locks/tags grinder "X" to work on the equipment. Employee B needs to work on grinder "X". Employee B MUST get in touch with Employee A, have he/she remove his/her lock/tag device and both would then lock/tag the grinder. Employee A must re-institute all lockout/tagout procedures after Employee B completes work.
- If valve "Y" were locked/tagged out by Employee A and Employee B needed to work on valve "Y", then Employee B must get in touch with Employee A and have he/she remove their

lockout/tagout device. Then both would lock/tag out the line at another location, which would protect both Employee A and B.

If equipment controlled by a lockout/tagout device must be energized, or tampered with in any way, the employee(s) who own the L/T device are contacted and he/she removes his/her own device.

Lockout/Tagout Involving More Than One Employee

When more than one employee works on the same equipment, each employee must attach his/her personal lock and tag to the lockout device(s) for that equipment.

If it is not possible or practical for every individual working on a job to place his/her lockout/tagout on every piece of equipment covered by lockout/tagout, one designated, authorized person of a work crew, or a supervisor with the knowledge of the crew, may lockout/tagout equipment for the whole crew. In those cases, if the device is lockable, the designated, authorized individual will place his/her key (or keys if multiple devices are involved) in a group lock box and members of the crew must attach their locks to the lock box. It is the responsibility of the designated, authorized individual to carry out all the steps of the lockout/tagout procedure and inform the crew when it is safe to work on the equipment. Additionally, the lock placed by the designated, authorized person must not be removed until the locks of all others have been removed and that one person is completely satisfied that it is safe to do. Once this lock is removed, the designated, authorized person may retrieve his/her keys from the lock box.

Each employee is held responsible for the prompt removal of his/her lock and tag when his/her work has been completed.

When a job is to be extended from one shift to another, the relieving employee or the supervisor shall attach his lock/tag to the lockout device before the employee going off shift removes his lock/tag. If the supervisor places his lock/tag on the device instead of the oncoming employee, the oncoming employee places his/her lock/tag on the device before starting.

Exceptions

Cord and plug connected equipment, such as power tools office machines, etc., do not require a lockout/tagout, as long as the plug end is unplugged and kept in the exclusive control of the person working with such equipment.

7. Employee Training

Employees authorized to attach and remove lockout/tagout devices shall be provided with initial training regarding the safe application, usage, and removal of such devices. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the associated energy, and the methods necessary for energy isolation and control.

All authorized employees will be provided with refresher training whenever the following conditions apply:

- There is a job assignment change.
- There is a change in machinery or equipment, or process changes that present new hazards.

- There is a change in the energy control procedures.
- The supervisor has reason to believe that there are deficiencies in the employee's understanding of the following:
  - The hazards associated with the energy that controls the machinery or equipment in the employee's work area.
  - Application and removal procedures for lockout/tagout devices.

Employees who work in areas where lockout/tagout procedures are used (affected employees), shall receive initial and refresher training in the purposes and uses of lockout/tagout devices and principles behind their use.

The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

8. Contractors

The Project Manager or site supervisor is responsible for informing the outside contractors of GHD's Lockout/Tagout Procedure. The contractor is responsible for complying with this procedure or by supplying the Project Manager with a copy of their company's procedure for approval.

To ensure the hazardous energy control devices used by the contractor differ from those used by GHD the contractors shall be required to identify their lockout/tagout devices. The device shall include a DANGER Tag containing the name of the company, the individual applying the device and a 24-hour phone number where the company representative can be reached.

9. Program Inspections

9.1 Periodic Inspections

Periodic inspections of the energy control procedure are required to be conducted at least annually by the supervisor to ensure that the procedure is adequate and that both, the procedure and the requirements of the OSHA standard (29 CFR 1910.147) are being followed. The inspection shall identify any inadequacies and deviations from the procedure. The inspections shall be documented to include the identification of the machine or equipment inspected, date, employees included in the inspection, and the person performing the inspection. The inspection will be documented using the form in Attachment B of this document. This program will be reviewed and updated, as necessary, at a frequency necessary to maintain its effectiveness. The responsibility for maintenance of this program belongs to the Corporate HSE Manager.

Lockout Inspections

Inspections of lockout procedures shall include a review with the inspector and each authorized employee. The review will cover the employer's energy control (lockout) procedures and the employee's responsibilities.

Tagout Inspections

Inspections of tagout procedures shall include a review with the inspector and each authorized and affected employee. The review will cover the employer's energy control (tagout) procedures and the employee's responsibilities.

The Project Manager is responsible for ensuring that periodic inspections of the Lockout/Tagout (Energy Control) Program are conducted to assess its effectiveness and to correct any deviations observed.

Attachment A **Written Energy Control Procedure Template**

Project Name:	Project Number:
Name of Facility:	Maintenance or Repair Activity:
Equipment Name:	Equipment Serial Number:

Energy Sources Present

☐ Electrical	☐ Chemical	☐ Mechanical	☐ Pneumatic	☐ Hydraulic	☐ Thermal

☐ Other: _____

SHUT DOWN

	Energy Source	Isolating Device	Location	Action	Verification Step
1					
2					

Note: Photos may be attached to facilitate LOTO procedure detailed above.

START UP

	Energy Source	Isolating Device	Location	Action	Verification Step
2					
1					

Note: Photos may be attached to facilitate LOTO procedure detailed above.

Lockout/Tagout Procedure Written By:

Name:	SS#	Date:	Signature:

Procedure Verification

The procedure listed above was field tested/verified by _____ of _____ on the _____ day of _____-, 2_____.

If the energy sources affecting this equipment are modified in anyway, the overall procedure should be re-evaluated.

Attachment B **Lockout/Tagout Periodic Inspection Form**

Project Name:			Project Number:		
Name of Facility:			Maintenance or Repair Activity:		
Equipment Name:			Equipment Serial Number:		
Energy Sources Present					
☐ Electrical	☐ Chemical	☐ Mechanical	☐ Pneumatic	☐ Hydraulic	☐ Thermal
☐ Other: _____					
Are changes to the procedure required? ☐ Yes ☐ No					
If Yes, identify:					
Employees included in the inspection:					
_____ Supervisor (Print Name)			_____ Signature		
Date of Inspection:					

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Table 2

On-Site Air Monitoring Program Action Levels for Retail Facilities
Health and Safety Plan
Philadelphia Refinery Operations
Pennsylvania

Monitoring Device	*Action Level*	*Action*
Photoionization Detector (PID)	**Benzene present in the Breathing Zone:**	Determine via Colorimetric Sampling
10.6 or greater eV lamp	<1.0 ppm or Background	Full-Face Respirator Available
Detector Tubes	≥1.0 ppm and ≤5 ppm	Full-face air purifying respirator Level C PPE MSA GME P100 Cartridge
	>5 ppm and <500 ppm	Supplied air respirator Level B PPE. Implement additional engineering controls
	≥500 ppm	Shut down activities. Notify SHO. Implement additional engineering controls
	Benzene not present in the Breathing Zone:	Determine via Colorimetric Sampling
	<10 ppm or Background	Full-Face Respirator Available
	≥10 ppm and <50 ppm	Wear Full-Face Respirator - Level C PPE
	≥50 ppm and <1,000 ppm	Wear Supplied Air Respirator - Level B PPE, Implement Additional Engineering Controls
	≥1,000 ppm	Shut down activities. Notify SHO. Implement additional engineering controls
Hydrogen Sulfide	>5 ppm	Shut down activities. Notify SHO. Implement additional engineering controls

If GHD is unable to identify/quantify the contaminants, supplied air will be required when the PID reading is greater than background, as the contaminant will be unknown and NIOSH, OSHA, and the manufacturer's use requirements for Level C (air purifying respirators) will not be met. If PID readings subside, workers can downgrade as necessary. GHD will upgrade to supplied air and attempt to obtain additional information for possible chemicals present in GHD's work area. The Owner will need to provide/obtain additional information as to the identity of the contaminant(s) in order to permit the use of Modified D and/or Level C.

Notes:

SHO Safety and Health Officer
LEL Lower Explosive Limit
PPE Personnel Protective Equipment
ppm parts per million

EVERGREEN FIELD PROCEDURES
PHILADELPHIA REFINERY COMPLEX
PHILADELPHIA, PENNSYLVANIA

1. LIQUID LEVEL ACQUISITION

Responsible Personnel: Technicians and Geologists

Training Qualifications:

All field personnel involved in liquid level acquisition shall have, as a minimum, completed OSHA 40 HOUR HAZWOPER training, PSM training, and obtained a TWIC Card as well as completing the 3-day minimum field training requirements as specified within the Corporate Health and Safety Plan. Prior to solo performance of liquid levels, all field personnel will have performed a minimum of three site visits under the direct supervision of experienced personnel.

Health and Safety Requirements:

Personal Protective Equipment (PPE) Required:

Level D attire including steel toe/steel shank boots, NOMEX coveralls, and an H2S meter are required to be worn. Based on site conditions, Level C attire may be required. The PPE required to upgrade to Level C may include: nitrile gloves, disposable outerboots, Tyvek coveralls, and a respirator. Safety glasses or hard hats may also be required in certain areas.

Site Controls:

Safety cones and or caution tape should be used in high traffic areas. The "Buddy System" may also be employed in high traffic areas.

Potential Hazards:

Traffic, pinch and trip, chemical (airborne and physical contact) and biological are all likely hazards to be encountered on-site. Additional hazards are mentioned in the site-specific HASP.

Materials and Equipment Necessary for Task Completion:

Electronic oil/water interface probe or conductivity water line, decontamination supplies (liquinox, deionized-distilled water, appropriate containers, scrub brush, and sorbent pads or paper towels), and air monitoring instruments (optional, based on previous site visits).

Methodology:

The task involves the deployment of a liquid sensing probe into a well (in most cases), recording the reading, and decontaminating the probe. The recorded field readings can then be utilized for one of several applications including: well sampling, water table gradient mapping, separate-phase hydrocarbon occurrence, thickness, and or gradient mapping, and various testing procedures.

The proper procedure for liquid level acquisition from a well is as follows:

1) The wells should be gauged in order of least to most contaminated based on existing sampling data or separate-phase hydrocarbon occurrence.
2) The gauging instrument is decontaminated prior to initial deployment and after each well to prevent cross contamination between wells.
3) Decontamination procedures include the following steps:
    a) Remove gross contaminants with sorbent pad or towel.
    b) Rinse/scrub equipment with water.
    c) Scrub equipment in Liquinox®/deionized-distilled water solution.
    d) Double rinse with deionized-distilled water.
    e) Air dry.
4) The well(s) to be gauged may need to be marked off with safety cones and or caution tape in order to protect personnel from auto traffic; the "Buddy System" may also be employed.
5) The manhole cover is then lifted off of the well head. A pry bar may be needed to prevent personal injury in the case of large manhole covers.
6) The probe is lowered into the well until the instrument signals contact with liquid.
7) The corresponding reading is recorded when the instrument signals either water or product. A clear bailer may be used to verify the existence or approximate amount and appearance of product.
8) The probe is then retracted from the well and decontaminated accordingly.
9) The well is then secured appropriately.
10) Note the start and stop time for gauging round in the field book.

2. GROUNDWATER MONITORING PROCEDURES

Responsible Personnel: Technicians and Geologists

Health and Safety Requirements:

Site specific HASP must be completed and reviewed by field personnel. Ambient air monitoring will be performed quarterly at all treatment areas to determine the necessity of PPE upgrade. As a minimum, level "D" attire will be worn.

Training Qualifications:

All field personnel involved in groundwater monitoring shall have, as a minimum completed OSHA 40 HOUR HAZWOPER training and completed the 3 day minimum field training requirements. Prior to groundwater monitoring, all field personnel will have sampled a minimum of three sites under the direct supervision of experienced personnel. Field personnel will also have experience in vapor monitoring techniques and sampling equipment decontamination.

Materials and Equipment Necessary for Task Completion:

A list of equipment required to access, gauge, purge, and sample site monitoring wells is presented below. Also listed are materials necessary to store, label, preserve, and transport groundwater samples.

- Current site map detailing well locations;
- Field data book for recording site data;
- Liquid level gauging device (graduated, optical interface probe);
- Keys and tools to provide well access;
- Appropriate sample containers and labels: volatile samples will be collected in laboratory provided 40 milliliter (ml) glass vials with plastic caps fitted with Teflon ® lined septa; all sample bottles will be laboratory sterilized and will contain the appropriate preservative, if applicable;
- Appropriate well purging apparatus as determined by volume of groundwater to be purged and compounds to be analyzed;
- Teflon ® (or equivalent) bottom-loading bailer to extract groundwater sample;
- Clean nylon or polypropylene bailer cord;
- Disposable nitrile sampling gloves;
- Decontamination supplies;
- Calibrated five-gallon bucket and watch or stopwatch to determine discharge rate during purging;

- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

Methodology for Three Well Volume Sampling:

Prior to actual site visitation for the groundwater sampling event, the following data will be reviewed to ensure proper preparation for field activities:

- Most recent liquid level data from all wells;
- Most recent analytical data from all wells to determine gauging and sampling sequence; and
- Well construction characteristics.

Each monitoring well to be sampled will be gauged to obtain liquid level data immediately prior to initiation of the sampling process. Refer to Liquid Level Gauging SOP for appropriate well gauging procedures. Liquid level data will be recorded in a field book. Should free-phase petroleum product be detected by the gauging process and verified through inspection in a pre-cleaned acrylic bailer, groundwater sampling will not be conducted at that location.

The sampling procedure will be initiated by purging from the well a minimum of three well volumes, except in cases where the well is pumped dry, as referenced below. Well purging is performed to remove stagnant water and to draw representative water from the aquifer into the well for subsequent sampling and analysis for the established parameters. In extreme cases where a well is pumped dry and/or shows little recharge capacity, the well will be evacuated once prior to sample procurement. Well volume calculations will be based on total well depth as determined during well installation and depth-to-water measurements obtained immediately prior to sampling.

Down-hole pre-purge, post-purge, and sampling water quality readings will be collected. The parameters to be monitored and recorded will include dissolved oxygen, turbidity, pH, specific conductance, redox potential, and temperature.

Well purging can be performed with various equipment including: a dedicated bailer for hand bailing low volumes of water; a surface mounted electric centrifugal pump with dedicated polyethylene tubing; and/or submersible pump (when the depth to water is greater than 20 feet) with dedicated polyethylene tubing. During pumping, the intake will be placed directly below the static water surface and slowly lowered during the purging process. This procedure may not prove necessary in low-yielding wells but is important in high-yielding, permeable strata where

an intake initially placed deep in a well may draw laterally and have little influence in exchanging water from shallower depths within the well bore.

Flow rate during well purging will be approximated by the bucket and stop watch method. The duration of pumping required to remove three well volumes will be calculated directly from this flow rate. All fluids removed during purging will be treated on-site with activated carbon.

The sequence of obtaining site groundwater samples will be based upon available historical site data for existing wells and soil organic vapor analyzer (OVA) readings for newly installed wells. Site wells will be sampled in order from the lowest to highest concentration of water quality indicator parameters based upon the most recent available set of laboratory analyses to reduce the potential for sample cross-contamination. Groundwater samples will not be obtained for analysis from any well containing measurable free product.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells.

1) Establish a clean work area where sampling equipment will not come in contact with the ground or any potentially contaminated surfaces.
2) Use a laboratory, pre-cleaned Teflon® sampling bailer for each well.
3) Use a clean pair of nitrile gloves.
4) Attach an appropriate length of unused, clean nylon or polypropylene cord to the designated sampling bailer.
5) Select appropriate laboratory-sterilized sample containers.
6) Slowly lower sampling bailer into well until water surface is encountered; continue to lower the sampling bailer into the standing water column to one foot below the water surface.
7) Retrieve bailer at a steady rate to avoid excess agitation.
8) Visually inspect bailed sample to ensure that no free product or organic detritus has been collected.
9) Uncap first designated sample vial and fill from bailer as rapidly as possible but minimizing agitation; secure septum and lid.
10) Inspect sealed sample for entrapped air; if air is present within sample vial. Remove lid and repeat vial filling, sealing and inspection process until no air is present.
11) Repeat Steps 9 and 10 for the second designated vial; all volatile parameter samples will be collected in duplicate.

12) Complete and attach labels to sample containers noting sample collector, date, time, and location of sample; record same data in field book.

13) Place samples in ice-filled cooler in such a manner as to avoid breakage. Samples collected for VOC analysis will be maintained at a temperature of 4°C.

Discard gloves and bailer cord and move to next sample location.

Methodology for Low-Flow Purging and Sampling:

For wells that will be Low-Flow purged and sampled, the USEPA Region III Bulletin QAD023: *Procedure for Low-Flow Purging and Sampling of Groundwater Monitoring Wells* will be followed. The following data will be reviewed for each well in order to set the pump intake for the low flow sampling:

- Soil boring (lithologic) log and continuous soil sample PID;
- Well construction log showing the screened interval;
- Identification of the most permeable zone screened by the well;
- Approximate depth to static water;
- Proposed pump intake setting; and
- Technical rationale for the pump intake setting, preferably across from the most impacted/contaminated subsurface interval.

Equipment

Adjustable rate, submersible, bladder pumps in conjunction with Teflon® or Teflon-lined polyethylene tubing for purging and sampling will be used. An alternate set up would include a stainless steel submersible Hurricane Pump with Teflon-lined tubing. The tubing diameter will be between 3/16-inch to ½-inch inner diameter and the length of the tubing extended outside the well will be minimized. Flow through cells will be used to evaluate parameters during sampling. Monitoring well information, equipment specifications, water level measurements, parameter readings, and other pertinent information will be recorded during monitoring well purging and sampling.

Sampling Procedure

The following protocol details the low-flow sampling procedure that will be used for sampling the monitoring wells.

1. PID Screening of Well. A PID measurement will be collected at the rim of the well

immediately after the well cap will be removed and recorded on the sampling form.

2. Depth to Water Measurement. A depth to water measurement will be collected and recorded. To avoid disturbing accumulated sediment and to prevent the inadvertent mixing of stagnant water, measuring the total depth of the well will be done at the completion of sampling on an annual basis.

3. Low Stress Purging Startup. Water pumping will commence at a rate of 100 to 400 milliliters per minute (mL/min). This pumping should cause very little drawdown in the well (less than 0.2-0.3 feet) and the water level should stabilize. Water level measurements are made continuously and will be recorded in milliliters per minute on the sampling form.

4. Low Stress Purging and Sampling. The water level and pumping rate will be monitored and recorded every five minutes during purging, and any pumping rate adjustments will be recorded. During the early phase of purging, emphasis will be placed on minimizing and stabilizing pumping stress, and recording any necessary adjustments. Adjustments, when necessary, will be made in the first 15 minutes of purging. If necessary, pumping rates will be reduced to the minimum capabilities of the pump to avoid well dewatering. If the minimal drawdown exceeds 0.3 feet, but the water level stabilizes above the pump intake setting, purging will continue until indicator field parameters stabilized, as detailed in Step 5 below. If the water level drops below the pump intake setting at the absolute minimum purge rate, the pump will remain in place and the water level will be allowed to recover repeatedly until there will be sufficient water volume in the well to permit the collection of samples.

5. Indicator Field Parameters Monitoring. During well purging, indicator field parameters (DO, turbidity, pH, specific conductance, and redox potential) will be monitored every five minutes (or less frequently, if appropriate). Purging will be considered complete and sampling began when all the aforementioned indicator field parameters had stabilized. Stabilization will be achieved when three consecutive readings, taken at five (5) minute intervals (or less frequently, if appropriate), are within the following limits:

    - DO (±10 percent);
    - turbidity (±10 percent);
    - specific conductance (±3 percent);
    - pH (± 0.1 unit); and
    - redox potential [Eh] ±10 mv).

    Temperature and depth to water will be also monitored during purging. Should any of the parameter-reading components of the flow-through meter fail during sampling; the sampling team will attempt to locate a replacement flow-through meter. If none is available, the

sampling team will measure that parameter with an individual criteria meter. Any other field observations relating to sample quality, such as odor, foaming, effervescence, and sheens, will also be recorded on the sampling form.

6. Collection of Ground Water Samples. Water samples for laboratory analyses will be collected before the groundwater had passed through the flow-through cell by either using a by-pass assembly or by temporarily disconnecting the flow-through cell. All sample containers will be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. During purging and sampling, the tubing remains filled with water in order to minimize possible changes in water chemistry upon contact with the atmosphere. Methods employed to ensure that the outlet tubing will be filled include (i) adjusting the tubing angle upward to completely fill the tubing and (ii) restricting the diameter of the tubing near the outlet of the tubing.

   The order in which samples will be collected is as follows:

   - Volatile organics;
   - Gas sensitive (e.g., Fe^{+2}, CH_4, H_2S/HS);
   - Base/Neutrals or PAHs;
   - Total Petroleum Hydrocarbons;
   - Total metals;
   - Dissolved metals;
   - Cyanide;
   - Sulfate and chloride;
   - Nitrate and ammonia;
   - Preserved inorganic;
   - Non-preserved inorganic; and
   - Bacteria.

Decontamination Requirements:

Numerous practices are employed throughout the processes of site investigation and sampling to assure the integrity of the resulting data. Of particular significance to the procedures of

groundwater measurement and sampling is the limitation, whenever possible, of materials inserted into a well bore and, even more importantly, of materials transferred from well to well.

Many items can be discarded between well sampling and/or gauging locations without significantly impacting project costs. Dedicated sampling equipment which can be discarded between well sampling locations without significantly impacting project costs, will be used whenever possible to preclude decontamination requirements. Sampling equipment included in this category are Teflon ® bailers, nitrile gloves, and bailer cord. However, other investigative and sampling equipment, including such items as liquid level probes, must be reused from well to well.

The danger in multi-well equipment applications lies in the potential of cross-contamination. While the threat of cross-contamination is always present, it can be minimized through the implementation of a consistent decontamination program during sensitive site measurement and data collection activities. The decontamination procedure is outlined below:

All site equipment used in a multi-well capacity will be decontaminated immediately prior to initial use and between each well. Standard site decontamination procedures for the optical interface probes between wells will be performed according to the following schedule:

- Initial rinse with clean tap water to remove excess residuals;
- Scrub equipment with sponge or clean, soft cloth in a distilled water/Liquinox@ (or equivalent) solution; and
- Double rinse with deionized/distilled water.

Rinse water generated during decontamination procedures will be treated on-site by passing the water through a bucket filled with activated carbon prior to disposal.

3. SOIL SAMPLING & WELL INSTALLATION

Responsible Personnel: Geologist

Training Qualifications: All field personnel supervising drilling activities shall have completed OSHA 40-Hour training, and three days of field training. Personnel supervising the well installation shall have observed drilling procedures for a minimum of three under the direct supervision of experienced personnel. Field personnel will have experience in operating the following field equipment: interface probe and photo-ionization detector (PID). Personnel should be able to describe soils encountered during drilling for generation of well logs.

Health and Safety Requirements:

A site specific HASP must be completed and reviewed by all field personnel. Prior to deploying a rig to the site, a utility call must be made (i.e. Pennsylvania One-Call) to allow mark-out of known subsurface utilities and associated laterals proximal to the site. Site plans, if available, should be reviewed to document and avoid the location of on-site utilities. No drilling should occur on retails sites within the exclusion zone. This zone is defined as the area between the pumps, the tank field and the station building. The area is excluded from drilling activities due to the likely occurrence of subsurface petroleum distribution lines. After review of all known mapped and marked utilities, a site reconnaissance will be performed to document the location of utility meters and storm sewer drains. In addition, the location of overhead utilities must be documented. After completing the subsurface and overhead utility review, the area to drill may be observed as clear or the location may be adjusted to a "clear" location.

Once the drilling location is established, the area must be marked with cones to alert area traffic of the work area. Other health and safety concerns include slip/trip hazards, working with heavy equipment and overhead work hazards. During drilling activities, a minimum of protective work gloves, steel toed boots, hard hats, and safety goggles must be worn.

A final health and safety requirement includes hand clearing the borehole, prior to advancing the borehole with the drill rig. To ensure the safety of workers, the borehole will be cleared by hand or air knife, to depth of 5 feet below ground surface. This will serve to clear the area of utilities, prior to drilling.

Decontamination Requirements:

All down-hole equipment must be steam cleaned prior to drilling at each boring/well location. All soil sampling equipment must be cleaned with detergent and rinsed with distilled water prior to deployment into the borehole. All well construction materials (i.e. PVC well casing, PVC well screen, sand pack, bentonite seal) should be clean and dedicated to each hole.

Methodology for Borings Outside RCRA Areas in AOI 5:

1) Borehole Advancement

During soil sampling or well installation activities, a borehole is advanced into the unconsolidated subsurface materials or bedrock via a drill rig (or similar). Various types of drilling methods could be deployed to advance the hole. A description of each drilling method is included below:

a) Hollow Stem Auger

A spiral tool form is used to move material from the subsurface to the surface. A bit at the bottom cuts into the subsurface material. Spiral augers on outside convey the material to the surface while spinning. The center of the auger is hollow like a straw when the inner drive rods and plug are removed. During drilling or formation cutting, the center is filled with rods connected to a plug at the bottom bit. Once the desired drilling depth is reached, the center plug and rods can be pulled out, leaving the hollow augers in place. The hollow augers hold the borehole to remain open for sediment sampling and well installation.

b) Air Rotary

A drill bit at the bottom of rods is used to cut into the subsurface material. Air injected into the drill rods escapes through small holes in the drill bit and conveys the drill cuttings to the surface.

c) Geoprobe®

The geoprobe® sampling allows collection of soil by directly pushing (through hydraulic hammering) a sampling device lined with a plastic macrocore into the soil column.

d) Hand Auger

A stainless steel or aluminum hand auger will be physically advanced to the desired soil sampling depth.

2) Soil Sampling

Soil samples will be obtained for lithologic logging and laboratory analysis for chemical contaminants with one of three different sampling devices: Split barrel spoon sampler, hand auger or Geoprobe® soil sampler. For either method, the sampling devices are lowered through the hollow-stem augers or open borehole to allow sampling of the undisturbed sediments below the auger bit. Soil samples will be collected at intervals which appear to be visually impacted or from intervals which exhibit the highest deflections on the screening device (PID or similar).

a) Split barrel spoon sampler (split spoon)

The split spoon sampler will be driven into the soil column in accordance with ASTM Standard Method D1586 (Reference A6, Appendix E). Soil sampling by split barrel spoon will entail drilling a borehole with a hollow-stem auger to the desired sampling depth (standard five foot intervals). After augering to the desired depth, slowly and carefully lower the split barrel spoon sampler attached to the drill rod extension into the borehole. Drive the sampler into the soil by repeated blows from a 140 Lb. hammer with 30 inch travel. Record the blow counts required to drive the split spoon sampler each successive six inch interval.

Remove sampler for borehole, split barrel open, remove soil sample utilizing a stainless steel knife to trim the top and edges of the sample and containerize sample in appropriate sample jar.

b) Geoprobe®

The geoprobe® liner is dedicated to each soil sampling interval. After retrieval of the sample, the liner may be sliced open and the soil sample can be logged and containerized in the appropriate sample jar. During shallow soil sampling from fine-grained sediments, the geoprobe® can advance the sampler directly into the ground, without the advance of an augered borehole.

c) Hand Auger

The hand auger allows for soil from the desired interval to be collected directly by removing the soil column that is contained in the auger portion of the device.

Methodology for Well Installations:

1) Well Construction

After drilling to the desired depth or the desired interval, permanent monitoring wells can be installed to allow groundwater sampling. In general, wells are constructed with slotted screen, which allows groundwater to flow into the well at the desired monitored interval and well casing, which restricts groundwater flow into the well from undesired interval. In most cases the well materials are constructed of PVC. In conditions where the shallowest groundwater interval is monitored, a single case construction monitoring well is installed. In conditions where multiple water bearing units occur and deep groundwater conditions are selected for monitoring, a double cased well is installed.

a) Single Casing Construction

The construction details of a monitoring well are determined by soil type, depth to groundwater and relative fluctuation of groundwater level. After drilling to the desired depth, a monitoring well is constructed for installation into the evacuated borehole. The well consists of a bottom cap, a length of screen and length of well casing. To determine the length of screen used, seasonal groundwater table or tidal fluctuations should be considered to allow the water table to intercept the well screen throughout the year. The assembled well is then inserted into the borehole.

The annular space between the well screen and subsurface is filled with a sand pack, which consists of clean, sorted sand. The sand pack allows water flow into the well but acts as a

filter to prevent subsurface sediments from silting in the well. The sand pack extends one to two feet above the top of well screen. Above the sand pack, a seal is installed in the annular space between the well casing and the subsurface. The seal is comprised of hydrated bentonite and prevents surface water from infiltrating the well screen. Above the well seal, the annular space is backfilled with drill cuttings or cement. A cap is placed on the top of the well to further prevent infiltration of the surface water. The top of the well is protected with either a stand-up pipe or a locking, flush mount box.

b) Double Casing Construction

In cases where multiple water bearing zones occur, a double case well is installed to allow monitoring of the deeper water bearing zones. Construction of a double cased well is similar to that of a single case well; however, to prevent groundwater infiltration from shallower water bearing zones, a second casing is installed. This type of construction requires drilling two different diameter boreholes.

During drilling through the shallower groundwater zones, large diameter augers/bits are used to create a large diameter borehole. The borehole is advanced through the shallower water bearing area which will not be monitored. An outer casing is installed to seal the deeper monitoring well from infiltration from the shallow water bearing zones. After the outer casing is installed, the borehole is advanced deeper with smaller diameter auger/bit. The outside diameter of second augers fit within the inside diameter of the outer casing. The borehole is advanced to allow monitoring of the deeper water bearing zone. Once the desired depth is obtained, a monitoring well is installed within the outer casing, using similar methods as described in the single casing construction (3a, above). The outside casing prevents shallow groundwater infiltration into the well. The inside casing prevents surface water infiltration into the well.

2) Soil Cutting Handling

Cuttings generated from drilling will be containerized or stock-piled, undercover, until appropriate disposal is determined. In the case the soils are not impacted, the cuttings may remain on-site. Impacted soils will be removed using appropriate hazardous waste handling procedures and disposed of with an approved hazardous waste handler.

3) Well Development

After installation, monitoring wells are developed to remove residual sediments within the well and annular space. Water is pumped from the well a low flow rate (to minimize turbulence within the well and associated sand pack) until groundwater flowing from the well appears relatively free of sediments.

Documentation:

All site activities should be detailed in the site investigators fieldbook. The entry shall include the date, time, weather, address, and persons present on-site. In addition, data required to create well construction logs or boring logs (if no well is constructed) should be collected. This data includes soil type, relative moisture content, depth of water table, observed impact, soil screening measurements (if PID is used), blow counts (if split spoon samples are collected), sample recovery, depth of borehole, length of well screen, length of well casing(s), sand pack interval, well seal interval. The site investigator should identify the relative location and number.

4. NON-AQUEOUS PHASE LIQUID (NAPL) SAMPLING PROCEDURES

Responsible Personnel: Technicians and Geologists

Training Qualifications:

All field personnel involved must have completed OSHA 40 HOUR HAZWOPER training. Prior to NAPL sampling, all field personnel will have worked a minimum of three sites under the direct supervision of experienced personnel. Field personnel will also have experience in sampling and vapor monitoring techniques and sampling equipment decontamination.

Materials and Equipment Necessary for Task Completion:

A list of equipment required to sample NAPL from a monitoring well is presented below:

- Current site map detailing well locations;
- Field data book for recording site data;
- Liquid level gauging device (graduated, optical interface probe);
- Keys and tools to provide well access;
- Appropriate sample containers and labels. NAPL samples will be collected in laboratory provided 40 milliliter (ml) glass vials with plastic caps fitted with Teflon ® lined septa; all sample bottles will be laboratory sterilized and will contain the appropriate preservative, if applicable. A minimum of 10 ml is required for laboratory analysis. In the case that sufficient volume is not obtained, a swabbing technique (described below) will be used;
- Sorbent pads (required for swabbing technique);
- Teflon ® (or equivalent) bottom-loading bailer to obtain NAPL sample;
- Clean nylon or polypropylene bailer cord;

- Decontamination supplies;
- H&S supplies (tyvek, nitrile gloves, safety goggles);
- Blank chain-of-custody forms; and
- Cooler and ice for sample preservation.

Health and Safety Requirements:

Site specific HASP must be completed and reviewed by field personnel. As a minimum, modified Level "D" attire will be worn. Individuals performing NAPL sampling are required to wear safety goggles, tyvek suit, and nitrile sampling gloves.

Decontamination Requirements:

During NAPL sampling activities, dedicated sampling equipment (i.e. Teflon ® bailers, nitrile gloves, and bailer cord) are utilized; thereby, eliminating decontamination requirements. The interface probe, used to record the presence of NAPL and relative thickness prior to sampling, does require decontamination between sampling locations.
All site equipment used in a multi-well capacity will be decontaminated immediately prior to initial use and between each well. Standard site decontamination procedures for the optical interface probes between wells will be performed according to the following schedule:

- Initial rinse with clean tap water to remove excess residuals;
- Scrub equipment with sponge or clean, soft cloth in a distilled water/Liquinox® (or equivalent) solution; and
- Double rinse with deionized/distilled water.

Methodology:

Each monitoring well to be sampled will be gauged to obtain liquid level and relative NAPL thickness immediately prior to initiation of the sampling process. Refer to SOP No. 1 for appropriate well gauging procedures. Liquid level data will be recorded in a field book.

Sampling of the NAPL will occur via two different methods: direct sample or swabbing.

The following sequence of procedures will be implemented for the collection of groundwater samples from monitoring wells.

1) Establish a clean work area where sampling equipment will not come in contact with the ground or any potentially contaminated surfaces.

2) Use a laboratory, pre-cleaned Teflon® sampling bailer for each well.
3) Don an unused, clean pair of nitrile gloves.
4) Attach an appropriate length of unused, clean nylon or polypropylene cord to the designated sampling bailer.
5) Select appropriate laboratory-sterilized sample containers.
6) Slowly lower sampling bailer into well until water surface is encountered; continue to lower the sampling bailer into the standing water column to one foot below the water surface.
7) Retrieve bailer at a steady rate to avoid excess agitation.
8) Visually inspect bailed sample to ensure for relative thickness of NAPL. If sufficient volume is present (>10 ml) place a direct sample of the NAPL into the laboratory vial. If less than 10 ml of NAPL is present, use a sorbent pad to absorb the NAPL from the surface of the groundwater sample. Place is swab sample into the laboratory vial.
9) Complete and attach labels to sample containers noting sample collector and date, time, and location of sample; record same data in field book.
10) Place samples in ice-filled cooler in such a manner as to avoid breakage. Samples collected for VOC analysis will be maintained at a temperature of 4°C.
11) Discard gloves and bailer cord and move to next sample location.

Documentation:

All site activities should be detailed in the site investigators fieldbook. The entry shall include the date, time, weather, address, persons present on-site, and the aforementioned parameters. Only relevant observations should be recorded. The nature of the work being performed is also appropriate.

Appendix C
Soil Boring and Monitoring Well Logs

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-001**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/1/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel, Sand, Cobbles, well graded, moist									0	
	0.5		1	Gravel, Sand, Cobbles, well graded, moist									0	
	1		1.5	Gravel, Sand, Cobbles, well graded, moist									0	
	1.5		3	Sand, tan, no odor, moist to wet, clear white sand at 2.5 feet									0	
		3		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-002**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/12/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/12/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (75%), fine to coarse, sub-angular, sand (25%), fine to coarse, light brown, dry									0	
	0.5		1	Gravel (95%), fine to coarse, sub-angular, sand (5%), fine to coarse, light brown, dry									0	
		1.25		Obstruction										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:** Aquaterra	**Hole Designation:** BH-16-003
Project Number: 11109614	**Driller:** Rob Drewicz	**Date/Time Started:** 7/12/2016 0:00
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 7/12/2016
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (60%), fine to coarse, sub-angular, sand (40%), fine to coarse, brown, dry									0	
	0.5		1	Gravel (60%), fine to coarse, sub-angular, sand (40%), fine to coarse, gray, dry									0	
	1		1.5	Gravel (70%), fine to coarse, sub-angular, sand (30%), fine to coarse, dark gray, dry									0	
	1.5		2	Gravel (70%), fine to coarse, sub-angular, sand (30%), fine to coarse, dark gray, dry									0	
		1.92		Obstruction										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-005**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/28/2016 10:45**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (65%), fine to coarse, sub-angular, sand (35%), fine to coarse, brown, moist									0	
	0.5		1	Clay (70%), dark gray, sand (20%), fine to coarse grained, brown, gravel (10%), fine to coarse, sub-angular									0	
		0.75		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-006**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/28/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANMTPELREVAL	PID (ppm)	N-VALUE
	0		0.5	Fill, coarse sand, large stones (gravel #57 stone), sub-angular, light brown, moist									0	
	0.5		1	Silty Sand (85%), fine to coarse grained, gravel, angular, fine to coarse gravel, wet									0.7	
	1		1.5	Silty sand (50%), dark gray and black, clay (35%), light gray, gravel (15%), wet									5.7	
	1.5		2	Clay (85%), gray, sand (15%), fine to medium grained, light brown, slightly moist									2.6	
		2		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-007**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/28/2016 10:45**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (70%), fine to coarse grained, brown, gravel (30%), fine to coarse, sub-angular, moist									0	
		0.5		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-008**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/28/2016 10:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (60%), fine to coarse grained, dark gray, clay (20%), light brown, gravel (20%), fine to coarse, sub angular									0	
	0.5		1	Sand (70%), fine to coarse grained, dark gray, gravel (20%), fine to coarse, sub angular, clay (10%), gray									0	
	1		1.5	Clay (60%), gray, sand (20%), fine to coarse grained, gray, gravel (20%), fine to coarse, sub angular, moist									0	
		1.5		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-009**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/28/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANTPEVAL	PID (ppm)	N-VALUE
	0		0.58	Fill, gravel, tan, sand, coarse grained, black, wet									0	
		0.3		Surface Water										
	0.58		0.83	Cobbles, gravel, sand, light brown, some tan, wet, sheen on water									2	
	0.83		1.08	Cobbles, sand, brown to purple brown, gravel, some tan, wet, sheen on water, slight odor									2.2	
	1.08		2	Sandy silt, gray black, moist to dry, slight odor									0.1	
		1.8		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-010**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/28/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand,coarse grained, tan-cream, some black, gravel, moist									0	
	0.5		1	Sand, coarse grained, light tan, gravel (0.08-0.125), moist									0	
	1		1.17	sand, tan to medium brown, black, gravel, some silty sand, moist									0	
	1.17		1.5	Sandy silt, brown black, slight odor, slightly moist									0.1	
		1.5		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-011**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/28/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.42	Gravel (0.08 to 0.17 size), tan, sand, black, moist									0	
	0.42		0.75	Gravel (0.08 to 0.17 size), cobbles, sand, brown, moist									0	
	0.75		1	Cobbles, sand, light brown to purple red, wet									0	
	1		1.25	Sand, silty sand, transition purple red to tan, sandy silt, black, moist									0	
	1.25		2	sandy silt, clay silt, dark brown gray to brown black, slight odor, moist								1.5-2.0	0	
	2		3.3	silt, brown black to gray black, sand, coarse grained, clear white, slight odor								3.0-3.3	2.3	
		3.3		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-012**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/28/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/28/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.46	Gravel, tan, sand, black, moist									0	
	0.46		1	Silty, sand, very fine grained, gravel, bark brown to tan, moist									0	
	1		1.5	Clay silt, dark brown to brown black, moist, slight hydrocarbon odor, stain									1.2	
	1.5		1.83	clay silt, sand, dark brown, slight odor, stain, moist to wet								1.8-1.83	1.5	
		1.7		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-013**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/29/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/29/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		1.83	Gravel, rocks (4-5 inches), cobbles, tan									0	
	1.83		2	Clayey silt, gravel, poorly sorted, black, moist									1.5	
	2		2.67	Clayey silt, poorly sorted, black, slight odor									6.7	
	2.67		3.17	Clayey silt, poorly sorted, black, slight odor									6.4	
		3.17		Water table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-014**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/29/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/29/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (80%), fine to coarse grained, black, gravel (20%), fine to coarse, sub-angular, dry									0.1	
	0.5		1	Sand (70%), fine to coarse, black, clay (25%), black, gravel (5%), sub angular, dry to moist									0.2	
	1		1.5	Clay, dark gray, wet									0.3	
		1.5		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:**	**Hole Designation:** BH-16-015	
Project Number: 11109614	**Driller:**	**Date/Time Started:** 6/29/2016 0:00	
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 6/29/2016	
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon	

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		1.67	Large boulders, gravel, cobbles									0	
	1.67		2	Sandy silt, gray black, very slight odor, moist									0.1	
	2		2.67	Silt, gray black, slight odor, moist to dry									0	
	2.67		3.33	Silt, gray black, slight odor, moist to dry									0.1	
	3.33		4	Silt, gray black, slight odor, moist to dry									0.6	
		3.83		Water table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:**	**Hole Designation:** BH-16-016	
Project Number: 11109614	**Driller:**	**Date/Time Started:** 7/1/2016 0:00	
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 6/28/2016	
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon	

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.08	Gravel, light tan, dry									0	
	0.08		1.5	Large rocks, cobbles, gravel, sand, tan to orange, wet									0	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-017**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/11/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/11/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (65%), fine to coarse, black, gravel (35%), fine to coarse, angular, moist									13.1	
	0.5		1	Silty sand (100%), fine to medium, black, moist									131.7	
	1		1.5	Silty sand (100%), fine to medium, black, moist									120.8	
	1.5		2	Silty sand (60%), fine to medium, black, silty clay (40%), black									201.2	
	2		2.5	Silty clay (100%), black, moist, wet									278.5	
	2.5		3	Silty clay (100%), black, moist, wet									296.7	
	3		3.5	Clay (60%), black, silty clay (40%), black, wet									285.4	
	3.5		4	Clay (100%), black, saturated									117.8	
		3.92		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-018**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/11/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/11/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (90%), fine to coarse, black, gravel (10%), fine to medium, sub-angular, moist									12.5	
	0.5		1	Silty sand (100%), fine to coarse, black, moist									15.5	
	1		1.5	Silty sand (100%), fine to medium, black, wet									70.5	
	1.5		2	Silty sand (100%), fine to medium, black, wet									91.6	
	2		2.5	Clay (100%), black									156	
		2.25		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-019**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/6/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/6/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (65%), fine to coarse, angular, silty sand (25%), dark gray, sand (10%), fine to coarse, dark brown, moist									0.5	
	0.5		1	Silty sand (55%), fine to coarse, dark gray, gravel (45%), fine to coarse, angular, moist									0.4	
	1		1.5	Silty sand (80%), fine to coarse, dark gray and light brown, gravel (20%), fine to coarse, sub-angular, parts of brick									0	
	1.5		2	Silty sand (80%), fine to coarse, dark gray and light brown, gravel (20%), fine to coarse, sub-angular, parts of brick									0	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-020**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/28/2016 14:00:00 PM**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/1/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANMTPELREVAL	PID (ppm)	N-VALUE
	0		0.5	Fill (large angular gravel, red bricks) (75%), sand (25%), fine to coarse grained, gray									0	
	0.5		1	Fill (large angular gravel, red bricks) (75%), sand (25%), fine to coarse grained, gray									0	
	1		1.5	Gravel (65%), fine to coarse, sub-angular, sand (35%), fine to coarse, gray, slightly moist									0.1	
	1.5		2	Sand (75%), fine to coarse grained, gray and brown, gravel (25%), fine to coarse, sub-angular, slightly moist									0.3	
	2		2.5	Sand (80%), fine to coarse grained, gray, gravel (20%), fine to coarse, sub-angular									0.2	
	2.5		3	Sand (40%), fine to coarse, gray, clay with silt (40%), dark gray, gravel, fine to coarse, sub-angular, moist									0.1	
	3		3.5	Clay with silt (100%), dark gray, moist									0	
	3.5		4	Clay with silt (100%), dark gray, moist									0	
		4.17		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-021**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/30/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/30/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		3	Rocks (5-6 inches), brick pieces, sand and gravel									0	
	3		4	Sandy clay, brown, silty clay, gray black, slight odor									1.7	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-022**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/5/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/5/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (60%), fine to coarse, sub-angular, sand (40%), fine to coarse, brown, moist									0	
	0.5		1	gravel (40%), fine to coarse, sub-angular, sand (40%), fine to coarse, brown, moist, silty sand (20%), fine to coarse, brown, moist									0	
	1		1.5	Silty Sand (60%), fine to coarse, brown with black, gravel (40%), fine to coarse, sub-angular, parts of brick, moist									7.8	
	1.5		2	Silty Sand (60%), fine to coarse, brown with dark gray, gravel (40%), fine to coarse, sub-angular, with brick stone, moist									0.6	
	2		2.5	Silty sand (75%), fine to coarse, dark gray, gravel (25%), fine to coarse, sub-angular, clay, black, wet									2.4	
		2.5		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-023**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/1/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/1/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANT EVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (60%), fine to coarse grained, gray, gravel (40%), fine to coarse, sub-angular, slightly moist									0	
	0.5		1	Silty sand (60%), fine to coarse grained, gray to brown, gravel (40%), fine to coarse, sub-angular, slightly moist									0	
	1		1.5	Silty sand (40%), fine to coarse, gray and brown, silty clay (40%), dark gray, gravel (20%), fine to coarse, sub-angular, moist									0.4	
	1.5		2	Silty clay (65%), dark gray, silty sand (30%), fine to coarse, brown, gravel (5%), fine to coarse, sub-angular									0.4	
	2		2.5	Clay (80%), dark gray with brown, sand (20%), fine to medium grained, brown, wet									0.2	
	2.5		3	Clay (95%), dark gray, sand (5%), fine to medium, brown, saturated									0.2	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-024**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/7/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/7/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (80%), fine to coarse, sub-angular, pieces of brick, sand (20%), fine to coarse, dark brown, dry									0.5	
	0.5		1	Gravel (80%), fine to coarse, sub-angular, pieces of brick, sand (20%), fine to coarse, dark brown, dry									0.6	
	1		1.5	Gravel (70%), fine to coarse, sub-angular, sand (30%), fine to coarse, dark brown, dry									0.6	
	1.5		2	Gravel (60%), fine to coarse, sub-angular, sand (40%), fine to coarse, dark brown, dry									0.5	
	2		2.5	Gravel (50%), fine to coarse, sub-angular, sand (50%), fine to coarse,very dark brown, dry									0.5	
	2.5		3	Sand (60%), fine to coarse, very dark brown, gravel (40%), fine to coarse, sub-angular, dry									0.5	
	3		3.5	Sand (75%), fine to coarse, very dark brown, gravel (25%), fine to coarse, sub-angular, dry									0.5	
	3.5		4	Sand (75%), fine to coarse, very dark brown, gravel (25%), fine to coarse, sub-angular, slightly moist									0.3	
	4		4.5	Sand (65%), fine to coarse, very dark brown, gravel (35%), fine to coarse, sub-angular, moist									0.3	
		4.2		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-025**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/1/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/1/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOG Y	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SITE MATERIAL	PID (ppm)	N-VALUE
	0		0.5	Sand (60%), fine to coarse grained, gray, gravel (40%), fine to coarse, sub-angular, dry									7.1	
	0.5		1	Silty sand (65%), fine to coarse, dark gray, gravel (35%), fine to coarse, sub-angular									30.5	
	1		1.5	Silty sand (65%), fine to coarse, dark gray, gravel (35%), fine to coarse, sub-angular									210.5	
	1.5		2	Silty sand (65%), fine to coarse, dark gray, gravel (35%), fine to coarse, sub-angular									355.8	
	2		2.5	Silty sand (75%), fine to coarse, dark gray, gravel (25%), fine to coarse, sub-angular									417.8	
	2.5		3	Silty sand (75%), fine to coarse, dark gray, gravel (25%), fine to coarse, sub-angular									450.3	
	3		3.5	Silty sand (50%), fine to coarse grained, dark gray, clay (40%), dark gray, gravel (10%), fine to coarse, sub-angular									492.6	
	3.5		4	Clay (60%), dark gray, silty sand (40%), fine to coarse grained, dark gray, moist									501.7	
	4		4.5	Clay (80%), dark gray, silty sand (20%), fine to coarse, dark gray									530.1	
	4.5		5	Clay (100%), dark gray									624.3	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-026**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/1/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/1/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANMTPELREVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (85%), fine to coarse, sub-angular, sand (15%), fine to coarse, brown, dry									0	
	0.5		1	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, brown, dry									0	
	1		1.5	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, brown and gray, dry									0	
	1.5		2	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, gray and brown, dry									0.3	
	2		2.5	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, gray, dry									0.2	
	2.5		3	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, gray, dry									0	
	3		3.5	Gravel (75%), fine to coarse, sub-angular, silty clay (15%), gray, sand (10%), fine to coarse, gray, dry									0	
	3.5		4	Gravel (60%), fine to coarse, sub-angular, silty clay (40%), gray, moist									0	
		3.91		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-027**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/7/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/7/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (75%), fine to coarse, sub-angular, sand (25%), fine to coarse, brown, dry									0	
	0.5		1	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, brown, dry									0	
	1		1.5	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, brown, dry									0	
	1.5		2	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, brown, dry									0	
		1.8		Obstruction Concrete Block										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-028**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/11/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/11/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.67	Gravel, cobbles, sand, moderately graded, brown									0	
	0.67		1	Cobbles, sand gravel, brick pieces, brown, moist									0	
	1		1.25	Sand silt, gravel, brown, moist, some cobbles									0	
	1.25		2	Silty clay (95%), dark brown, gravel (5%), fine to coarse, sub angular, moist									1.5	
	2		2.5	Silty clay (100%), dark brown, wet									1.3	
		2.25		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-029**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/8/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/8/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel, sand, cobbles, brown, well graded, dry									0	
	0.5		0.75	Sand, silt, gravel, brown black, moderately graded, strong odor, dry									158.5	
	0.75		1	Sandy silt, black, very strong odor, poor graded, dry									823	
	1		1.42	Sandy silt, some gravel, black, poor graded, very strong odor, dry									846.7	
	1.42		1.67	Sandy silt, some gravel, black, poor graded, very strong odor, dry									>1000	
	1.67		2.08										>1000	
	2.08		2.25	Sandy silt, black, brick pieces, poor graded, strong odor, moist to dry									>1000	
		2.25		Brick pieces, refusal										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-030**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/11/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/11/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (55%), fine to coarse, dark brown, gravel (45%), fine to coarse, sub-angular, dry									1.6	
	0.5		1	Sand (55%), fine to coarse, dark brown with reddish brown, gravel (45%), fine to coarse, sub-angular, dry									2.4	
	1		1.5	Gravel (65%), fine to coarse, sub-angular, with pieces of cement and brick, sand (30%), fine to coarse, dark brown, sand (5%), fine to coarse, black and reddish brown, dry									4.1	
	1.5		2	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, dark gray, dry									69.5	
	2		2.5	Gravel (85%), fine to coarse, sub-angular, sand (15%), fine to coarse, dark gray, moist									371.5	
	2.5		3	Gravel (85%), fine to coarse, sub-angular, sand (15%), fine to coarse, dark gray and light gray, moist										
	3		3.5											
	3.5		4	Gravel (85%), fine to coarse, sub-angular, sand (15%), fine to coarse, dark gray and light gray, moist									670	
	4		4.5	Gravel (70%), fine to coarse, sub-angular, sand (30%), fine to coarse, dark gray and light gray, moist									73.8	
	4.5		5	Gravel (65%), fine to coarse, sub-angular, sand (35%), fine to coarse, brown and light gray, moist									573	
	5		5.5	Silty sand (60%), fine to coarse, brown, gravel (40%), fine to medium, dark brown									370.1	
	5.5		6	Silty sand (75%), fine to coarse, dark brown, gravel (25%), fine to medium, dark brown									580.3	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-031**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/12/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/12/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel, sand, light brown to gray, fill, dry									0	
	0.5		1	Silty sand, some cobbles, black, mica, slight odor, crumbly, dry									0.1	
	1		1.58	Gravel, sandy silt, black, slight odor, moist									4.3	
	1.58		2	Clay, gray, green gray, dry									3.2	
	2		3	Clay, gray, green gray, dry									8.4	
	3		4	Clay, brown gray, moist to wet									2.4	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:** Aquaterra	**Hole Designation:** BH-16-032
Project Number: 11109614	**Driller:** Rob Drewicz	**Date/Time Started:** 7/12/2016 0:00
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 7/12/2016
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (55%), fine to coarse, brown, gravel (35%), fine to coarse, angular, sand (10%), fine to coarse, light brown, moist									0	
	0.5		1	Gravel (90%), fine to coarse, sub-angular, sand (10%), fine to coarse, dark brown, wet									0	
		1.1		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:**	**Hole Designation:** BH-16-033	
Project Number: 11109614	**Driller:**	**Date/Time Started:** 7/1/2016 0:00	
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 6/28/2016	
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon	

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.25	Gravel, cobbles, pebbles, sand, brown, moist, well graded									0	
	0.25		0.5	Gravel, sand, cobbles, tan, moist, well graded									0	
	0.5		0.92	Gravel, cobbles, sand, tan to light brown, wet									0	
		0.92		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor** Aquaterra	**Hole Designation:** BH-16-034
Project Number: 11109614	**Driller:** Rob Drewicz	**Date/Time Started:** 7/8/2016 0:00
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 7/8/2016
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SINTAMPLE REVAL	PID (ppm)	N-VALUE
	0		0.5	Large brick and cement blocks (80%), sand (10%), fine to coarse, black, gravel (10%), fine to coarse, sub-angular, dry									0	
	0.5		1	Silty sand (55%), fine to coarse, black, gravel (45%), sub-angular, slightly moist									5.9	
	1		1.5	Silty sand (75%), fine to coarse, black, gravel (25%), fine to coarse, sub-angular, slightly moist									35.7	
	1.5		2	Silty sand (75%), fine to coarse, black, gravel (25%), fine to coarse, sub-angular, moist									38.7	
	2		2.5	Clay (85%), black, silty sand (10%), black, gravel (5%), fine to coarse, sub-angular									82.9	
	2.5		3	Clay (85%), black, silty sand (15%), black									155.3	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-035**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/8/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/8/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (85%), fine to coarse, sub-angular, sand (15%), fine to coarse, light brown									0	
	0.5		1	Gravel (60%), fine to coarse, sub-angular, sub-rounded, sand (15%), fine to coarse, brown, trace of mica									0	
	1		1.5	Gravel (50%), fine to coarse, sub-rounded, sub-andular, sand (50%), fine to coarse, light brown, brown, light gray, trace of mica									0	
	1.5		2	Gravel (50%), fine to coarse, sub-rounded, sand (50%), fine to coarse, brown, orangish brown, light gray, trace of mica									0	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-036**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/29/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/30/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SIANTMPLEEVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (90%), fine to medium grained, black and brown, gravel (10%), fine to coarse, sub-angular									0	
	0.5		1	Silty sand (100%), fine to medium grained, black, slightly moist									0	
	1		1.5	Clay (70%), black, silty sand (30%), fine to medium, black, slightly moist									0	
	1.5		2	Clay (100%), black, moist									0.5	
	2		2.5	Clay (100%), black, wet									0	
	2.5		3	Silty Clay (100%), black, wet									0	
	3		3.5	Clay (100%), black, saturated									2.2	
		3.25		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-037**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**6/29/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/29/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SITE LITHOLOGY	PID (ppm)	N-VALUE
	0		0.5	Silty Sand (55%), fine to coarse grained, brown, silty clay (45%), black, dry to slightly moist									0	
	0.5		1	Silty clay (100%), black, moist									0.3	
	1		1.5	Silty clay (100%), black, moist									0.3	
	1.5		2	Silty clay (100%), black, moist									355.2	
	2		2.5	Clay (100%), black, moist									178	
	2.5		3	Clay (100%), black, wet									340.5	
		3		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-038**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/30/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/30/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		1.5	Large rocks, sand, cobbles, some brick pieces, well graded, dry to moist									0	
	1.5		1.75	Sand, silt, brown, moist									0	
	1.75		1.91	Silty clay, black, cobbles, some brick pieces, moist									0	
	1.91		2.5	Brick, large rocks									0	
	2.5		3	Silty clay, gray black, slight odor									0.9	
	3		4	Silty clay, gray black, slight odor									1.3	

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:** Aquaterra	**Hole Designation:** BH-16-039
Project Number: 11109614	**Driller:** Rob Drewicz	**Date/Time Started:** 6/29/2016 0:00
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 6/29/2016
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Silty sand (60%), fine to coarse grained, brown to light brown, gravel (40%), fine to coarse, sub-angular, slightly moist									0	
	0.5		1	Silty sand (55%), fine to coarse grained, light brown, gravel (45%), fine to coarse, angular, dry									0	
	1		1.5	Silty sand (55%), light brown, gravel (45%), fine to coarse, angular, dry									0	
	1.5		2	Silty sand (50%), fine to coarse, light gray, gravel (50%), fine to coarse, angular, dry to wet									0	
		1.75		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**BH-16-040**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**6/29/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**6/29/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel, sand, tan, moist									0	
	0.5		1.33	Gravel, sand, tan, moist									0	
	1.33		1.5	Gravel, sand, brown, transition to black, slight odor, moist to wet									0.1	
		1.5		Water table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-041**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/6/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/6/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (60%), fine to coarse, tan and brown, gravel (40%), fine to coarse, sub-angular, dry									0	
	0.5		1	Sand (50%), fine to coarse, tan and brown, gravel (50%), fine to coarse, sub-angular, dry									0	
	1		1.5	Sand (50%), fine to coarse, brown and dark brown, gravel (50%), fine to coarse, sub-angular									0	
	1.5		2	Sand (50%), fine to coarse, brown and dark brown, gravel (50%), fine to coarse, sub-angular									0	
	2		2.5	Sand (60%), fine to coarse, brown and dark brown, gravel (40%), fine to coarse, sub-angular, dry									0	
	2.5		3	Sand (40%), fine to coarse, dark brown, silty sand (40%), dark gray, gravel (20%), fine to coarse, sub-angular									3.7	
	3		3.5	Silty sand (70%), fine to coarse, dark gray, gravel (30%), sub-angular										
	3.5		4	Large brick and cement pieces (65%), silty sand (35%), fine to medium, dark gray										
		3.91		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-042**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/6/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/6/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sand (55%), fine to coarse, orangish-brown, gravel (30%), fine to coarse, angular, silty sand (15%), fine to medium, black, dry									0.1	
	0.5		1	Silty sand (70%), fine to medium, black, sand (30%), fine to medium, reddish brown, dry									5.8	
	1		1.5	Silty sand (80%), fine to medium, black, sand (15%), fine to coarse, reddish brown, sand (5%), fine to coarse, brown, dry									56.8	
	1.5		2	Silty sand (80%), fine to medium, black, sand (15%), fine to coarse, reddish brown, sand (5%), fine to coarse, brown, dry									10.2	
	2		2.5	Sand (70%), fine to coarse, light brown and brown, gravel (30%), fine to coarse, sub-angular									36.2	
	2.5		3	Sand (60%), fine to coarse, light brown and brown, silty sand (30%), fine to coarse, black, gravel (10%), fine to coarse, sub-angular									132	
		3.08		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen
Project Number: 11109614
Client: Evergreen
Location: AOI 7

Drilling Contractor:
Driller:
Drilling Method: HA
Surface Elevation:

Hole Designation: BH-16-043
Date/Time Started: 6/29/2016 0:00
Date Completed: 6/29/2016
GHD Supervisor: Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.83	Sand, tan, some dark gray, gravel (1-1.5 inches), some silt, well graded, dry to moist									0	
	0.83		1.25	Gravel, sand, orange brown to 1 foot, sand, coarse grained, tan to tan orange 1-1.25 feet, dry									0	
	1.25		1.42	Sand, silt, gravel (1-2 inches), tan orange, transition to brown black silt, moist									0.1	
	1.42		1.75	Silty sand, some cobbles, gray black, slight odor, poor sorted, dry, some moist									0.2	
	1.75		2	Silty sand, some cobbles, brown black, sand, tan, mica pieces, slight odor, dry									0.1	
	2		2.25	Silty sand, gray black, pieces of glass, very slight odor, moist									0.1	
	2.25		2.5	Silty sand, gray black, pieces of brick, slight odor, moist									0.3	
	2.5		2.67	Silty sand, black, pieces of brick, some cobbles, dry ot moist									1.4	
	2.67		2.83	Silty sand, gray black, brick pieces, glass, some cobbles, slight odor, moist									1.8	
	2.83		3	Silty sand, black, gravel, pieces of glass, cobbles, slight odor, moist									3.2	
		3		Refusal										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name: PES AOI 7 Evergreen	**Drilling Contractor:** Aquaterra	**Hole Designation:** BH-16-044
Project Number: 11109614	**Driller:** Rob Drewicz	**Date/Time Started:** 7/12/2016 0:00
Client: Evergreen	**Drilling Method:** HA	**Date Completed:** 7/12/2016
Location: AOI 7	**Surface Elevation:**	**GHD Supervisor:** Alissa Cannon

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (80%), fine to coarse, angular, sand (10%), fine to coarse, light brown, sand (10%), fine to coarse, dark gray, dry									0	
	0.5		1	Gravel (90%), fine to coarse, angular, large bricks, sand (10%), fine to coarse, dark gray, wet									0	
		1		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-045**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/1/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/1/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, light brown									0.1	
	0.5		1	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, light brown									0.1	
	1		1.5	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, light brown to light gray									0	
	1.5		2	Gravel (80%), fine to coarse, sub-angular, sand (20%), fine to coarse, light gray, wet									0	
		1.8		Water Table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-046**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/8/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/8/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Obstruction										
	0.5		1	Obstruction										
	1		1.5	Obstruction										
	1.5		2	Obstruction										
	2		2.5	Black silty sand (90%), fine to coarse, pieces of brick (10%), dry									106.3	
	2.5		3	Obstruction										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor**	**Aquaterra**	**Hole Designation:**	**BH-16-047**
Project Number:	**11109614**	**Driller:**	**Rob Drewicz**	**Date/Time Started:**	**7/8/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/8/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5	Sub angular gravel (40%), fine to coarse, dark brown sand (40%), fine to coarse, black sand (20%), fine to coarse									0	
	0.5		1	Black sand (85%), fine to coarse, sub angular gravel (15%), fine to coarse, dry									0.3	
	1		1.5	Black sand (90%), fine to coarse, subangular gravel (10%), fine to meduim, pieces of brick, dry									30.3	
	1.5		2	Black sand (95%), fine to coarse, sub angular gravel (5%), fine, dry									133.8	
	2		2.5	Black silty sand (50%), fine to coarse, black sand (50%), moist									650.1	
	2.5		3	Black Sand (100%), fine to medium, wet									480.5	
		3.08		Water table										

Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**C-170**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/6/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/6/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		3.5	Brick, gravel, some sand, brown ray, brown, some brown black, very hard									0	
	3.5		4	Silt, brown black, roots, slight odor, poor graded, moist									1.2	
	4		5	Silt, gravel, cobbles, brown black, moderately graded, slight odor									2	
	5		6	Silt, some gravel, poor graded, moist									0.1	

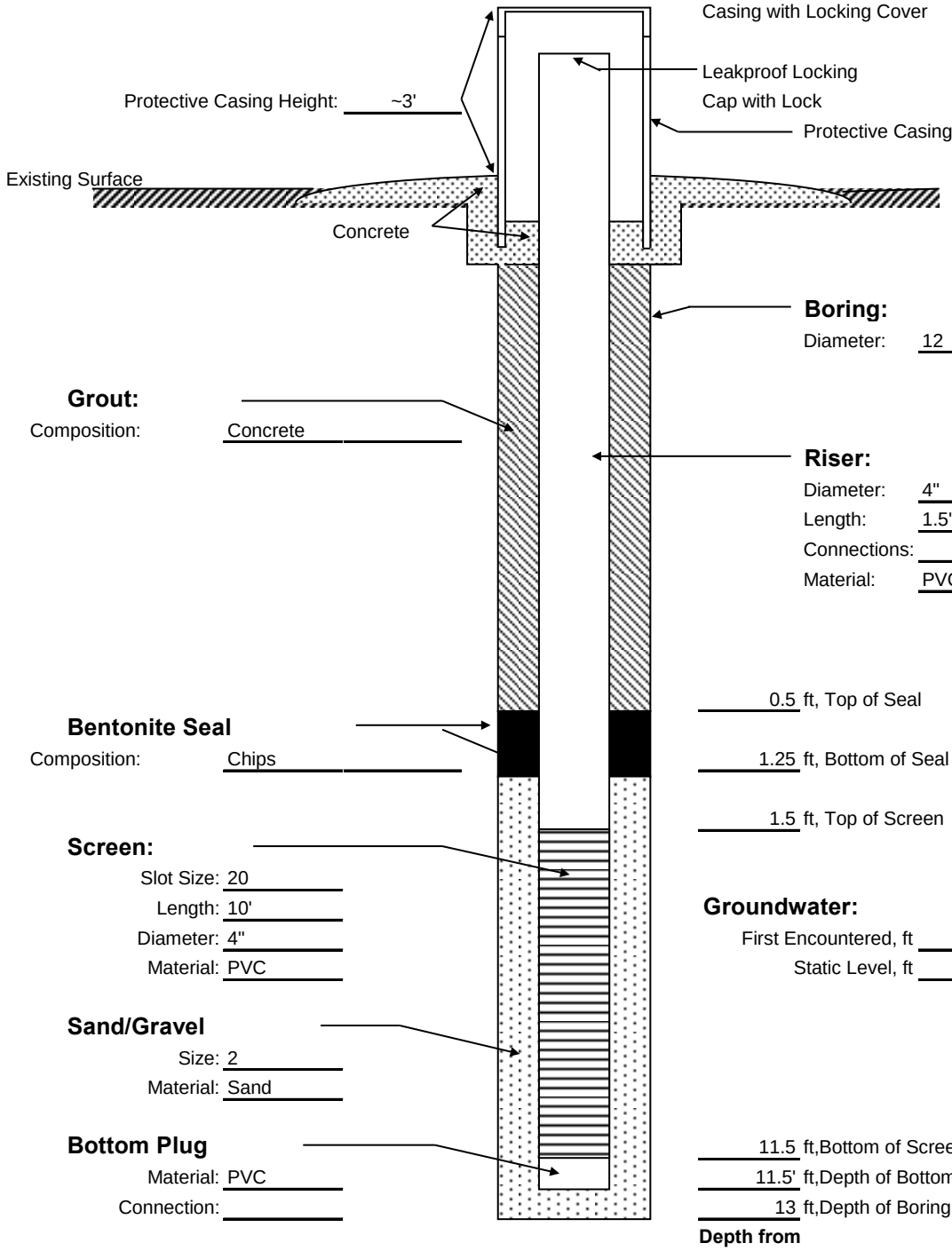
Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

WELL CONSTRUCTION LOG

Project Name:	Evergreen Philadelphia Energy Solutions	Hole Designation:	C-170
Project No.:	11109614	Date Completed:	7/8/2016
Client:	Evergreen Philadelphia Energy Solutions	Drilling Method:	Hollow stem auger
Location:	AOI 7	GHD Supervisor:	A. Cannon
Survey Information:			2014.11.17 PHL Refinery Com
top of inner casing:		longitude:	
ground:		latitude:	

NOT TO SCALE



STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**C-171**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/5/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/5/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		0.5										0.1	
	0.5		1	Sand, silt, gravel, brown, moist, some wood pieces									0.1	
	1		1.5	Silty clay, sand, brown, gray black, poor graded									0.6	
	1.5		2	Brick pieces, silt, gray black, some wood pieces, rocks										
	2		2.5	Brick pieces, silt, gray black, some wood pieces, rocks									1.7	
	2.5		3.5	Silt, clay, some sand, gray black, some gray, moist to wet, wood pieces									0.2	
	3.5		4	Clay silt, gray black, poor graded, wet, slight odor									0.1	
		3.67		Water table										
		4.17		Brick pieces										
	4		14	Silty clay, gray black, mosit to dry, slight odor										

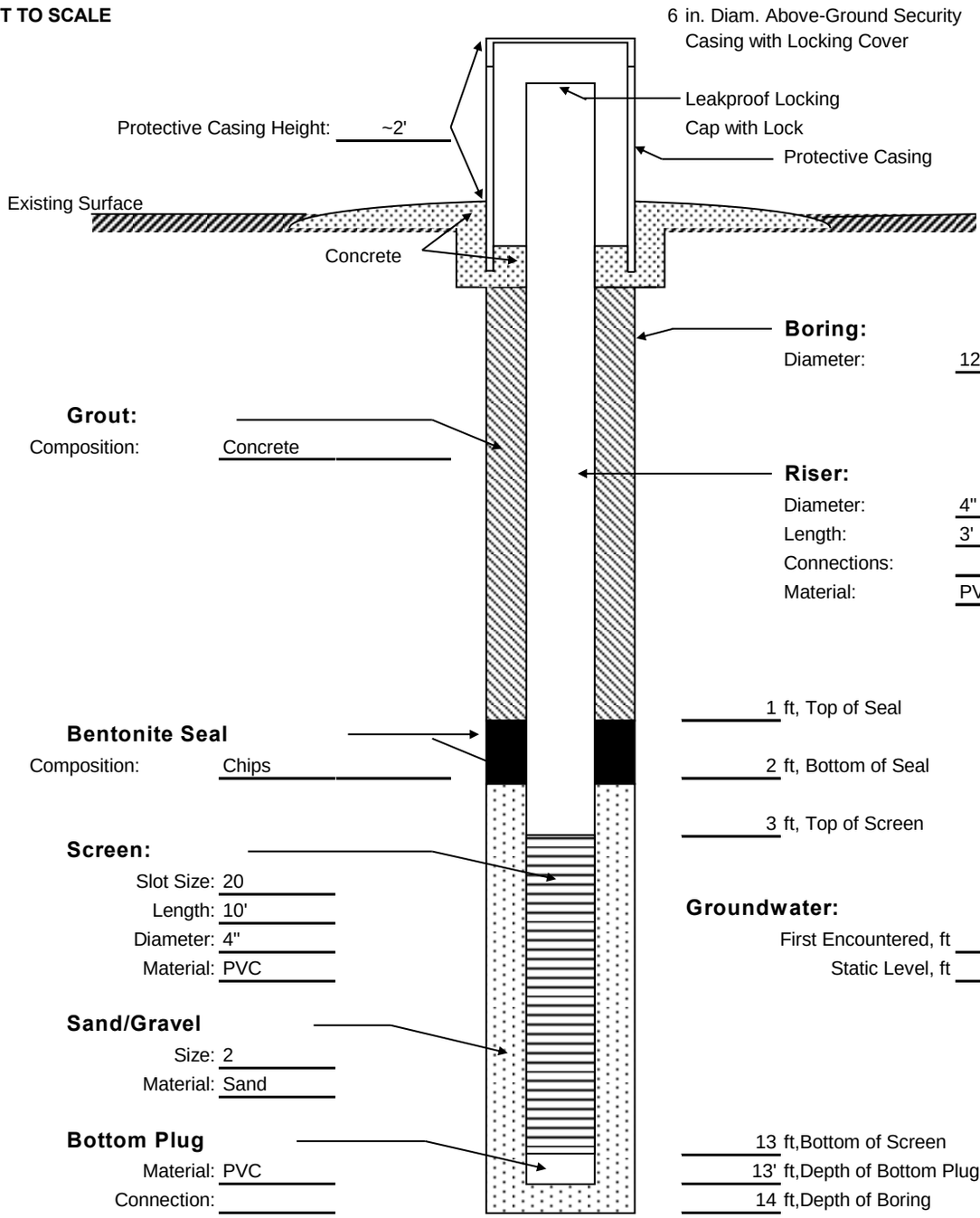
Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

WELL CONSTRUCTION LOG

Project Name:	Evergreen Philadelphia Energy Solutions	Hole Designation:	C-171
Project No.:	11109614	Date Completed:	7/8/2016
Client:	Evergreen Philadelphia Energy Solutions	Drilling Method:	Hollow stem auger
Location:	AOI 7	GHD Supervisor:	A. Cannon
Survey Information:			
top of inner casing:	10.36	Northing	219648.91
ground:	7.9	Easting	2679794.9

NOT TO SCALE



STRATIGRAPHY LOG (OVERBURDEN)

Project Name:	**PES AOI 7 Evergreen**	**Drilling Contractor:**		**Hole Designation:**	**C-172**
Project Number:	**11109614**	**Driller:**		**Date/Time Started:**	**7/6/2016 0:00**
Client:	**Evergreen**	**Drilling Method:**	**HA**	**Date Completed:**	**7/6/2016**
Location:	**AOI 7**	**Surface Elevation:**		**GHD Supervisor:**	**Alissa Cannon**

LITHOLOGY	Stratigraphic Intervals (depths in ft bgs) FROM	AT	TO	SAMPLE DESCRIPTION Order of Descriptors: Primary Component/Secondary Components Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Color, Moisture Content, Supplementary Descriptors	SAMPLE DETAILS SAMPLE #	SAMPLE METHOD	Penetration Record Split Spoon Blows 6"	6"	6"	6"	RECOVERY	SAMPLE INTERVAL	PID (ppm)	N-VALUE
	0		1	Brick, gravel, sand, cobbles, dark brown									0	
	1		2	Sand, silt, brick, cobbles, some clay, dark brown, slight odor, dry									0.2	
	2		3	Gravel, cobbles, sand, silt, brown to brown back, slight odor, moist									0.4	
	3		4	Sand, silty clay, some gravel, brick pieces, brown, slight odor, moist									10.6	
	4		5	Gravel, sand, cobbles, some silt, brown to brown gray, slight odor, wet									0.1	
		5.17		Water table										
	5		6	Silty clay, some sand, cobbles, dark brown, poor graded, moist									0.2	
	6		7	Silty clay, some sand, cobbles, dark brown, poor graded, moist									3	
	7		8	Cobbles, sand, silty clay, moderately sorted, wet									0.1	

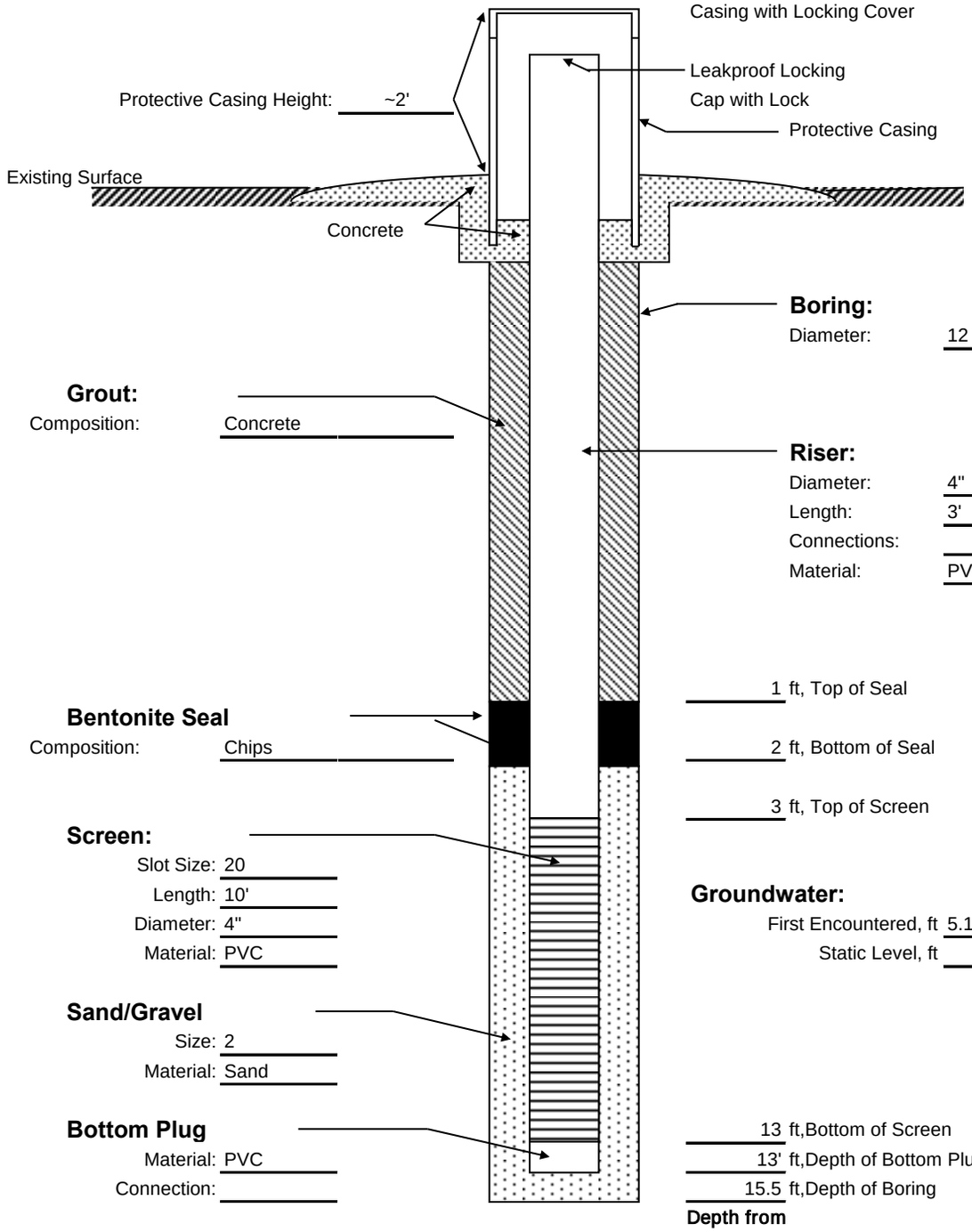
Notes and Comments

HA - Hand Auger
NA - Not Available
WH - Weight of Hammer
SS - Split-Spoon
NIR: No Instrument Response.

WELL CONSTRUCTION LOG

Project Name:	Evergreen Philadelphia Energy Solutions	Hole Designation:	C-172
Project No.:	11109614	Date Completed:	7/6/2016
Client:	Evergreen Philadelphia Energy Solutions	Drilling Method:	Hollow stem auger
Location:	AOI 7	GHD Supervisor:	A. Cannon
Survey Information:			
top of inner casing:	5.91	longitude:	218450.74
ground:	3.8	latitude:	2680374.84

NOT TO SCALE



Appendix D
Laboratory Analytical Reports (USB Flash Drive)

Appendix E
LNAPL Conceptual Site Model

Appendix E from ATTACHMENT H of the Langan SCR/RIR (2012)
LNAPL MODELING PROCEDURES
AOI 7: SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

H.1 INTRODUCTION AND OVERVIEW

Models which assess volume, mobility, and recoverability of light non-aqueous phase liquid (LNAPL) contamination have progressed beyond simply extrapolating LNAPL monitoring well thicknesses into the surrounding geologic materials. Instead, these models incorporate the physical properties of groundwater, LNAPL, and soil, in conjunction with an improved understanding of how fluids interact with each other and the surrounding geologic materials, and provide better estimates of LNAPL volume, mobility, and recoverability. These scientific improvements have allowed more realistic endpoints to be set during the remediation process.

For the LNAPL modeling in AOI 7 at the Sunoco Refinery in Philadelphia, PA (the Facility), Langan utilized the American Petroleum Institute (API) Publication Number 4682, "Free-Product Recovery of Petroleum Hydrocarbon Liquids," dated June 1999, as a guide for assessing LNAPL volume, mobility, and recoverability. The parameters discussed in subsequent sections are presented in API Publication 4682 as the significant variables and parameters needed to evaluate the nature and extent of free LNAPL. An updated version of the API model found in the API publication "API Interactive LNAPL Guide," version 2.0.4, dated July 2004, was used. These parameters and the API model were utilized to estimate the specific volume and mobility of LNAPL at the Facility.

H.2 INPUT PARAMETERS

Representative values obtained from the API's LNAPL and Environmental Canada's Reference Database were used to identify input parameters. Table H-1 of this attachment summarizes the LNAPL modeling input parameters used for this phase of the project. The individual input parameters used for the LNAPL models are described in detail below.

H.3 FLUID PROPERTIES

The fluids of concern in LNAPL modeling are LNAPL, groundwater, and air. Key physical properties of these fluids are density (ρ), interfacial tension (σ) and viscosity (μ). Chromatographic and mass spectroscopic hydrocarbon LNAPL characterization analyses were

conducted on collected LNAPL samples in an attempt to identify and categorize LNAPLs on site.

H.3.1 Fluid Density and Specific Gravity

Fluid density,ρ, is the mass of fluid per unit volume. Specific gravity, ρ_r, is the relative density of LNAPL with respect to the density of water. The density of LNAPL is related to its specific gravity through the following relationship:

$$\rho_r = \rho_o/\rho_w \qquad \text{(H.1)}$$

where ρ_o and ρ_w are the LNAPL and water densities, respectively.

Density estimates for LNAPL samples collected from wells within the Facility were determined from LNAPL and groundwater density data. If a density value was not available for the LNAPL in a particular monitoring well, a value was assigned based on the physical characteristics of the LNAPL observed in neighboring wells.

H.3.2 LNAPL Viscosity

Viscosity is the measure of friction between molecules within a given fluid. The dynamic (or absolute) viscosity, μ, is defined as the ratio of the shear stress to the strain rate for a Newtonian fluid (Newtonian fluids have constant viscosity and flow immediately on the application of a force). The kinematic viscosity (ν) is the ratio of the dynamic viscosity to the density of a fluid.

If a kinematic viscosity value was not available for the LNAPL within a monitoring well, a value was assigned based on the physical characteristics of the LNAPL in relation to neighboring monitor wells, or a representative viscocity value was selected from the API or Environmental Canada Database chosen based upon other LNAPL physical characteristics.

H.4 FORMATION PHYSICAL PROPERTIES

Where available, site-specific geologic and hydrogeologic data were obtained from site soil boring investigations, monitoring and recovery wells installation and sampling activities, and aquifer characteristic testing. All remaining physical property input values were obtained from reference literature.

Variations in soil type were noted from boring log descriptions. For the purpose of determining modeling parameters, generalizations of the geologic characteristics were made based on the occurrence and distribution of soil types within the LNAPL wetted screen interval of monitoring wells. Consistent with the API guidance publication, the geologic parameters of interest include: soil texture, porosity, bulk density, fluid saturation, capillary pressure relationships, and total organic carbon (TOC). These parameters are discussed in detail below.

H.4.1 Formation Texture

One of the most important parameters in determining the properties of porous media is the size range of particles in a soil, which is referred to as soil texture. Grain size is closely related to soil texture, and a grain size distribution gives the relative percentage of grain sizes within a formation.

Where available, historic site-specific grain size distribution data were used to describe the relative percentage of grain size within the various geologic units at the Facility. Regions with similar grain size distributions were grouped together, and representative values were selected. Soil within the historic maximum LNAPL wetted interval was used for this selection. Note, however, that in any given boring log, the soil type spanning the LNAPL wetted interval may actually include a range of soil types. In addition to the grain size analyses, the soil Atterberg Limits were referenced for select soil types. The Atterberg limits were used to correlate and characterize the fine-grained soil (i.e., silt and clay) in conjunction with the grain size distribution analyses.

H.4.2 Porosity

The ratio of the volume of void space in a soil to the total volume is defined as the porosity (n), which is usually written as a fraction or a percent of void space. Generally,

wider variations in particle sizes result in smaller porosity values, as the void space between the larger particles are filled by smaller particles. The effective porosity (or kinematic porosity) refers to the volume of interconnected pore spaces through which fluids can flow.

H.4.3 Bulk Density

Bulk density is a measure of the weight of the soil per unit volume, usually given on an oven-dry (110° C) basis. Variation in bulk density is attributable to the relative proportion and specific gravity of solid organic and inorganic particles and to the porosity of the soil. Most mineral soils have bulk densities between 1.0 and 2.0.

H.4.4 Fluid Saturation

According to the API guidance documents, the void space of a natural porous medium affected by an LNAPL release is filled with water, air and LNAPL. The fraction of the pore space of a representative volume of material that is occupied by a particular fluid is called the fluid saturation. The fluid saturation of each phase can range from 0 to 1, and the sum of the three phases must equal 1.

H.4.5 Capillary Pressure Relationships

According to the API guidance document, molecules located near the interface between two fluids (i.e. water and LNAPL) in one void space have a greater energy than molecules of the same fluid located within the bulk volume due to cohesive forces between the molecules. The excess energy associated with a fluid interface results in interfacial tension between the fluids, and surface tension between the liquid and vapor.

These relationships are incorporated into the API model for determining formation specific volume under vertical equilibrium.

H.5 LNAPL EFFECTIVE PERMEABILITY

Water, air, and LNAPL are in competition for the interstitial spaces within the formation. Relative permeability describes the ability of one fluid to flow in the presence of other fluids, compared to the ability of the fluid to flow if it were the only fluid present. Typically, these

differences in permeability between water and LNAPL are observed as LNAPL reaches the water table in sufficient quantities, pools, and spreads laterally as a floating layer.

The API modeling approach is to predict the LNAPL saturation and relative permeability distributions under vertical equilibrium conditions. The effective saturation and relative permeability values depend on the LNAPL thicknesses within the formation, for which the apparent monitoring well LNAPL thicknesses serve as a useful measure. The modeling objective is to replace the layer with varying saturation and relative permeability with an equivalent layer with vertically uniform characteristics.

For each well with reported apparent LNAPL thickness, the API model was run to determine the effective relative permeability of LNAPL within that well. As a first approximation, the residual saturation of LNAPL (the portion of LNAPL that is adhered to soil and not recoverable) was considered to be zero for the calculation of effective relative permeability. The residual saturation of LNAPL will be determined based on the soil grain size, fluid saturation and capillary curves for the recoverability analysis.

H.6 SOIL INTRINSIC PERMEABILITY

The intrinsic permeability of the soil was estimated using the following equation:

$$k_{soil} = \frac{K_W \mu_W}{\rho_W g} \qquad \text{(H.2)}$$

where,

k_{soil} = permeability of soil

K_w = hydraulic conductivity of groundwater for fill horizon

μ_w = dynamic viscosity of water

p_w = density of water

g = gravity

The estimates of the ground water density and viscosity were used to determine the intrinsic soil permeability. The gravity constant was assumed to be 32.2 feet/s^2 (9.81 m/s^2).

H.7 LNAPL HYDRAULIC CONDUCTIVITY AT SATURATION

To estimate the seepage velocity of the free-phase LNAPL, the hydraulic conductivity of the formation with respect to LNAPL must be known. The hydraulic conductivity of LNAPL is first calculated at 100% saturation at the LNAPL phase. Then it is corrected from the effective LNAPL relative permeability. This corrected hydraulic conductivity of LNAPL is the hydraulic conductivity of LNAPL in the formation at the estimated saturation of LNAPL. This can be estimated based on the following equation:

$$K_{oil} = k_{ro} \frac{k_{soil} \rho_{oil} g}{\mu_{oil}} \qquad \text{(H.3)}$$

where,

K_{oil} = hydraulic conductivity of LNAPL in the soil at saturation

k_{ro} = effective LNAPL relative permeability

k_{soil} = permeability of soil relative to groundwater (Equation D.2)

μ_{oil} = dynamic viscosity of LNAPL

ρ_{oil} = density of LNAPL

g = gravity

H.8 LNAPL SPECIFIC DISCHARGE

The result of the corrected hydraulic conductivity for LNAPL saturation (Equation H.3) was used to calculate the specific velocity of the LNAPL based on hydraulic gradient of the groundwater using the following equation:

$$q_{oil} = K_{oil} \times i_w \qquad \text{(H.4)}$$

where,

q_{oil} = LNAPL specific velocity of LNAPL discharge

K_{oil} = hydraulic conductivity of LNAPL in the soil at the corrected saturation

i_w = water table gradient

The water table gradient was assumed to be similar to the LNAPL table gradient. Based on the groundwater monitoring data collected to date, average water table gradients were selected.

The seepage velocity or mobility of the LNAPL was calculated based on the specific velocity calculated in Equation H.4, and correcting it for the effective porosity of the formation as follows:

$$v_{oil} = \frac{q_{oil}}{\phi_{eff}} \qquad \text{(H.5)}$$

where,

v_{oil} = LNAPL seepage velocity

q_{oil} = LNAPL specific velocity of LNAPL discharge

ϕ_{eff} = effective porosity

The specific velocity of the LNAPL discharge from the previous calculation was divided by the effective porosity to determine the seepage velocity of LNAPL for all wells. For this calculation, total porosity values associated with each soil type were reduced for use as an effective porosity for LNAPL mobility.

H.9 LNAPL MODELING RESULTS

Calculated LNAPL specific volumes range 4.19 e-5 feet (C-151) to 0.571 feet at C-148. Well locations with calculated specific volumes greater than 0.1 feet are C-143, C-161, C-152, C-147, C-106, C-148 and C-167. The majority of these are located near the 137 Crude Unit and No. 3 Separator. The calculated LNAPL relative permeabilities range 0.047 % to 49.5 %. Fifteen of the eighteen wells with measureable LNAPL have calculated relative permeabilities greater than 1%.

Calculated LNAPL seepage velocities range 1.28e-6 (C-151) to 0.02 ft/d (WP-14). Thirteen wells have calculated LNAPL seepage velocities greater than 1e-7 cm/s (2.83e-4 ft/d). Located in Tables H.2 and H.3 are the output results of the LNAPL modeling. Located in Table H.4 of this attachment is the LNAPL characterization data provided by Torkelson Laboratories.

Table H.1
API Model Input Parameters, Soil Type and LNAPL Thickness
AOI 7 Site Characterization Report
Sunoco Philadelphia Refinery and Belmont Terminal
Philadelphia, Pennsylvania

Well ID	Apparent LNAPL Thickness Field Measurement[1]		API Database					LNAPL Density (Torkelson Geochemistry) (gm/cc)	LNAPL Type or Surrogate LNAPL Type (Torkelson Geochemistry)	Interfacial/Surface Tension			Interfacial/Surface Tension Source
	meter	feet	Effective Porosity Well ID (unitless)	USCS Soil Type Surrounding Well Screen[2]	van Genuchten "N" (unitless)	van Genuchten "a" [m^{-1}]	Irreducible Water Saturation[3] (unitless)			Air/Water Surface Tension[4] (dynes/cm)	Air/LNAPL Surface Tension (dynes/cm)	LNAPL/Water Interfacial Tension (dynes/cm)	
C-65	0.323	1.060	0.328	(SW)g	1.550	7.830	0.290	0.9126	Lubrication Oil	65.000	31.000	24.400	Gasoline Engine Lube Oil ETC Database
C-106	0.536	1.760						0.9306					
C-107	0.101	0.330						0.8487	Residual Oil	65.000	32.100	30.200	Residual Fuel Oil #4 ETC Database
C-143	0.735	2.410						0.8676	Middle Distillate	65.000	27.300	24.000	Diesel Fuel Oil - Southern USA (15°C) API Interactive LNAPL Guide
C-64	0.344	1.130						.8807 (C-154)	Light Crude	65.000	26.600	21.900	West Texas Intermediate (15°C) API Interactive LNAPL Guide
C-97	0.034	0.110						.8428 (C-150)					
C-147	1.009	3.310						0.8409					
C-148	1.618	5.310						0.8512					
C-150	0.098	0.320						0.8428					
C-151	0.012	0.040						0.8597 (C-152)					
C-152	0.774	2.540						0.8597					
C-153	0.143	0.470						0.8620					
C-154	0.027	0.090						0.8807					
C-161	0.238	0.780						0.8737					
C-162	0.314	1.030						0.8833					
C-166	0.223	0.730						0.8486					
C-167	1.649	5.410						0.8601					
WP-14	0.323	1.060						0.8601 (C-167)					

NOTES:
(1) Groundwater/LNAPL gauging event January 2012.
(2) Unified Soil Classification System. Soil type was determined from C-142, C-143 and C-144D boring logs.

USCS Symbol	API Database Version e / Folk Description
(SW)g	Well graded sand with gravel

(3) Residual LNAPL saturation in the saturated and vadose zones are considered to be negligible.
(4) SPL Interfacial Tensions.

NAPL Type	Source
Lube Oil	Environment Canada ETC Database(Gasoline Engine)
Middle Distillate	Environment Canada ETC Database (Diesel)
Residual Oil	Environment Canada ETC Database (Residual Fuel Oil #4)
Light Crude	Environment Canada ETC Database (South Louisiana Crude)

Table H.2
API Model Results
AOI 7 Site Characterization Report
Sunoco Philadelphia Refinery and Belmont Terminal
Philadelphia, Pennsylvania

Well ID	Apparent LNAPL Thickness Field Measurement[1]		Specific Volume (D_o)		LNAPL Relative Permeability (k_{ro})
	meter	feet	meters	feet	unitless
C-151	0.012	0.040	1.3E-05	4.2E-05	0.047%
C-154	0.027	0.090	1.5E-05	4.8E-05	0.163%
C-97	0.034	0.110	6.5E-05	2.1E-04	0.641%
C-107	0.101	0.330	5.3E-04	0.002	2.372%
C-150	0.098	0.320	9.0E-04	0.003	4.222%
C-153	0.143	0.470	1.7E-03	0.006	5.967%
C-65	0.323	1.060	4.3E-03	0.014	6.761%
C-166	0.223	0.730	5.7E-03	0.019	13.902%
C-162	0.314	1.030	7.4E-03	0.024	12.335%
C-64	0.344	1.130	9.4E-03	0.031	14.628%
WP-14	0.323	1.060	1.0E-02	0.033	13.834%
C-143	0.735	2.410	4.2E-02	0.138	27.981%
C-161	0.238	0.780	4.8E-02	0.158	30.494%
C-152	0.774	2.540	5.2E-02	0.170	32.323%
C-147	1.009	3.310	8.9E-02	0.294	42.386%
C-106	0.536	1.760	1.1E-01	0.346	33.537%
C-148	1.618	5.310	1.7E-01	0.569	50.830%
C-167	1.649	5.410	1.7E-01	0.571	49.521%

Table H.3
LNAPL Seepage Velocity Calculations
AOI 7 Site Characterization Report
Sunoco Philadelphia Refinery and Belmont Terminal
Philadelphia, Pennsylvania

Well_ID	LNAPL Type	Effective Soil Porosity	Groundwater Density (15°C)	Groundwater Dynamic Viscosity (15°C)	Soil Permeability		Calculated Relative Permeability (k_{rn})	Hydraulic Gradient	LNAPL Density (15°C)	LNAPL Dynamic Viscosity (15°C)		LNAPL Conductivity at 100% Pore Saturation	Corrected LNAPL Conductivity		LNAPL Specific Discharge		LNAPL Seepage Velocity		
		unitless	kg/m³	(N-s)/m²	mD	m²	unitless	unitless	kg/m³	cP	(N-s)/m²	m/d	m/d	ft/d	m/d	ft/d	m/yr	ft/yr	ft/d
		1	2	3	1	Calculated	4	5	6	3 or 7	Calculated	Calculated	Calculated		Calculated		Calculated		
C-65	Lubrication Oil	32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	6.8%	0.0497	913	175.00	1.75E-01	1.25E-02	8.46E-04	2.777E-03	4.21E-05	1.38E-04	**4.68E-02**	**1.536E-01**	**4.208E-04**
C-106		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	33.5%	0.0148	931	175.00	1.75E-01	1.28E-02	4.28E-03	1.405E-02	6.35E-05	2.08E-04	**7.06E-02**	**2.317E-01**	**6.349E-04**
C-107	Residual Oil	32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	2.4%	0.0494	849	35.00	3.50E-02	5.82E-02	1.38E-03	4.530E-03	6.81E-05	2.24E-04	**7.58E-02**	**2.488E-01**	**6.817E-04**
C-143	Mixture Distillate	32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	28.0%	0.0034	868	4.00	4.00E-03	5.21E-01	1.46E-01	4.780E-01	5.00E-04	1.64E-03	**5.57E-01**	**1.826E+00**	**5.003E-03**
C-64	Light Crude	32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	14.6%	0.0220	881	7.00	7.00E-03	3.02E-01	4.42E-02	1.450E-01	9.72E-04	3.19E-03	**1.08E+00**	**3.549E+00**	**9.723E-03**
C-97		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	0.6%	0.0065	843	7.00	7.00E-03	2.89E-01	1.85E-03	6.079E-03	1.20E-05	3.93E-05	1.33E-02	4.377E-02	1.199E-04
C-147		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	42.4%	0.0110	841	7.00	7.00E-03	2.88E-01	1.22E-01	4.010E-01	1.34E-03	4.41E-03	**1.50E+00**	**4.909E+00**	**1.345E-02**
C-148		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	50.8%	0.0022	851	7.00	7.00E-03	2.92E-01	1.48E-01	4.868E-01	3.32E-04	1.09E-03	**3.70E-01**	**1.213E+00**	**3.323E-03**
C-150		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	4.2%	0.0022	843	7.00	7.00E-03	2.89E-01	1.22E-02	4.003E-02	2.73E-05	8.96E-05	3.04E-02	9.974E-02	2.733E-04
C-151		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	0.0%	0.0009	860	7.00	7.00E-03	2.95E-01	1.37E-04	4.505E-04	1.28E-07	4.19E-07	1.42E-04	4.663E-04	1.278E-06
C-152		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	32.3%	0.0110	860	7.00	7.00E-03	2.95E-01	9.53E-02	3.127E-01	1.05E-03	3.44E-03	**1.17E+00**	**3.827E+00**	**1.049E-02**
C-153		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	6.0%	0.0009	862	7.00	7.00E-03	2.96E-01	1.76E-02	5.788E-02	1.64E-05	5.38E-05	1.83E-02	5.991E-02	1.641E-04
C-154		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	0.2%	0.0030	881	7.00	7.00E-03	3.02E-01	4.91E-04	1.611E-03	1.47E-06	4.83E-06	1.64E-03	5.377E-03	1.473E-05
C-161		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	30.5%	0.0079	874	7.00	7.00E-03	3.00E-01	9.14E-02	2.998E-01	7.23E-04	2.37E-03	**8.05E-01**	**2.641E+00**	**7.236E-03**
C-162		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	12.3%	0.0038	883	7.00	7.00E-03	3.03E-01	3.74E-02	1.226E-01	1.40E-04	4.60E-04	**1.56E-01**	**5.116E-01**	**1.402E-03**
C-166		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	13.9%	0.0034	849	7.00	7.00E-03	2.91E-01	4.05E-02	1.327E-01	1.39E-04	4.56E-04	**1.55E-01**	**5.071E-01**	**1.389E-03**
C-167		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	49.5%	0.0069	860	7.00	7.00E-03	2.95E-01	1.46E-01	4.793E-01	1.01E-03	3.31E-03	**1.12E+00**	**3.678E+00**	**1.008E-02**
WP-14		32.8%	999.19	1.14E-03	2.87E+03	2.83E-12	13.8%	0.0494	860	7.00	7.00E-03	2.95E-01	4.08E-02	1.339E-01	2.01E-03	6.61E-03	**2.24E+00**	**7.353E+00**	**2.015E-02**

NOTES:
1 - API Parameter Database Version e
2 CRC Handbook of Chemistry and Physics, 68th Edition, 1987 - 88.
3 API Interactive LNAPL User's Guide, July 2004.
4 Results of the van Genuchten-Mualem Model of LNAPL Ditribution and Relative Permeability (API, 2003) using January 2012 LNAPL thickness values.
5 Calculated from groundwater elevations gauged July 2011
6 Determined from representative sample for each impacted area. LNAPL sample analyzed by Lancaster Labs, Inc., August 2011
7 Environmental Canada Oil Properties Database
$(N-s)/m^2$ = Newton-seconds per square meter
mD = millidarcy
cP = centipoise
kg = kilogram
m = meter
d = day
yr = year
Bold = seepage velocity greater than 1e-7 cm/sec = 3.154e-2m/yr = 2.83e-4 ft/d

Appendix H
Table H.4
AOI 7 LNAPL Characterization Summary Table
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

Interpretation of Product Types, Proportions, and Weathering						Similarities to Other Samples in Study		
Characterization Results Compiled for CCR (TGI Job No. 04046 - Analyzed in March 2004)								
Well ID	**Density g/cc (60°F)**	**LNAPL Type(s)**	**Torkelson LNAPL Type(s)**	**Proportion (%)**	**Weathering**	**Quite Similar To**	**Fairly Similar To**	**Somewhat Similar To**
C-65	0.9162	Lube Oil	Lube Oil	60	Extreme	C-106 & PZ-204		All other lube oils in study
			Residual Oil	40	Severe			All other residual oils in study except A-133
C-106	0.9306	Lube Oil	Lube Oil	60	Extreme	C-65 & PZ-204		All other lube oils in study
			Middle Distillate	35		A-136 & B-43	N-68 & S-104	All other middle distillates in study
			Gasoline	5				All other gasolines in study
C-107	0.9371	Residual Oil	Residual Oil	100	Extreme		N-14	All other residual oils in study except A-133
Characterization Results Compiled for AOI 7 Site Characterization Activities (TGI Job No. 10099 - Analyzed in July 2010)								
C-143	0.8676	Middle Distillate	Middle Distillate	50	Extreme			S-297
			Heavier Virgin Naphtha	30	Severe	Unique		
			Heavier Material	20	Extreme			All other heavier materials in study
Characterization Results Compiled for AOI 7 Site Characterization Activities (TGI Job No. 12005 - Analyzed in February 2012)								
C-147	0.8409	Light Crude Oil	Light Crude	100	Severe		C-148 and C-166	C-152
C-148	0.8512	Light Crude Oil	Light Crude	100	Severe		C-147 and C-166	C-152
C-150	0.8428	Light Crude Oil	Light Crude	100	Extreme-Severe	Unique		
C-151	QNS	Light Crude Oil	Light Crude	100	Extreme-Severe		C-154 and C-161	C-167
C-152	0.8597	Light Crude Oil	Light Crude	100	Severe			C-147, C-148, and C-166
C-153	0.8620	Light Crude Oil	Light Crude	100	Extreme	Unique		
C-154	0.8807	Light Crude Oil	Light Crude	100	Extreme		C-151 and C-161	C-167
C-161	0.8737	Light Crude Oil	Light Crude	100	Extreme		C-154 and C-151	C-157
C-162	0.8833	Light Crude Oil	Light Crude	100	Extreme	Unique		
C-166	0.8486	Light Crude Oil	Light Crude	100	Severe		C-147 and C-148	C-152
C-167	0.8601	Light Crude Oil	Light Crude	100	Extreme			C-151, C-154, and C-161
C-168	0.8487	Very Light Crude Oil	Light Crude	100	High-Severe	Unique		

Heavier material could either be crude oil or residual oil
g/cc - Grams per cubic centimeter
TGI - Torkelson Geochemistry, Inc.
NA Not Applicable
QNS - Not enough quantity of sample to perform density analysis
CCR 2004 Sunoco Current Conditions Report
LNAPL Light Non Aqueous Phase Liquid
All LNAPL results reported were analyzed by TGI
Product interpretations were provided by TGI

Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233
Phone: 918-749-8441 e-mail: BTorkelson@torkelsongeochemistry.com
Fax: 918-749-6005

CHAIN-OF-CUSTODY RECORD

Project: Sunoco, Inc. Philadelphia Refinery
Location: 3144 Passyunk Avenue, Philadelphia, PA 19145

Proj. No.: AOIs 2, 3, & 7 SCRs/RIRs
P.O.:
Sampled By: Tim Delk

Report/Bill To: Langan Engineering & Env'l Services
Address: P.O. Box 1569
Doylestown, PA 18901-0219

Phone: 215.491.6500
Fax: 215.491.6501
e-mail: dwebster@langan.com

Additional Instructions
Samples to be analyzed for Fingerprint (GC Characterization) and Density. Include a "Brief Description/Interpretation" of LNAPL, to be consistent with existing LNAPL types for Sunoco Philadelphia. Must have data results no later than July 30, 2010.

Requested Turn-Around Time: Data needed by July 30th

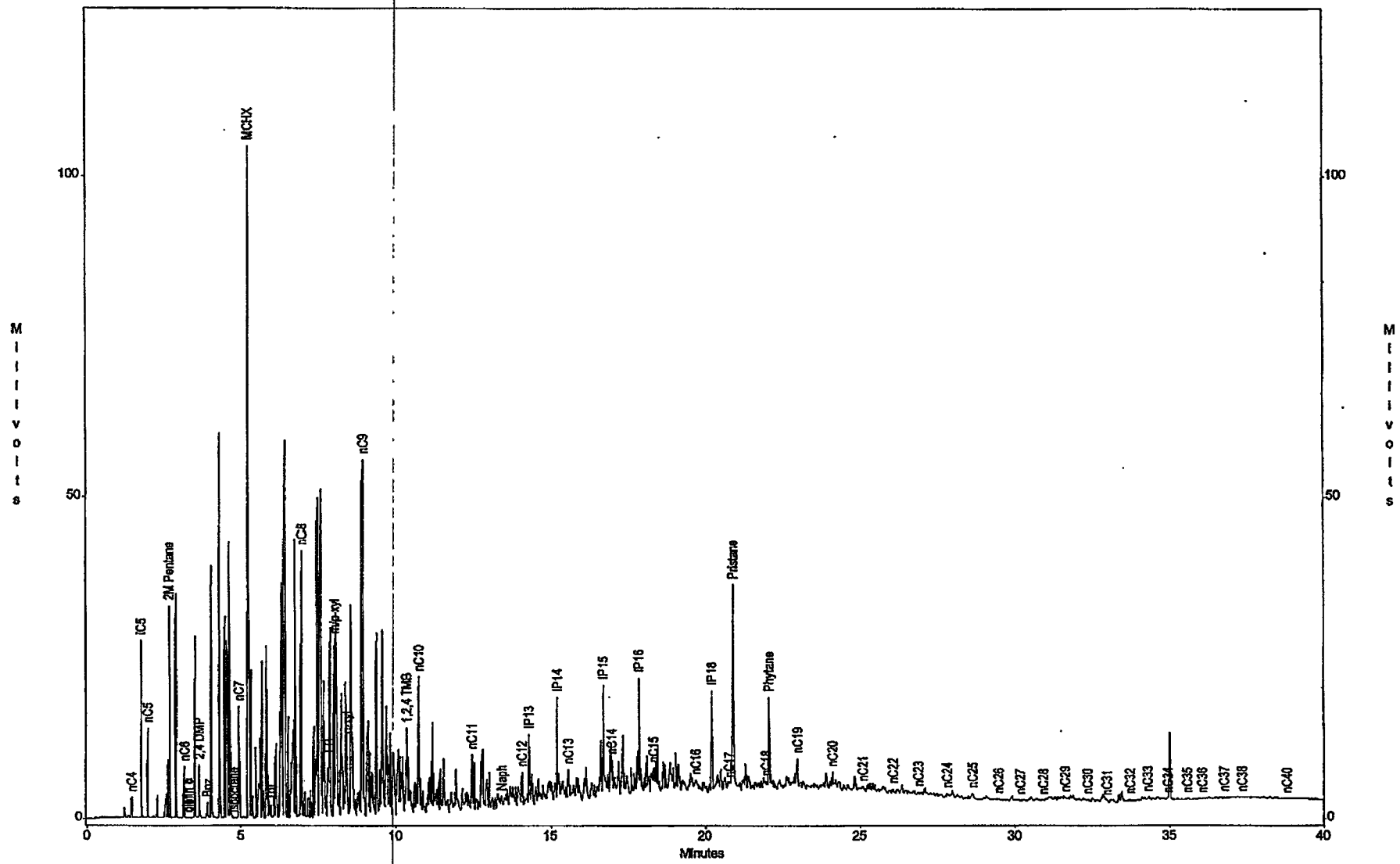
	ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES: None	ANALYSES REQUESTED: Fingerprint-GC Characterizati	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac. Tens.	Lead	Sulfur	REMARKS
AOI-3	1	S-282	7/15/10	Prod		1	X	X	X							Include a "Brief Description/Interpretation" of LNAPL, to be
AOI-3	2	S-285				1										consistent with existing LNAPL types for Sunoco Philadelphia.
AOI 2	3	S-297				1										
AOI 2	4	S-313				1										Times S-282-0950
AOI 2	5	S-315				1										S-285-1115
AOI 7	6	C-143	7/15/10	Prod		1	X	X	X							S-297-1100
	7															S-313-1035
	8															S-315-1020
	9															C-143-1130
	10															

RELINQUISHED BY	ACCEPTED BY	DATE	TIME
[signature]	TS DRAKE WAREHOUSE	07-16	
RELEASED TO FED EX EXP.	SAME DATE		
	[signature]	7-19-10	0845

Torkelson Geochemistry, Inc.

Sunoco, Inc., Philadelphia Refinery
Sample ID : C-143
Acquired : Jul 20, 2010 11:28:51

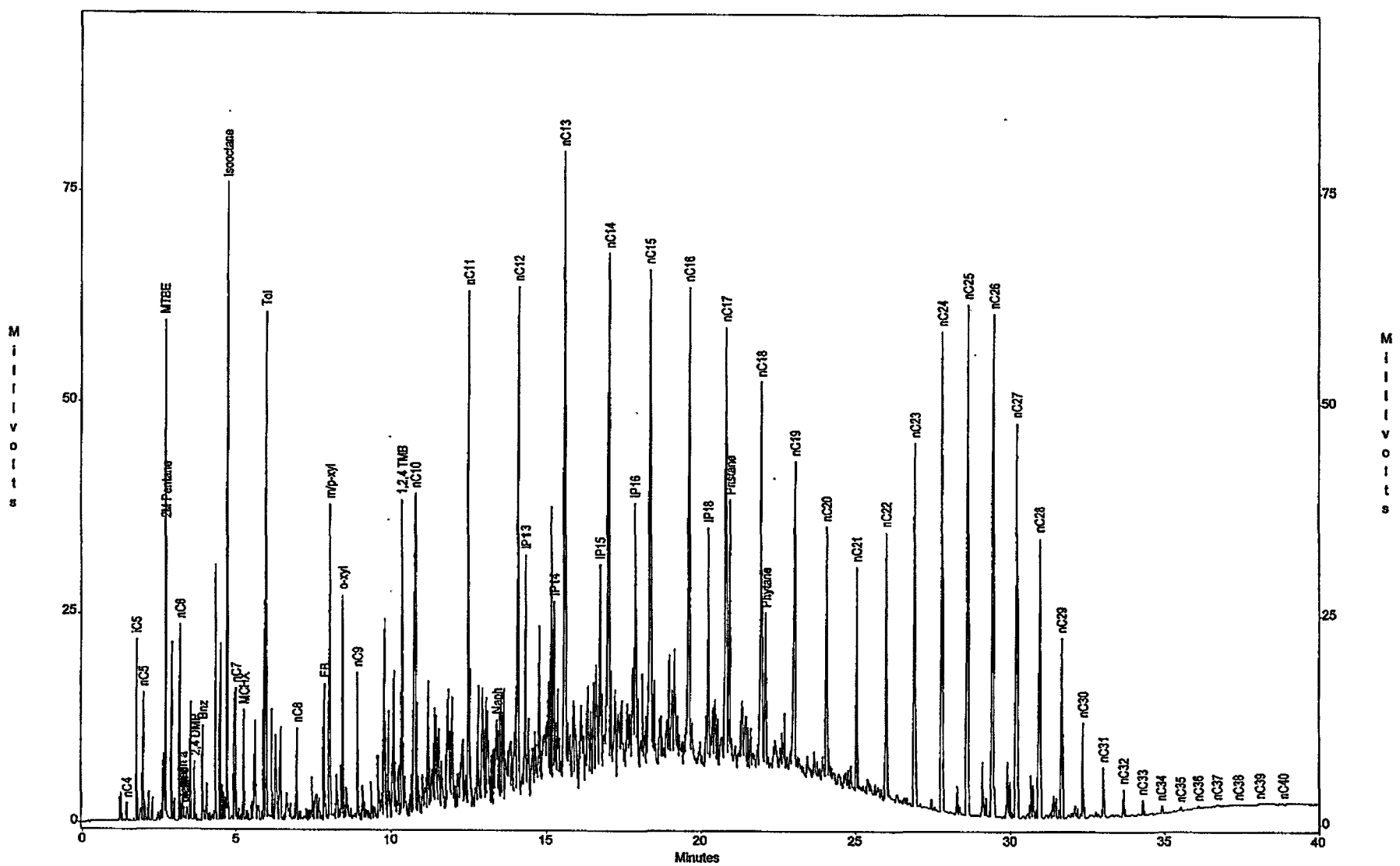
c:\ezchrom\chrom\10099\c-143 – Channel A



Torkelson Geochemistry, Inc.

Sunoco, Inc., Philadelphia Refinery
Sample ID : Gas/Dies/Wax std
Acquired : Jul 20, 2010 09:47:53

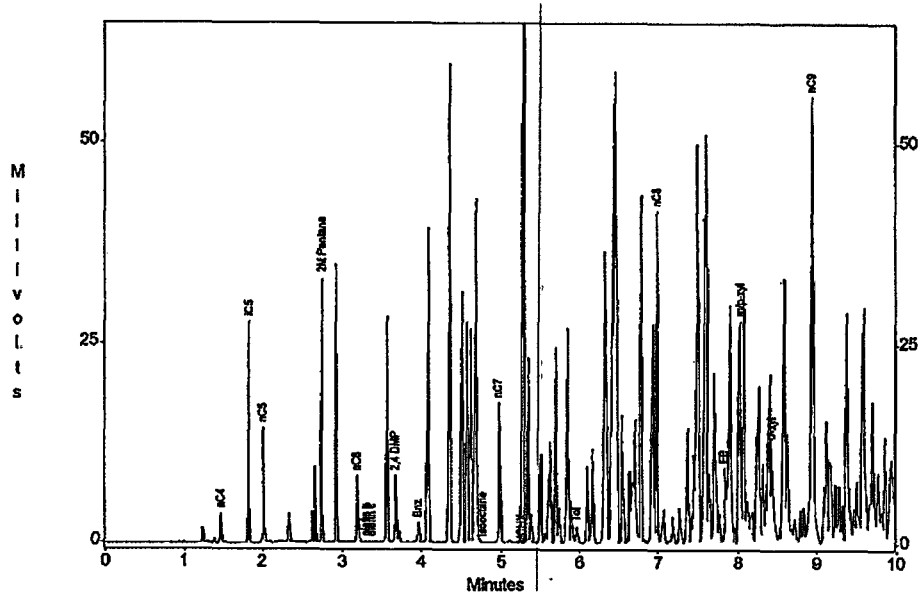
c:\tezchrom\chrom\10099\gadiwax2 -- Channel A



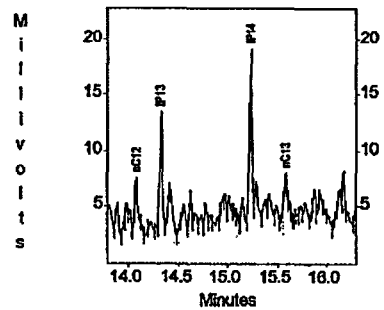
Torkelson Geochemistry, Inc.

Sunoco, Inc., Philadelphia Refinery
Sample ID : C-143
Acquired : Jul 20, 2010 11:28:51

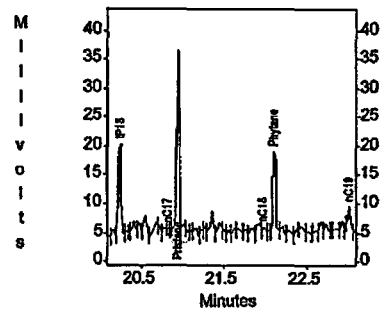
c:\ezchrom\chrom\10099\c-143 – Channel A



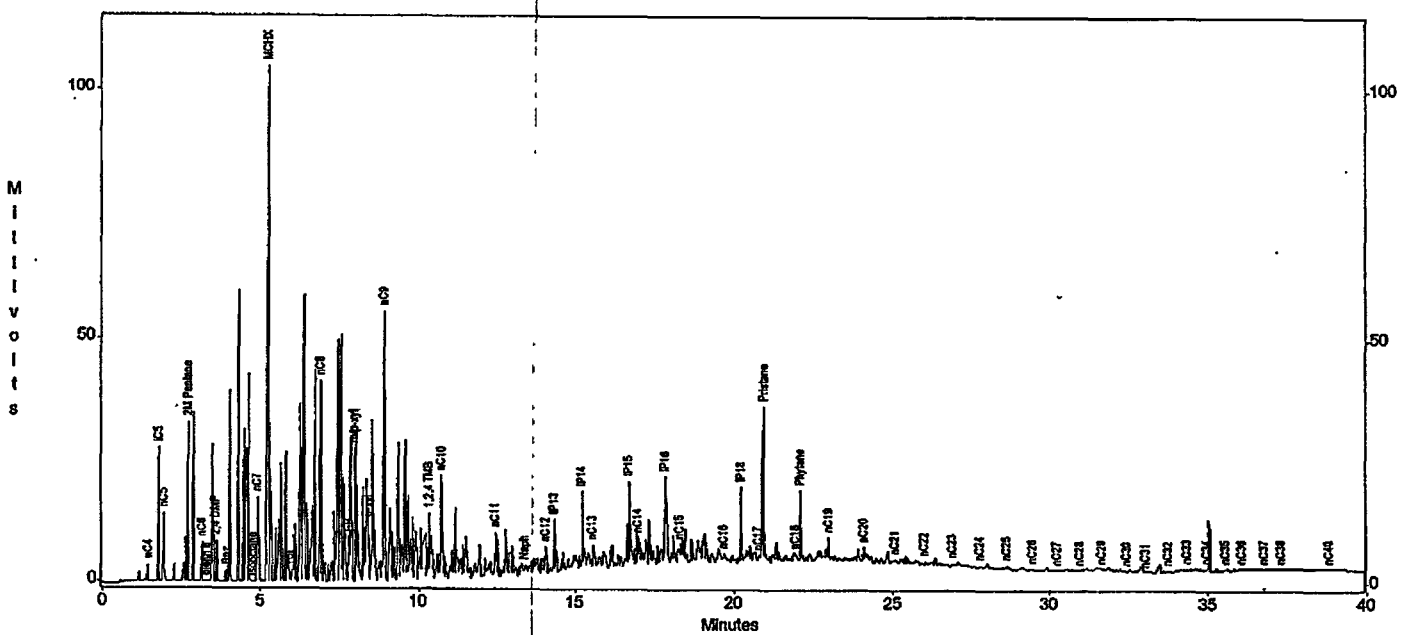
c:\ezchrom\chrom\10099\c-143 – Channel A



c:\ezchrom\chrom\10099\c-143 – Channel A



c:\ezchrom\chrom\10099\c-143 – Channel A



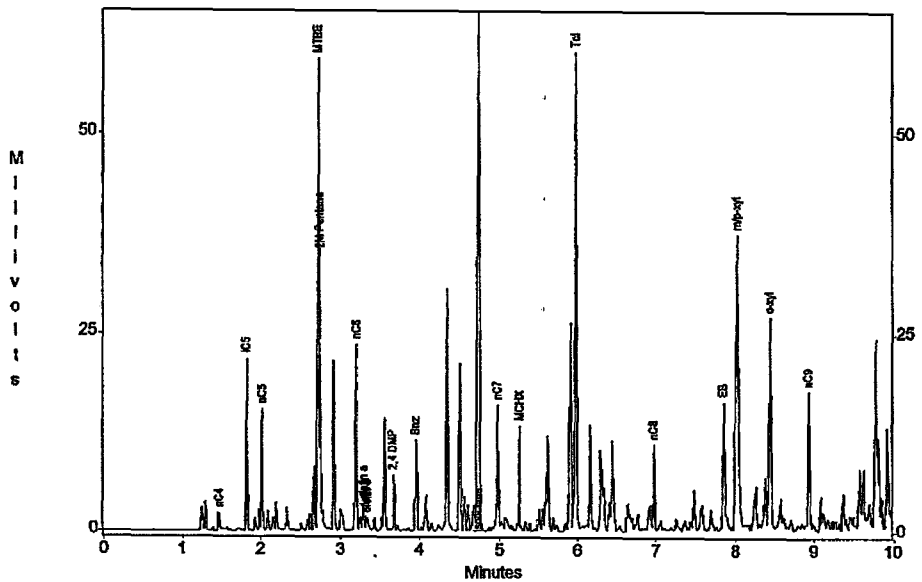
Channel A Results

Peak	Area	Height
nC4	2466	3538
IC5	29859	27746
nC5	11629	14336
MTBE	0	0
2M Pentane	30030	33150
nC6	8194	8347
olefin a	31	22
olefin b	87	79
olefin c -	170	131
2,4 DMP	8824	8490
Benz	3282	2470
Isooctane	66	28
nC7	20862	17512
MCHX	175772	104822
Tol	3534	2045
nC8	56205	41636
EB	13984	9360
m/p-xyl	48704	27779
o-xyl	27084	12423
nC9	103249	55760
1,2,4 TMB	21432	13604
nC10	35696	21414
nC11	18458	9121
Naph	5148	2309
nC12	13846	5931
IP13	23181	11735
IP14	30530	17192
nC13	12747	6018
IP15	37102	18746
nC14	22855	7069
IP16	37790	19641
nC15	19382	5566
nC16	7722	3124
IP18	42487	17021
nC17	5390	2594
Pristane	61585	33254
nC18	6651	2466
Phytane	41071	15565
nC19	18528	5838
nC20	8963	3423
nC21	2753	766
nC22	2350	782
nC23	1492	493
nC24	1618	483
nC25	2799	700
nC26	1023	328
nC27	280	104
nC28	304	155
nC29	741	432
nC30	386	214
nC31	93	36
nC32	333	172
nC33	1103	305
nC34	46	61
nC35	199	102
nC36	147	91
nC37	30	46
nC38	39	44
nC39	0	0
nC40	108	28

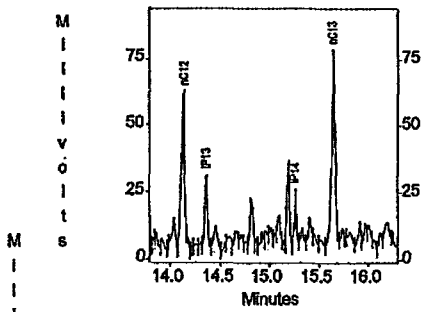
Torkelson Geochemistry, Inc.

Sunoco, Inc., Philadelphia Refinery
Sample ID : Gas/Dies/Wax std
Acquired : Jul 20, 2010 09:47:53

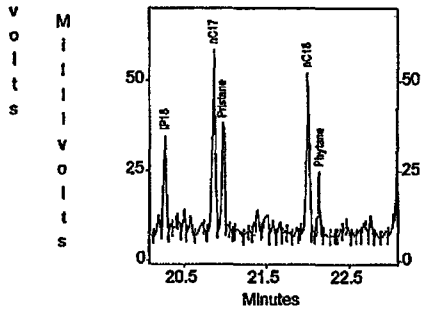
c:\ezchrom\chrom\10099\gadiwax2 -- Channel A



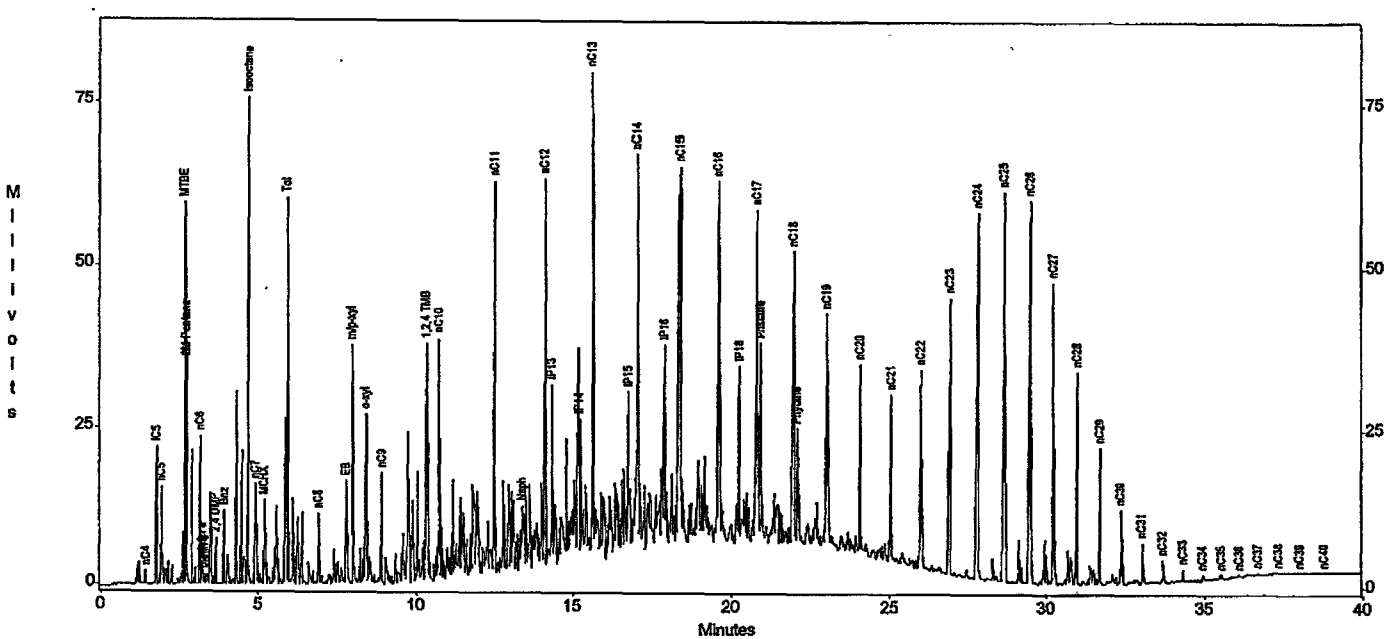
c:\ezchrom\chrom\10099\gadiwax2 -- Channel A



c:\ezchrom\chrom\10099\gadiwax2 -- Channel A



c:\ezchrom\chrom\10099\gadiwax2 -- Channel A



Channel A Results

Peak	Area	Height
nC4	1984	2368
iC5	15414	21815
nC5	11667	15453
MTBE	49307	59479
2M Pentane	33096	34918
nC6	22200	23338
olefin a	3612	3418
olefin b	1724	1722
olefin c	1971	1548
2,4 DMP	7274	7143
Benz	14167	11489
Isooctane	105238	75835
nC7	19179	15820
MCHX	15682	13181
Tol	85518	60313
nC8	13430	11072
EB	23107	16349
m/p-xyl	81108	37519
o-xyl	39737	26870
nC9	24717	17590
1,2,4 TMB	68131	37505
nC10	61257	38172
nC11	124394	61224
Naph	19825	9956
nC12	128262	60646
IP13	52562	28790
IP14	46766	22703
nC13	176618	75744
IP15	39477	24563
nC14	151755	60419
IP16	75003	32151
nC15	156310	59696
nC16	142887	57295
IP18	65882	28620
nC17	129725	52397
Pristane	74492	31831
nC18	97720	45871
Phytane	48775	18464
nC19	83344	36711
nC20	61781	30048
nC21	54899	26638
nC22	68336	31525
nC23	106107	43174
nC24	160461	57025
nC25	186168	60645
nC26	183641	59685
nC27	134561	46943
nC28	82385	33357
nC29	45276	21535
nC30	21368	11336
nC31	11214	6091
nC32	6031	3368
nC33	3267	1886
nC34	1852	992
nC35	1084	567
nC36	546	285
nC37	326	167
nC38	241	92
nC39	236	68
nC40	153	45

Torkelson Geochemistry, Inc.				
Density Measurements				
Paar DMA 512 / DMA 60		ASTM Method 4052		
Sample	Density gm/ml	Temp. of Measurement	Job Number	Date
C-143	0.8676	60F	10099	7/20/10
S-282	0.8104	60F	10099	7/20/10
S-285	0.8921	60F	10099	7/20/10
S-297	0.8229	60F	10099	7/20/10
S-313	0.8694	60F	10099	7/20/10
S-315	0.8552	60F	10099	7/20/10

Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233
Phone: 918-749-8441 e-mail: BTorkelson@aol.com
Fax: 918-749-6005

CHAIN-OF-CUSTODY RECORD

Project: Sun- Philadelphia Refinery COA
Location: Philadelphia, PA

Proj. No.:
P.O.:
Sampled By: M. Brad Spancake & Tim Delk

Report/Bill To: Colleen Costello
Address: 30 South 17th St, Suite 1500
Philadelphia, PA 19103

Phone: 215.864.0640
Fax: 215.864.0671
e-mail:

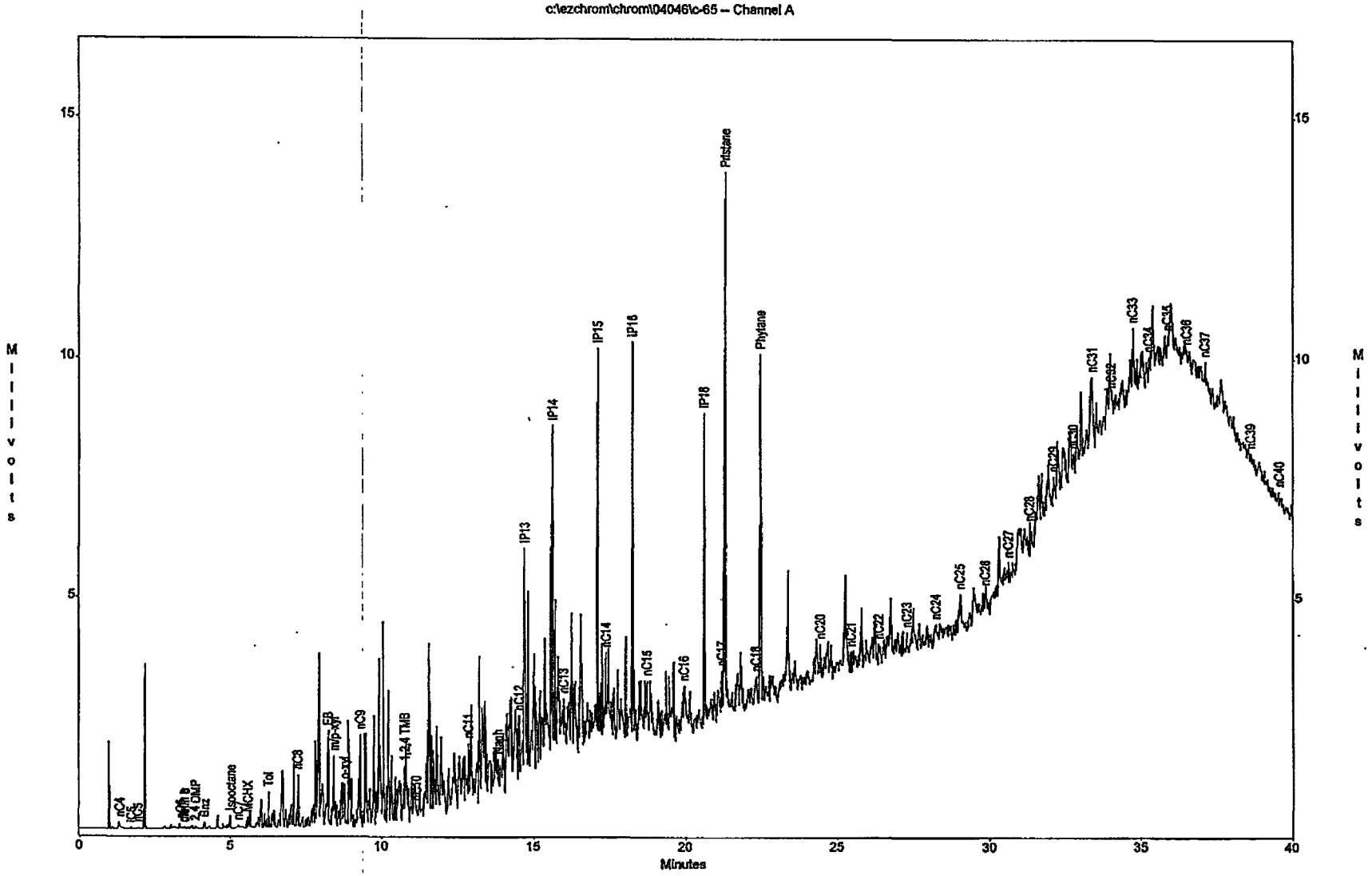
Additional Instructions

Requested Turn-Around Time:

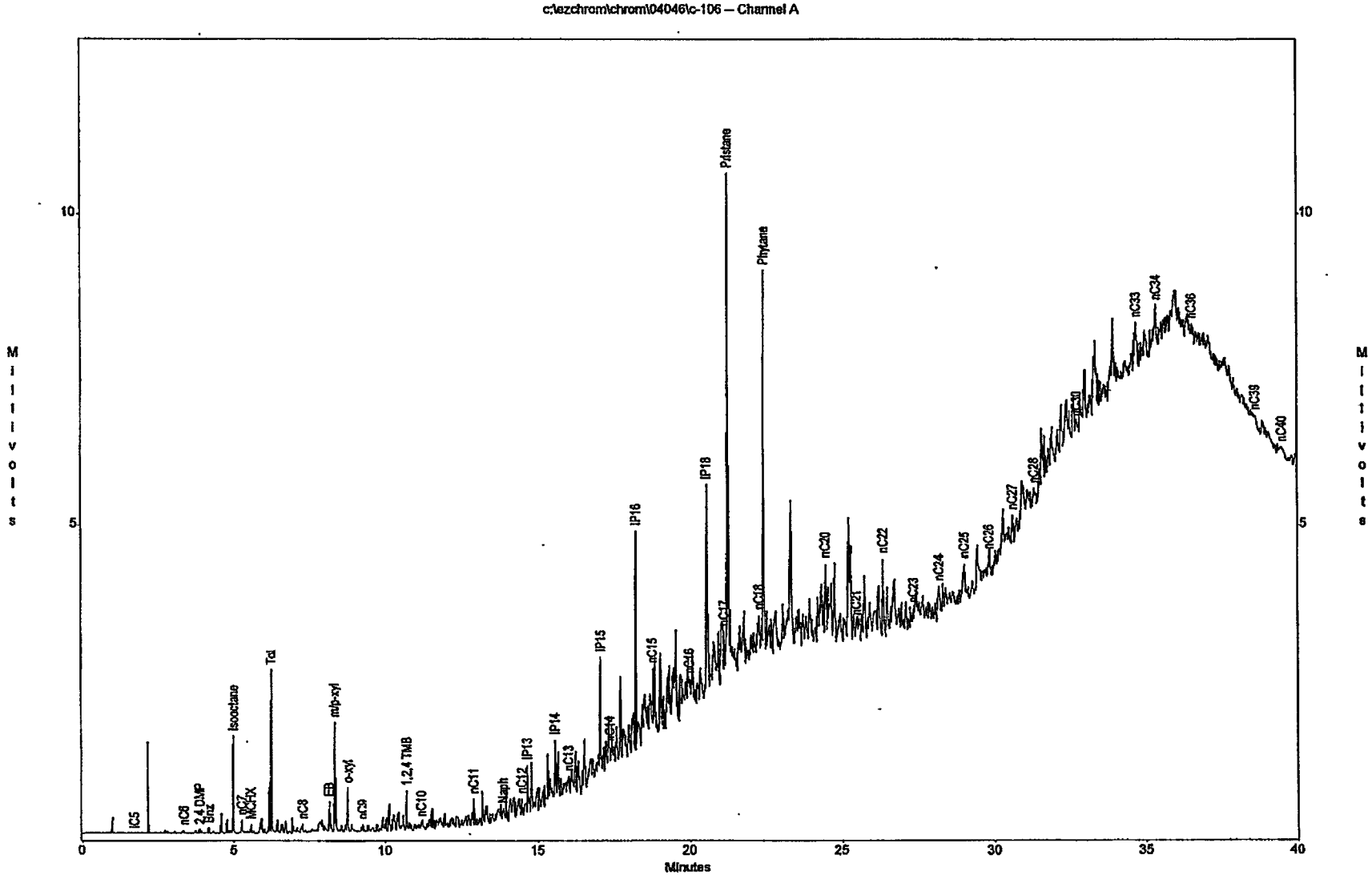
ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES: None	ANALYSES REQUESTED: GC Characterization	ANALYSES REQUESTED: Specific Gravity	REMARKS
1	West Yard W8	2/27/04	Product		1	X	X	X	
2	A-13	↓	↓		1	X	X	X	
3	B-144				1	X	X	X	
4	C-106				1	X	X	X	
5	A-133				1	X	X	X	
6	C-65				1	X	X	X	
7	B-43				1	X	X	X	
8	B-39				1	X	X	X	
9	A-136				1	X	X	X	Sorbent Pad Sample
10	C-107				1	X	X	X	

RELINQUISHED BY	ACCEPTED BY	DATE	TIME
M. Brad Spancake	FED EX	3/1/04	
	Bruce Torkelson	3-2-04	1705

Sun - Philadelphia Refinery COA
Sample ID : C-65
Acquired : Mar 07, 2004 17:16:51

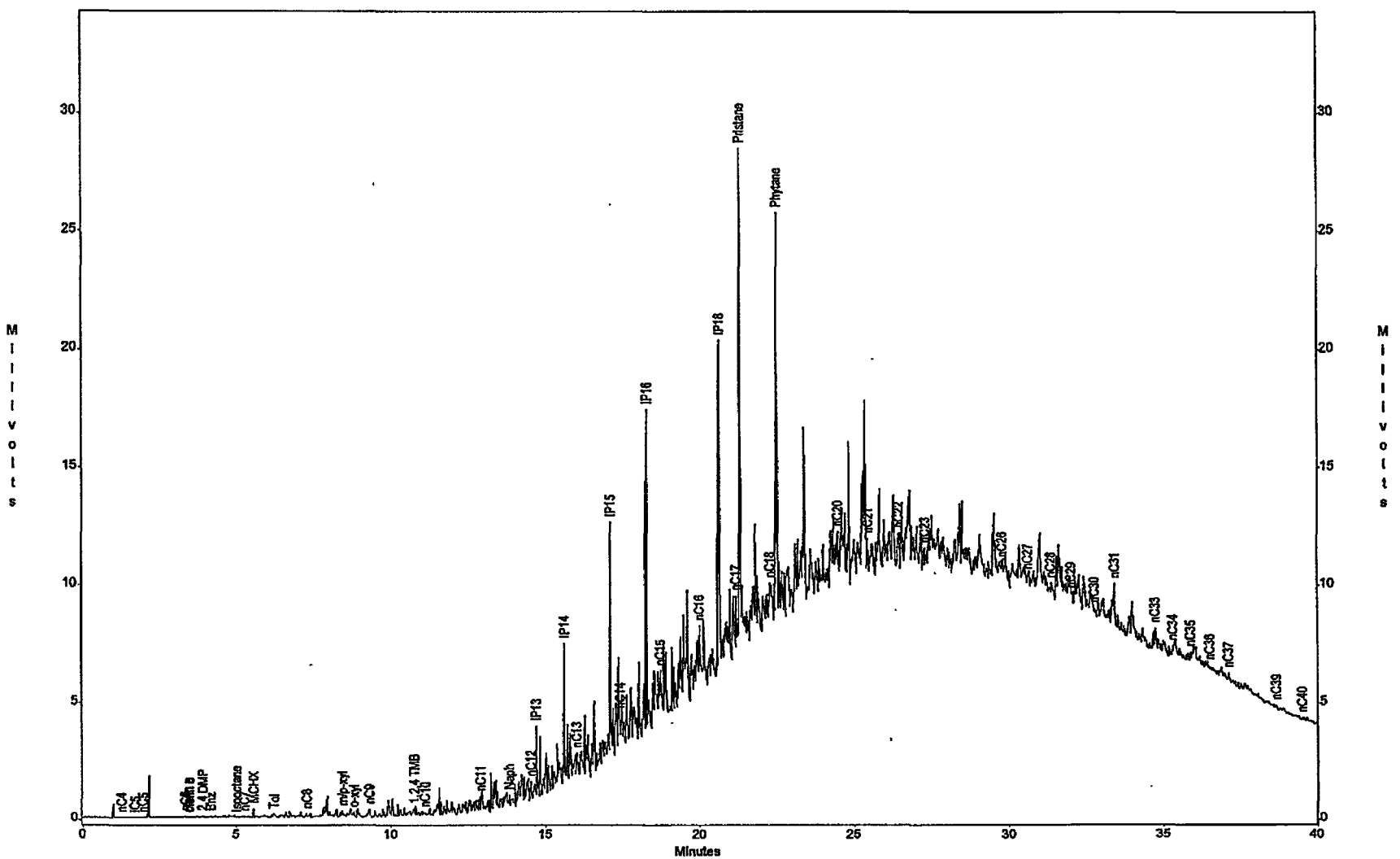


Sun - Philadelphia Refinery COA
Sample ID : C-106
Acquired : Mar 08, 2004 17:35:42



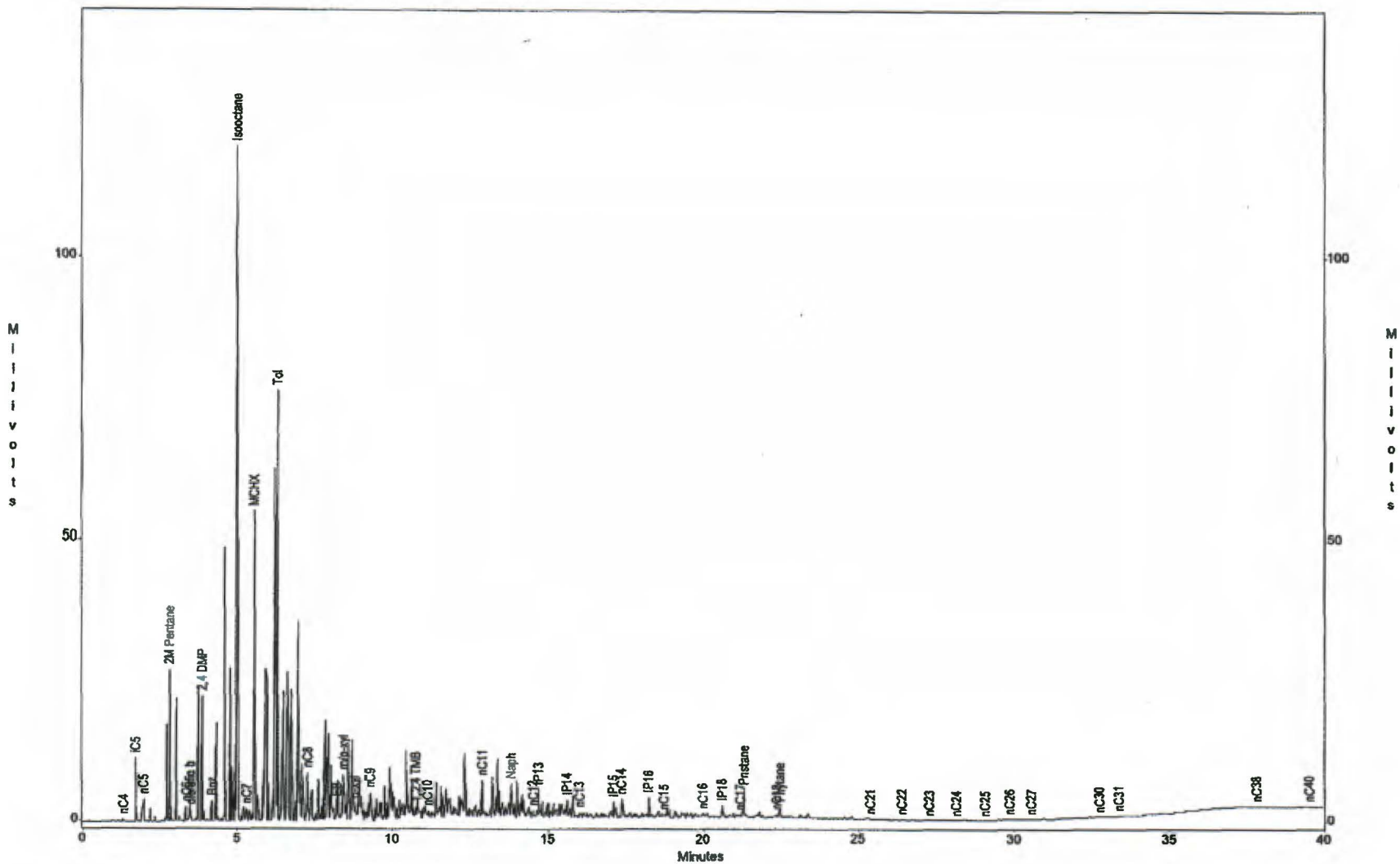
Sun - Philadelphia Refinery COA
Sample ID : C-107
Acquired : Mar 06, 2004 18:02:57

c:\ezchrom\chrom\04046\c-107 -- Channel A



Sun - Philadelphia Refinery COA
Sample ID : WP 9-2
Acquired : Mar 08, 2004 07:50:05

c:\ezchrom\chrom\04046wp-9-2 – Channel A



Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233
Phone: 918-749-8441
Fax: 918-749-6005
e-mail: BTorkelson@torkelsongeochemistry.com

CHAIN-OF-CUSTODY RECORD

Project: SUNOCO PHILA REFINERY AOI-7
Location:
Proj. No.:
P.O.:
Sampled By: Shawn Sykes

Report/Bill To: Bill to td@aquaterra-tech.com
Address:
Report to:
Phone:
Fax: Ltd@aquaterra-tech.com
e-mail: LDwebster@langan.com

Additional Instructions
Please include a brief interpretation of product type consistent with other samples from the Tbilly refinery
Requested Turn-Around Time:

ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES: None	ANALYSES REQUESTED: GC Characterization	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac. Tens.	Lead	Sulfur	REMARKS
1	C-147	1/13/12			1		X	X							
2	C-148	1/13/12			1		X	X							(2) Boxes / Cans
3	C-150	1/13/12			1		X	X							
4	C-151	1/13/12			1		X	X							
5	C-152	1/13/12			1		X	X							
6	C-153	1/13/12			1		X	X							
7	C-154	1/13/12			1		X	X							
8	C-161	1/13/12			1		X	X							
9	C-162	1/13/12			1		X	X							
10	C-166	1/13/2			1		X	X							

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
[signature] / Aquaterra	1/13/12	1400	AQUATERRA SAMPLE REFRIGERATOR	1/13/12	1400
[signature] / AQUATERRA	1/16/12	1450	FED EX	1/16/12	1450
			[signature]	1-19-12	1420

Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233
Phone: 918-749-8441
Fax: 918-749-6005
e-mail: BTorkelson@torkelsongeochemistry.com

CHAIN-OF-CUSTODY RECORD

SUNOCO

Project: PHILA REFINERY AOE-7
Location:
Proj. No.:
P.O.:
Sampled By: Shawn Sykes

Report/Bill To:
Address:
Phone:
Fax: tdg@aquaterra-tech.com
e-mail: Dwebster@langan.com

Additional Instructions

Requested Turn-Around Time:

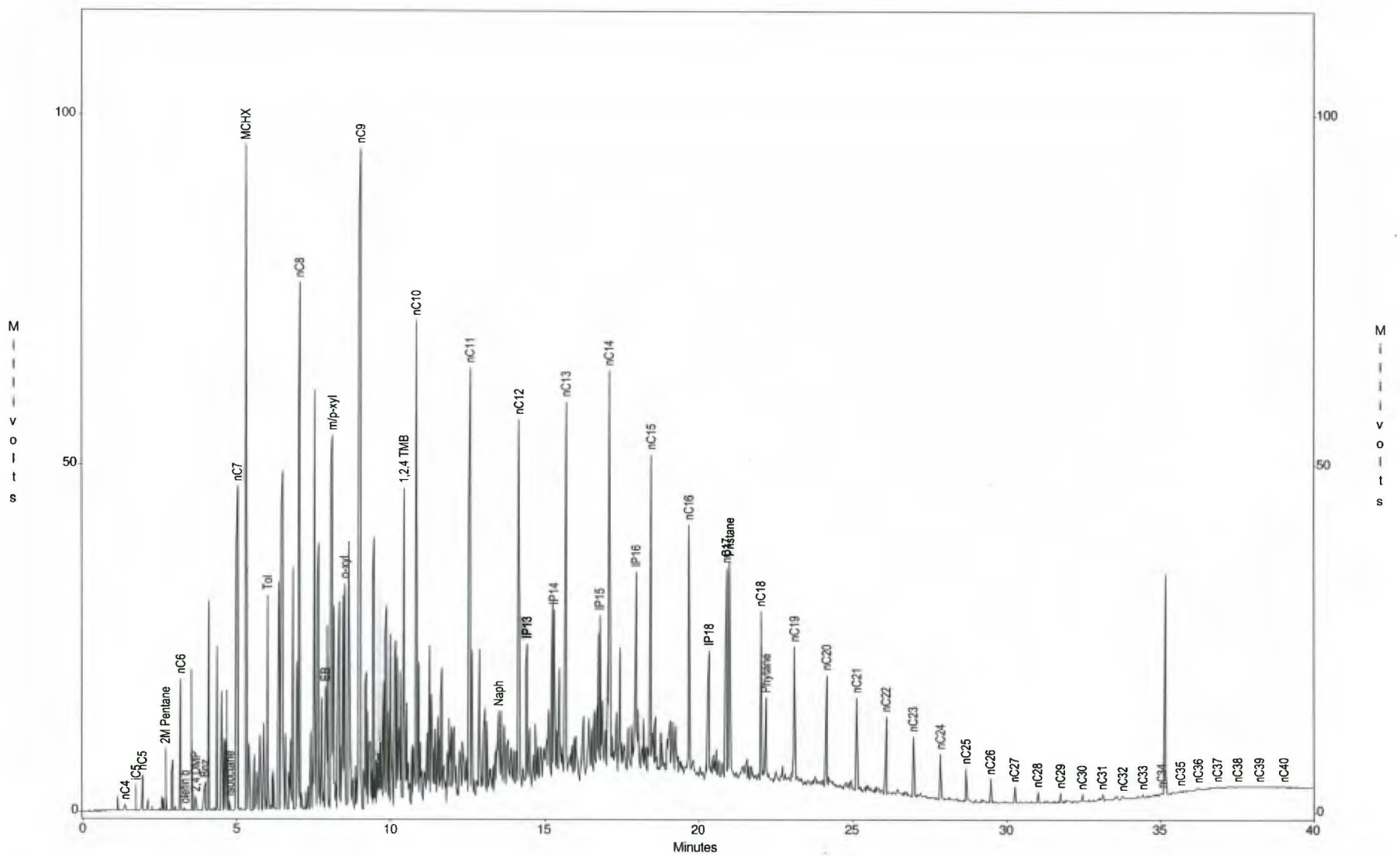
ITEM NO	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES: None	ANALYSES REQUESTED: GC Characterization	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac. Tens	Lead	Sulfur	REMARKS
1	C-167	1/13/12			1		X	X							
2	C-168	1/13/12			1		X	X							
3															
4															
5															
6															
7															
8															
9															
10															

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
[signature] / AQUATERRA	1/13/12	1400	AQUATERRA SAMPLE REFRIGERATOR	1/13/12	1400
[signature] / AQUATERRA	1/16/12	1450	FED EX	1/16/12	1450

Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-147
Acquired : Jan 24, 2012 18:07:21

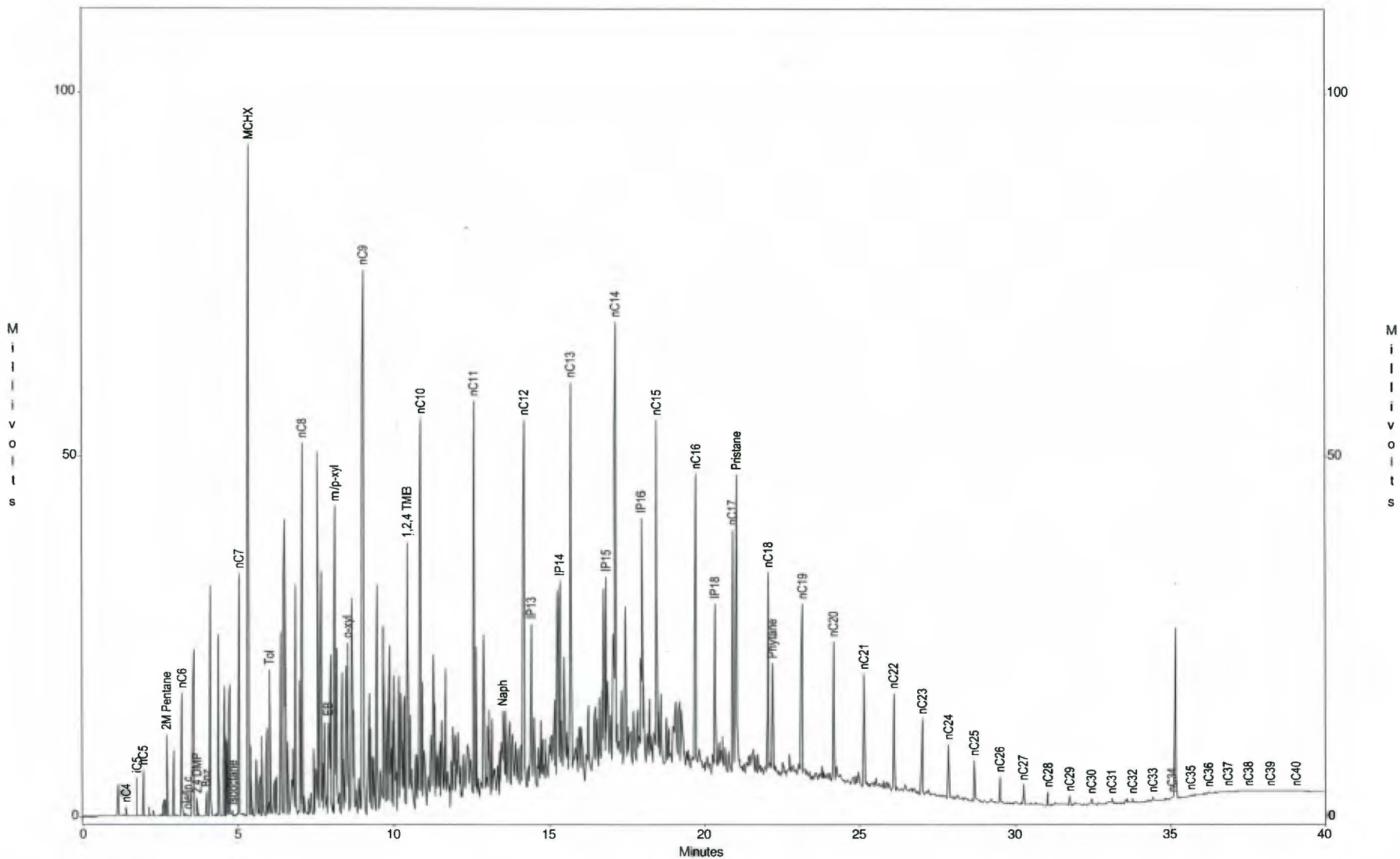
c:\ezchrom\chrom\12005\c-147 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-148
Acquired : Jan 24, 2012 10:59:28

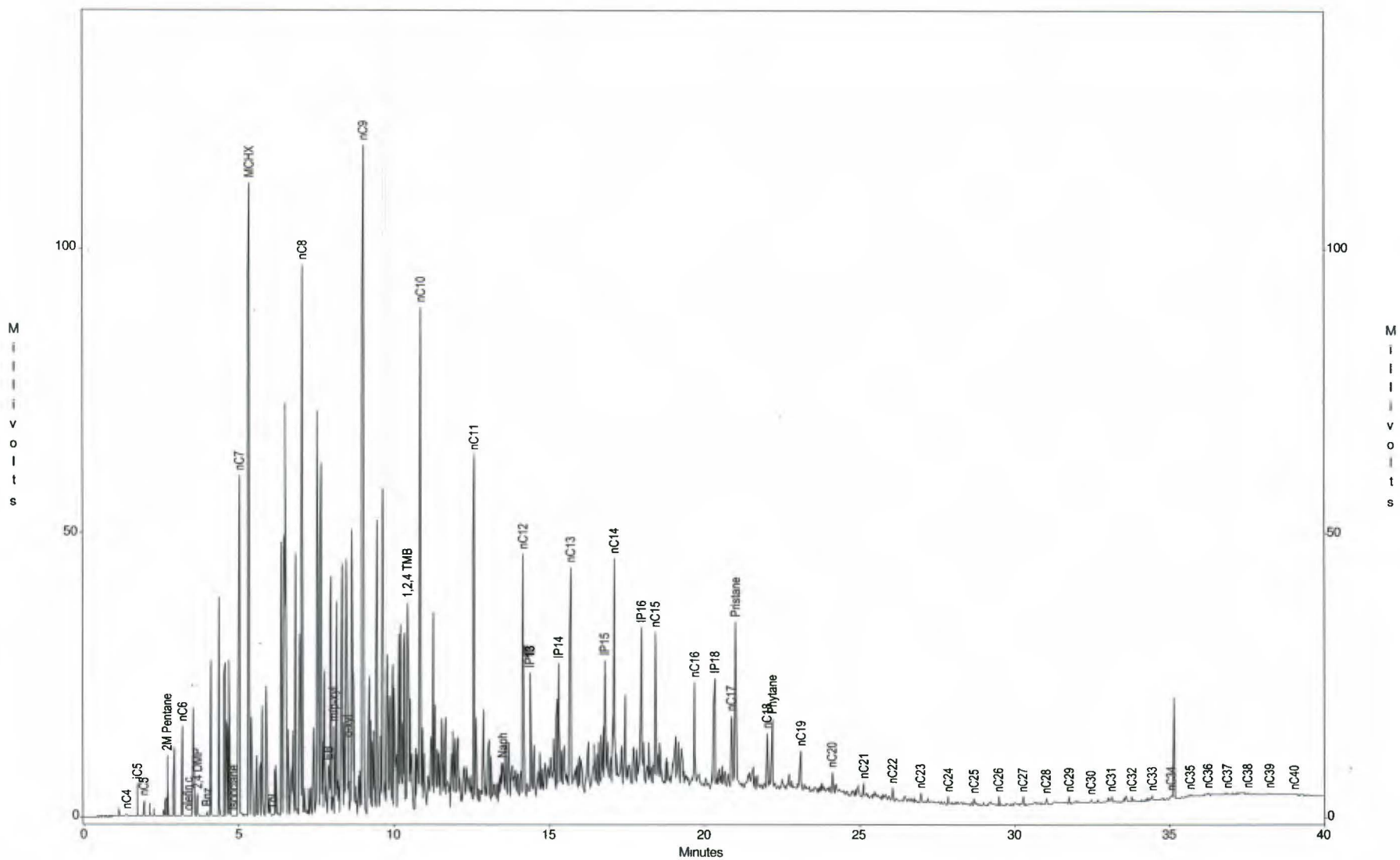
c:\ezchrom\chrom\12005\c-148 – Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-150
Acquired : Jan 24, 2012 19:46:11

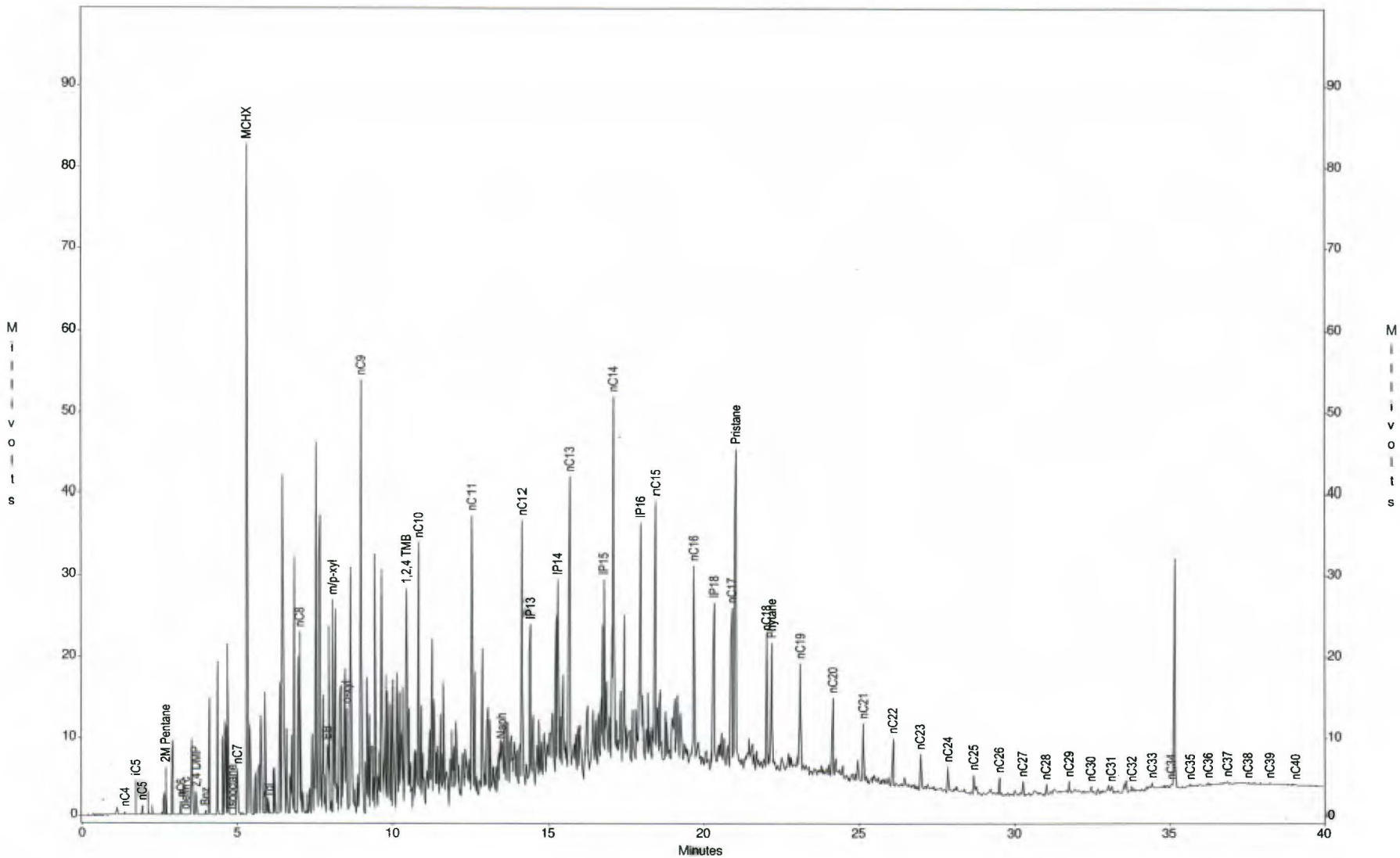
c:\ezchrom\chrom\12005\c-150 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-151
Acquired : Jan 24, 2012 15:57:06

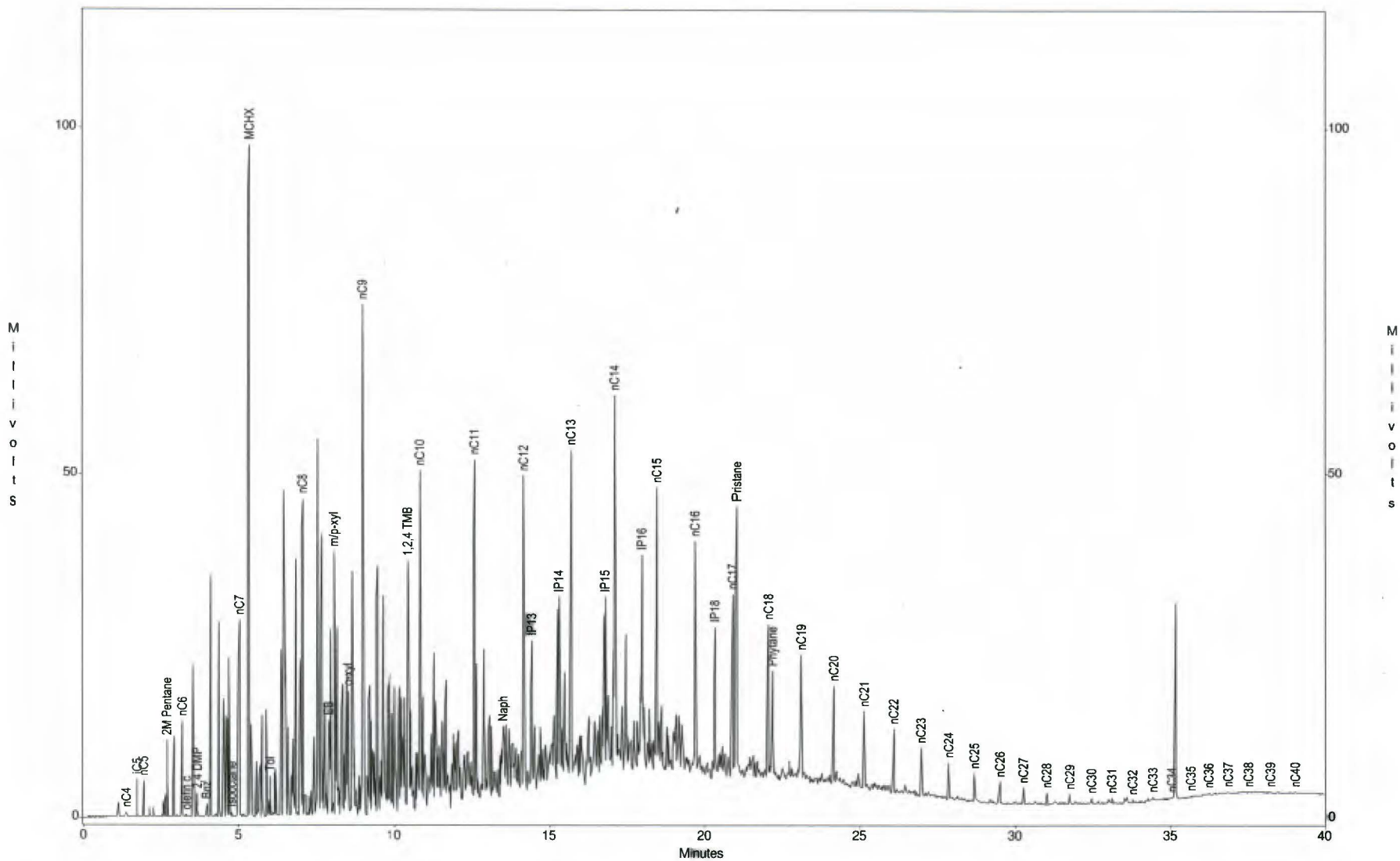
c:\ezchrom\chrom\12005\c-151 -- Channel A



Torkelson Geochemistry, Inc.

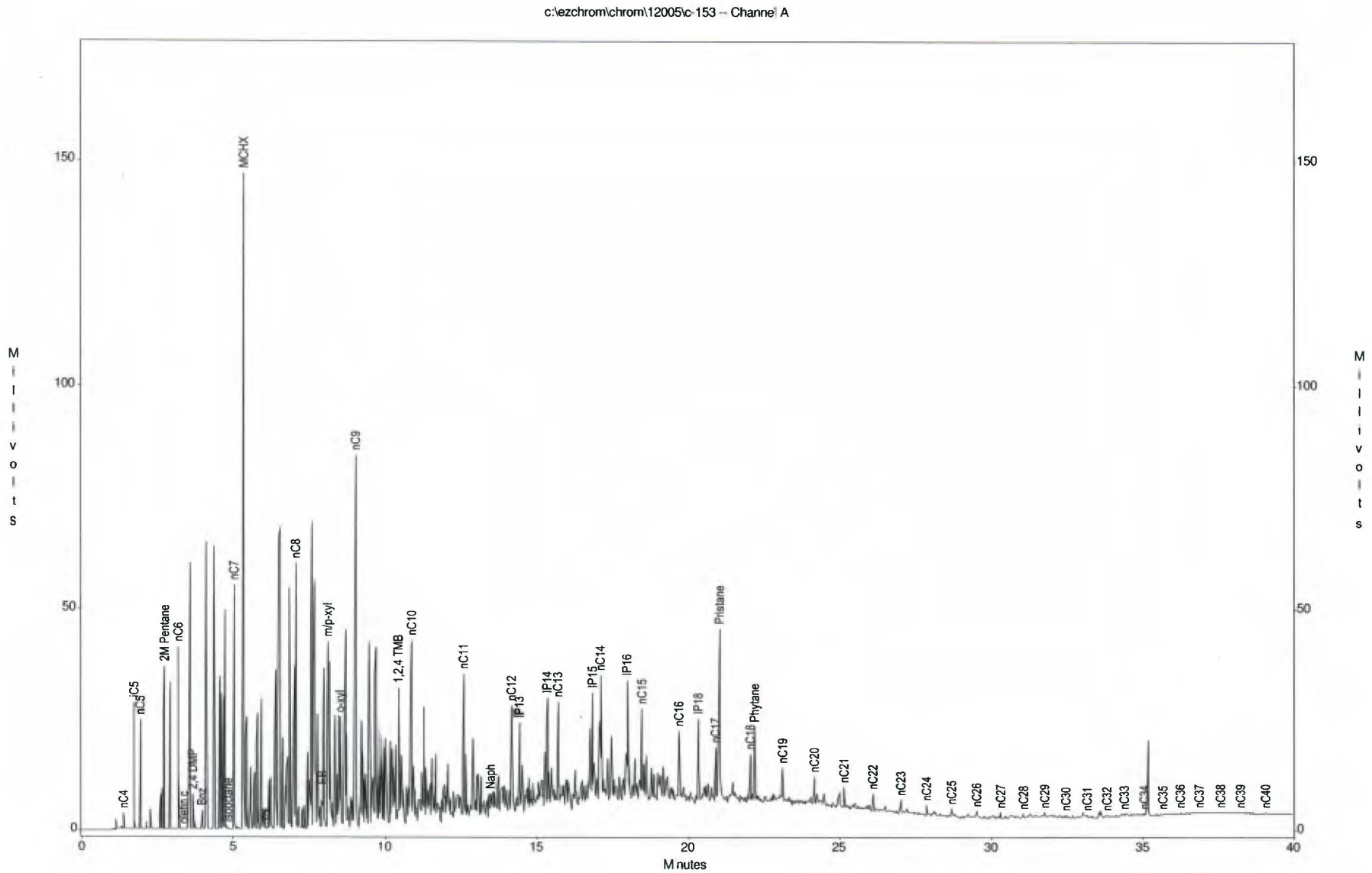
Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-152
Acquired : Jan 24, 2012 14:19:23

c:\ezchrom\chrom\12005\c-152 - Channel A



Torkelson Geochemistry, Inc.

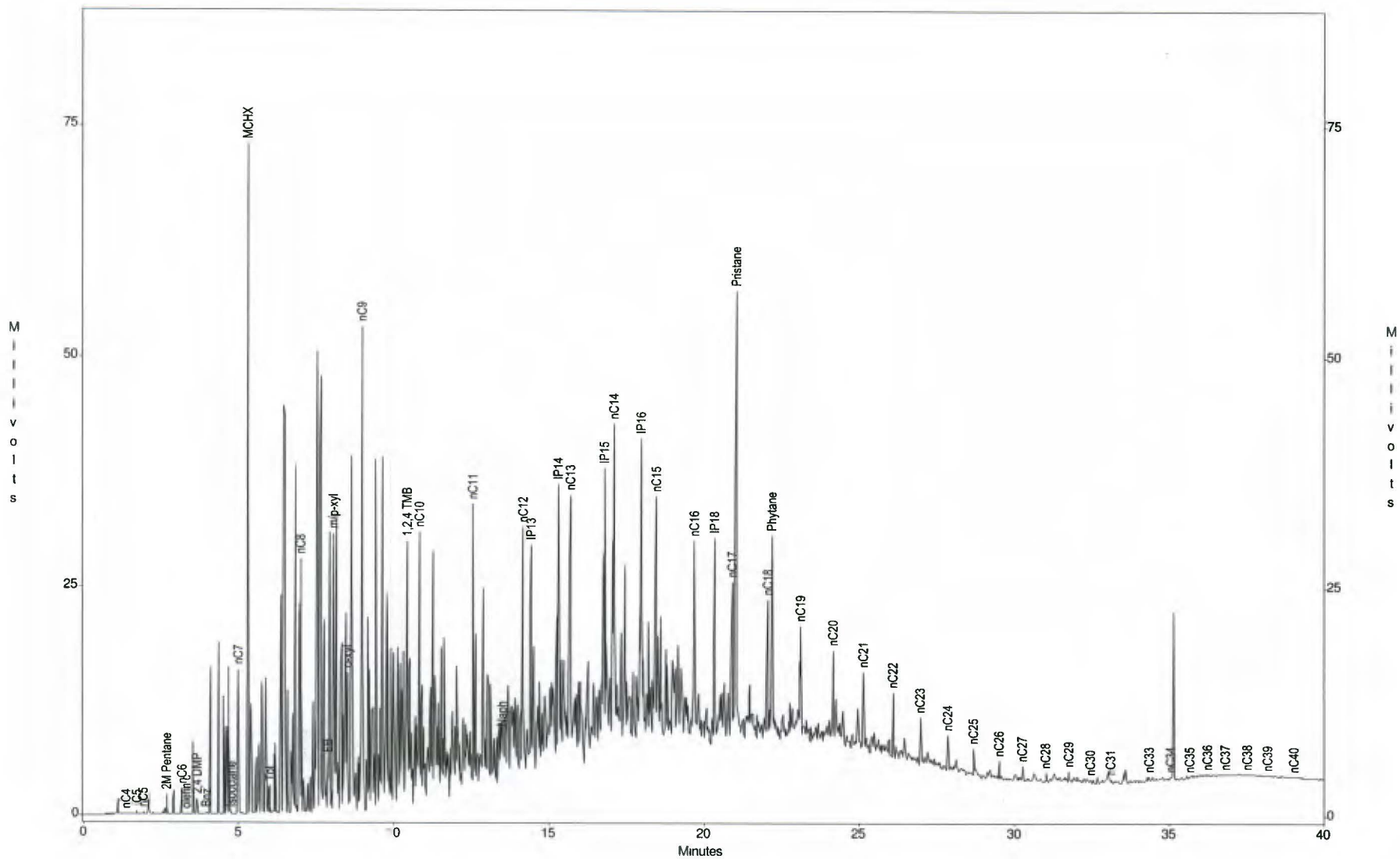
Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-153
Acquired : Jan 24, 2012 10:10:30



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-154
Acquired : Jan 24, 2012 21:25:45

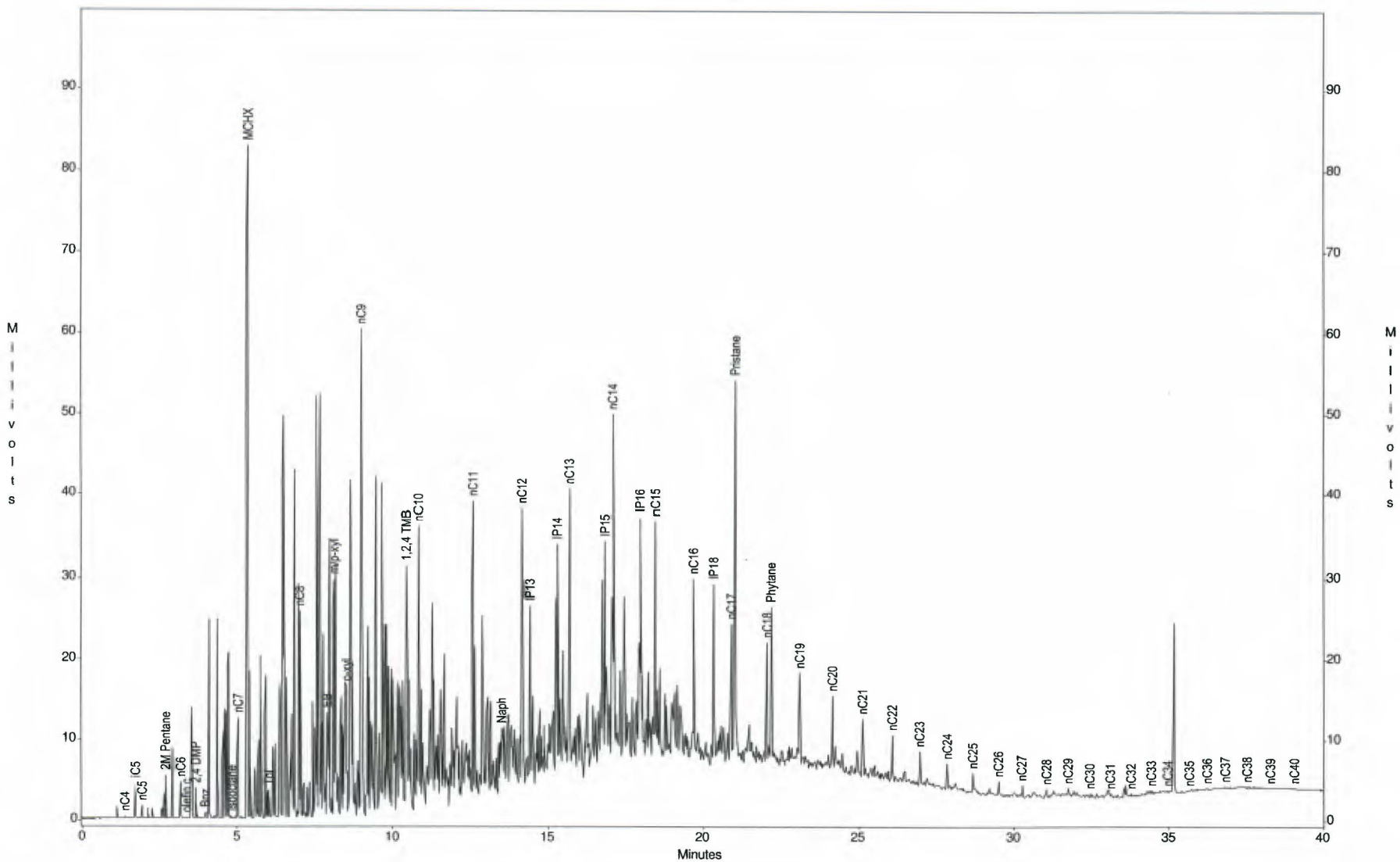
c:\ezchrom\chrom\12005\c-154 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-161
Acquired : Jan 24, 2012 11:49:58

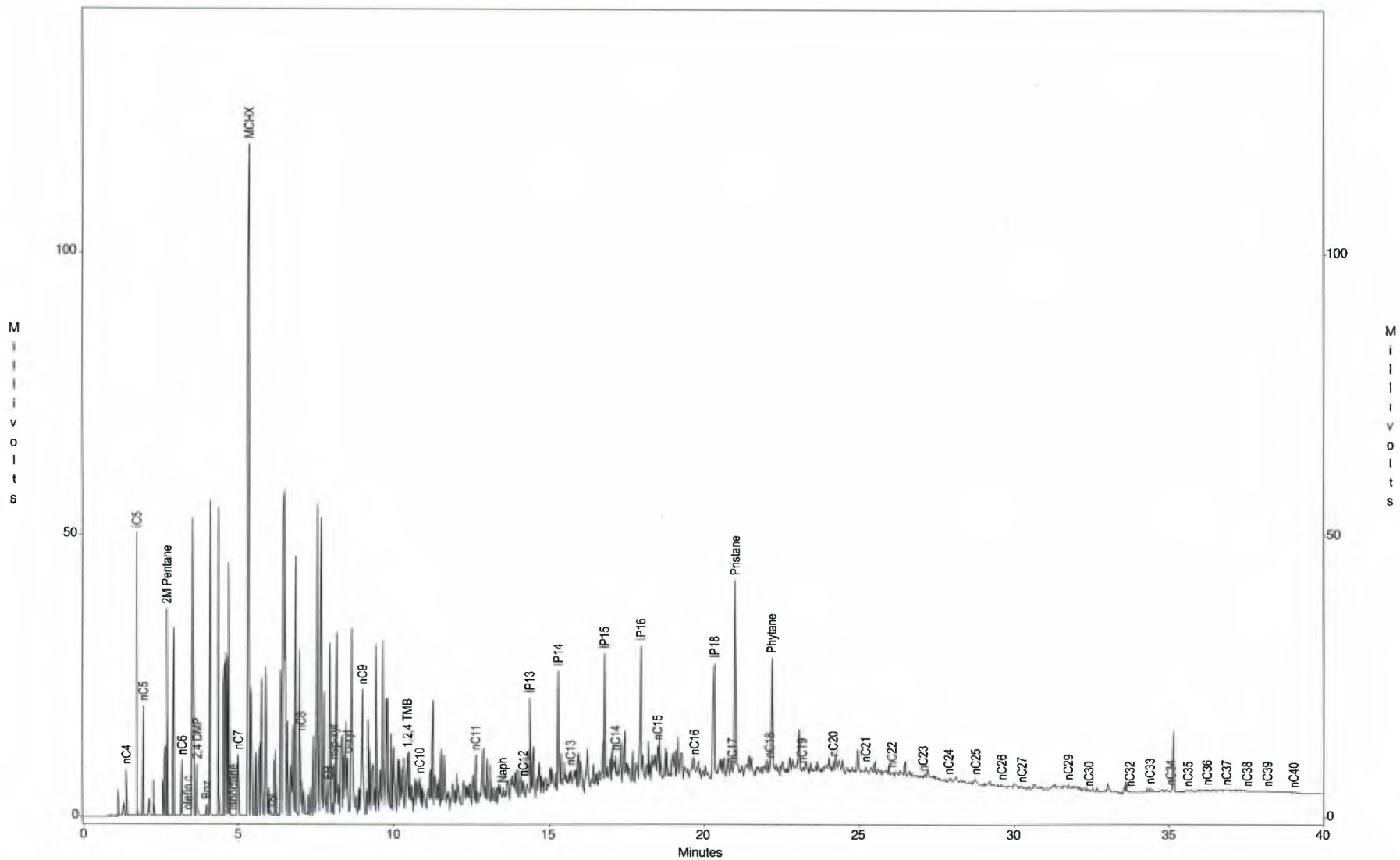
c:\ezchrom\chrom\12005\c-161 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-162
Acquired : Jan 24, 2012 18:57:14

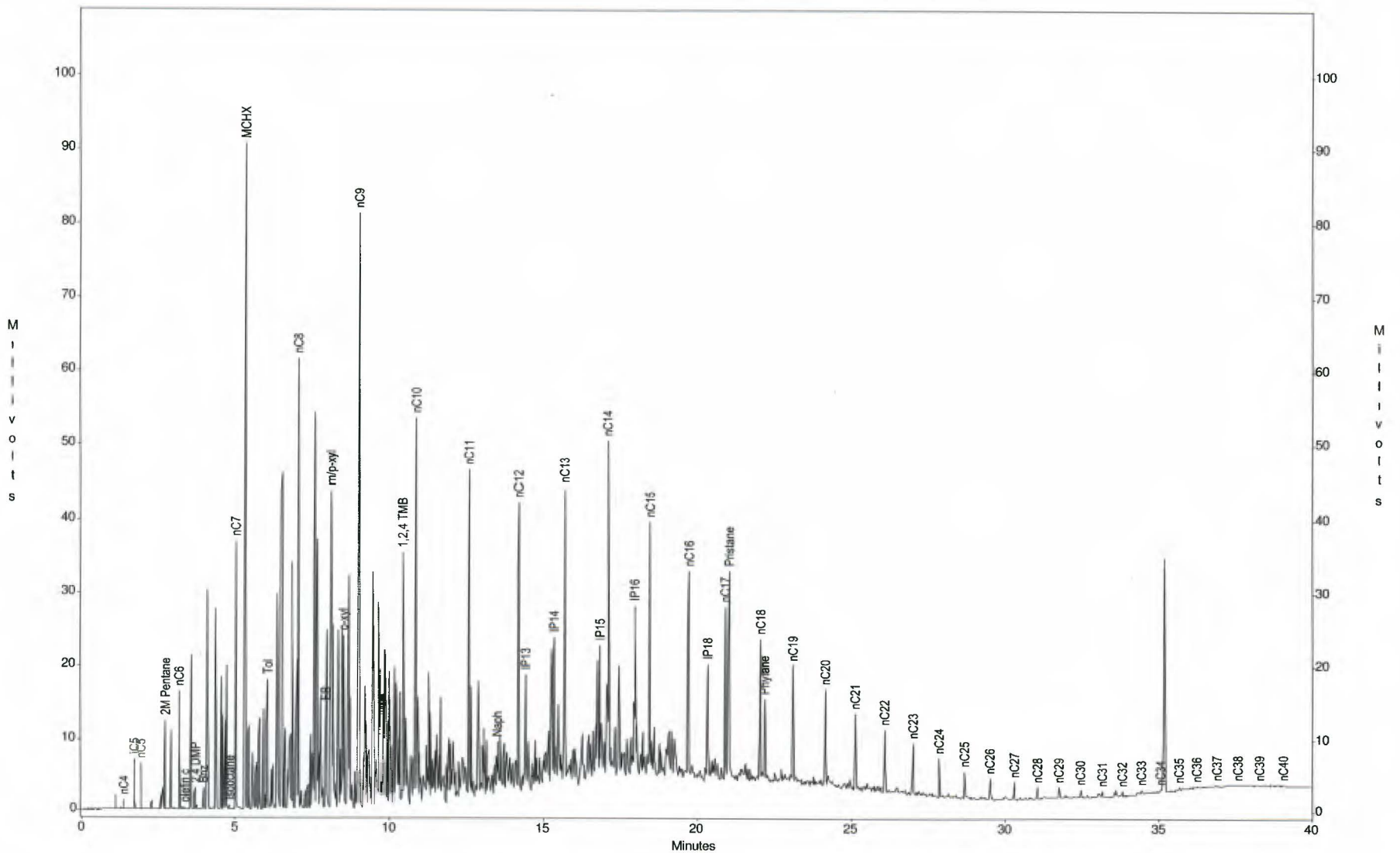
c:\ezchrom\chrom\12005\c-162 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-166
Acquired : Jan 24, 2012 09:20:57

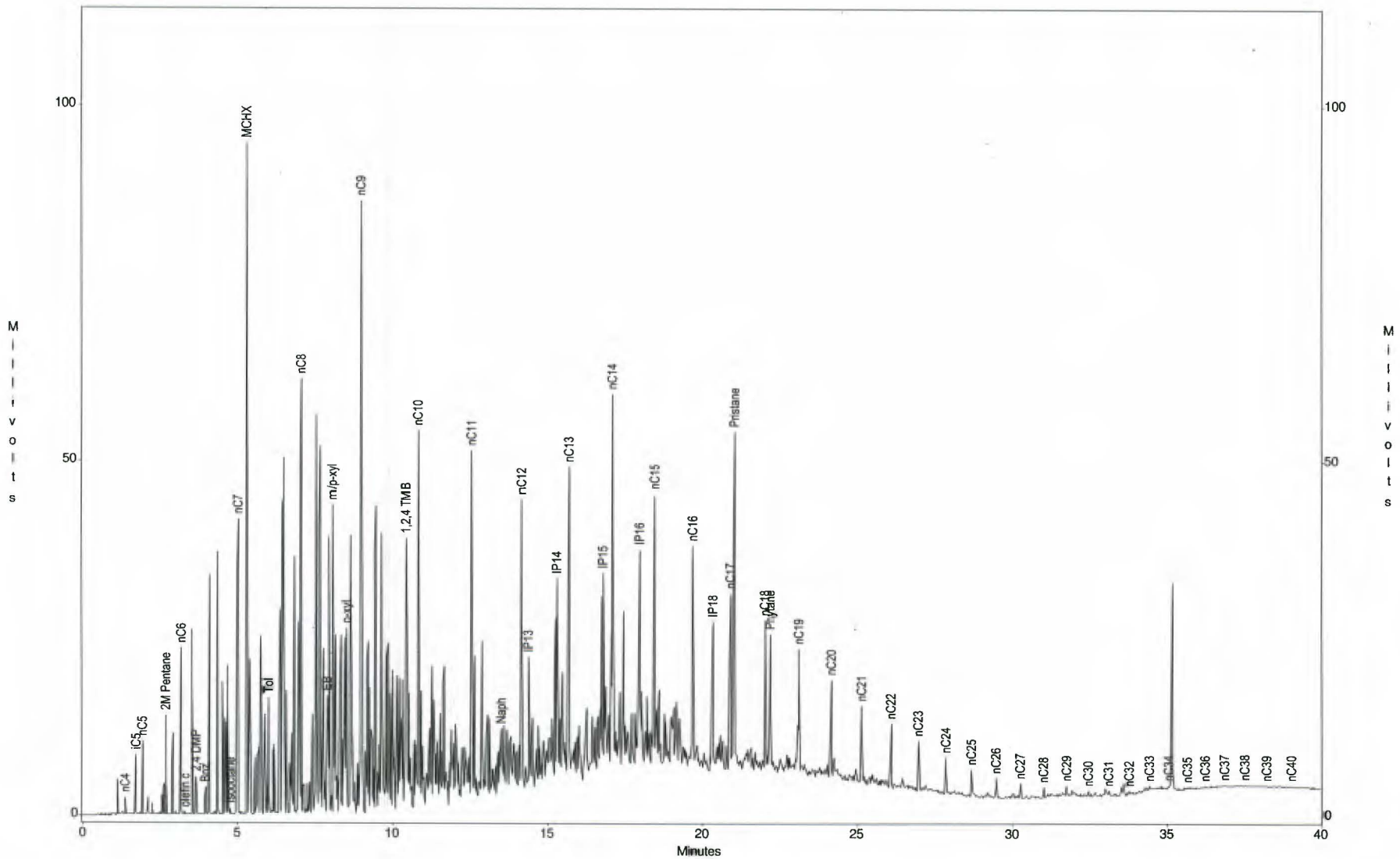
c:\ezchrom\chrom\12005\c-166 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-167
Acquired : Jan 24, 2012 20:35:48

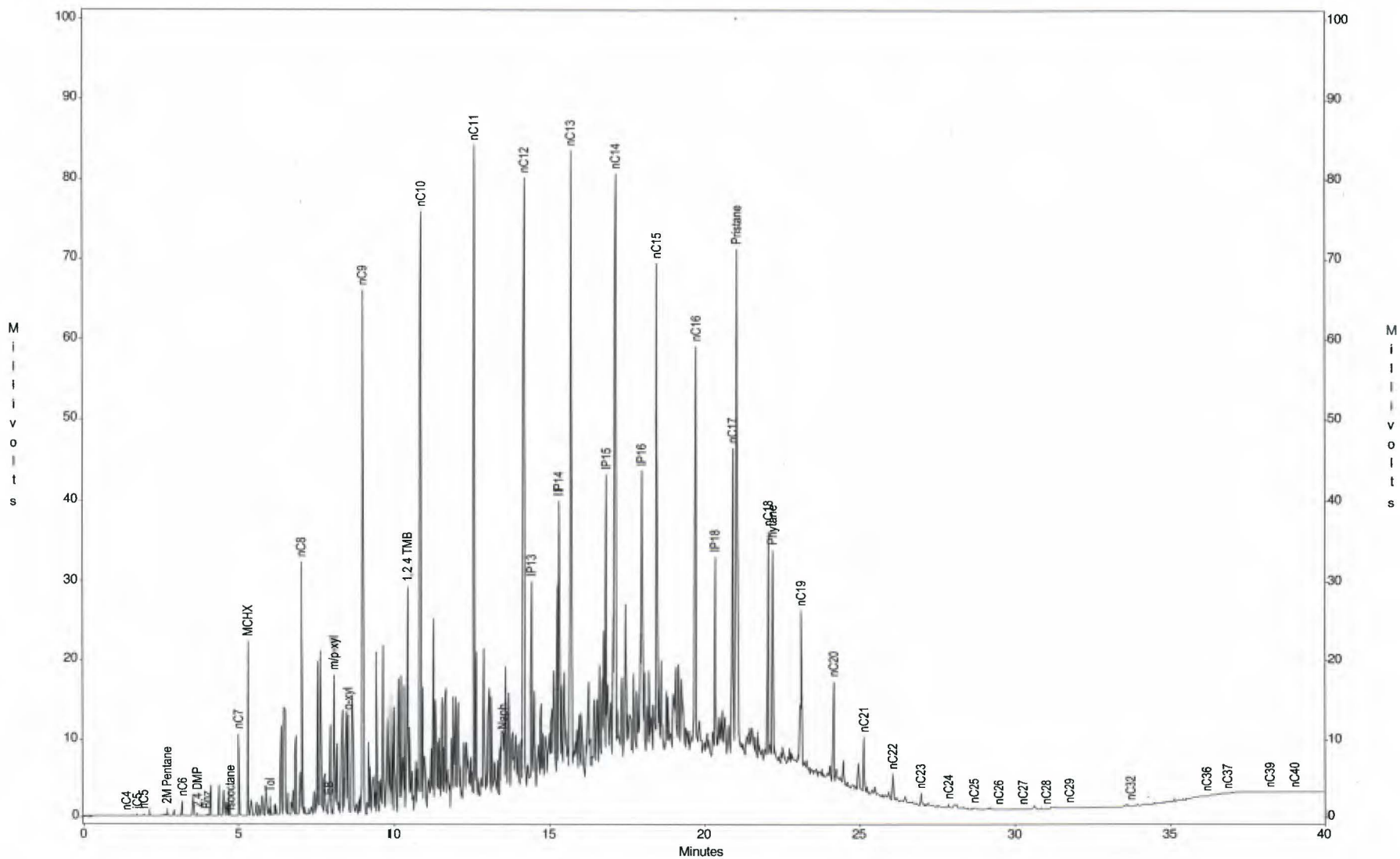
c:\ezchrom\chrom\12005\c-167 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-168
Acquired : Jan 24, 2012 15:09:04

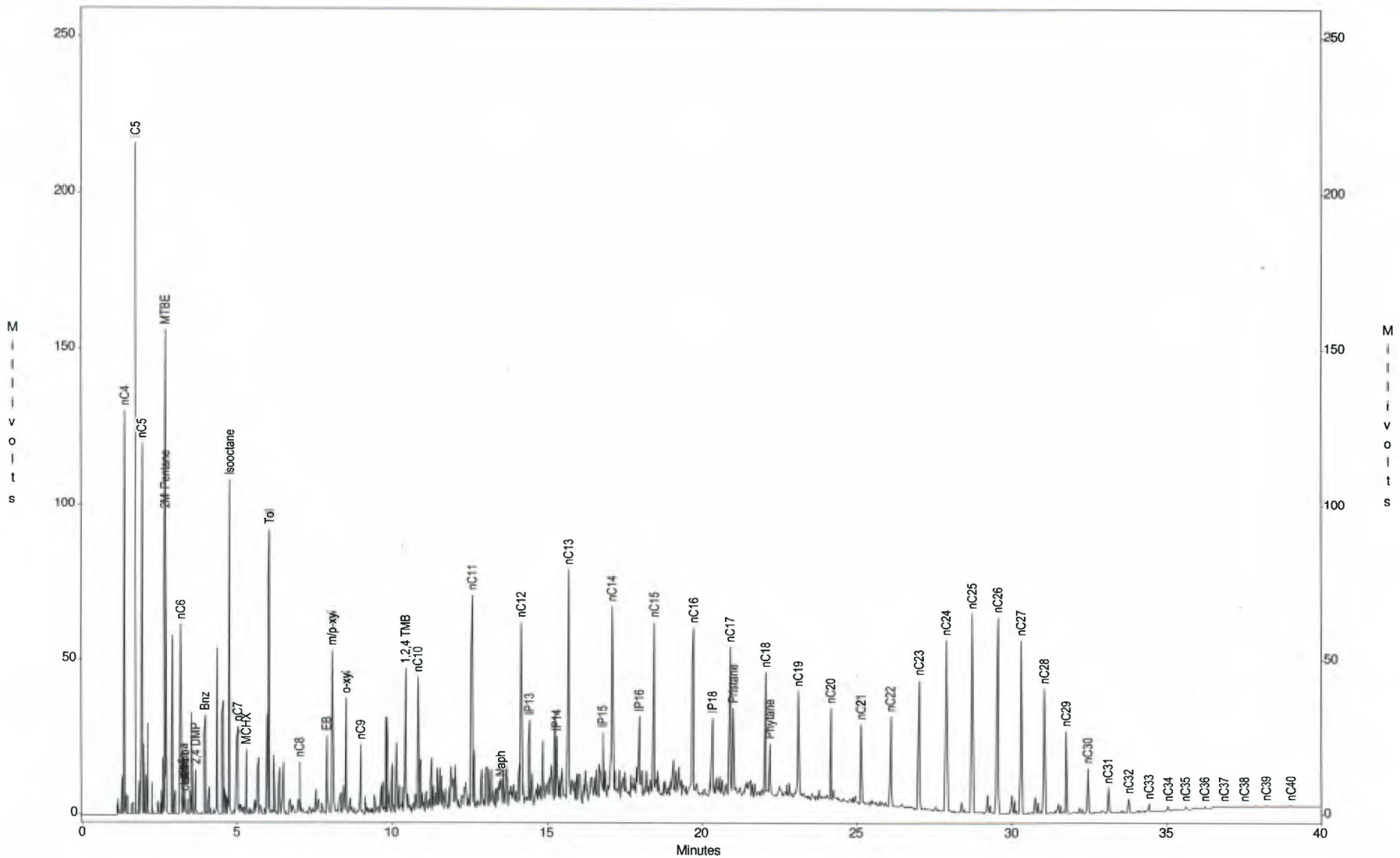
c:\ezchrom\chrom\12005\c-168 -- Channel A



Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : Gas/Dies/Wax std
Acquired : Jan 24, 2012 13:30:21

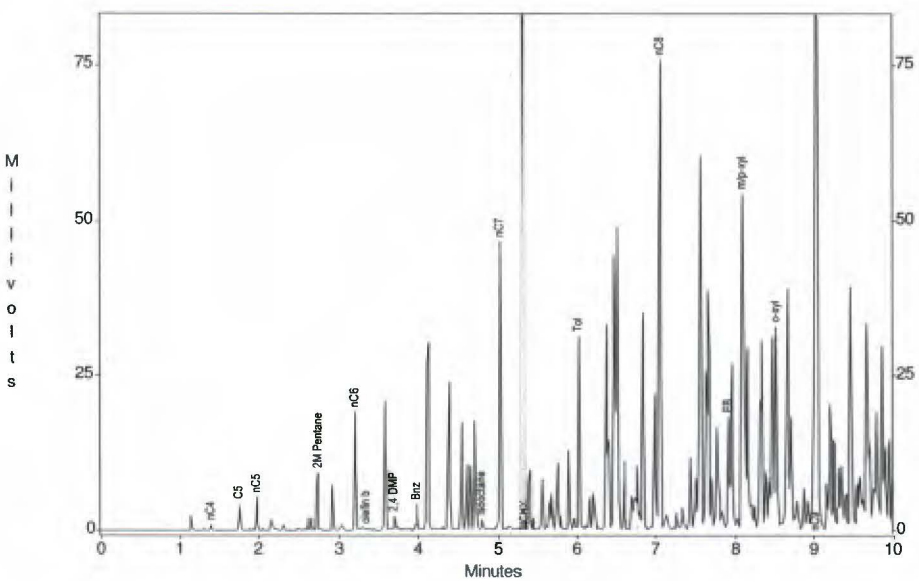
c:\ezchrom\chrom\12005\gadiwax2.2 -- Channel A



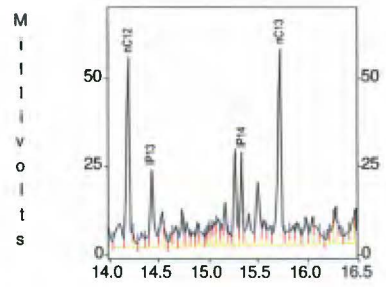
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-147
Acquired : Jan 24, 2012 18:07:21

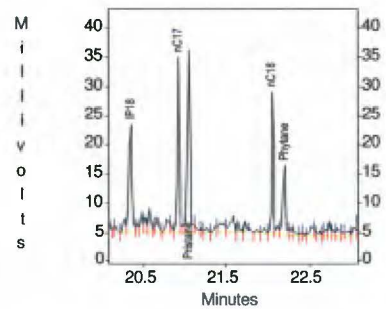
c:\ezchrom\chrom\12005\c-147 -- Channel A



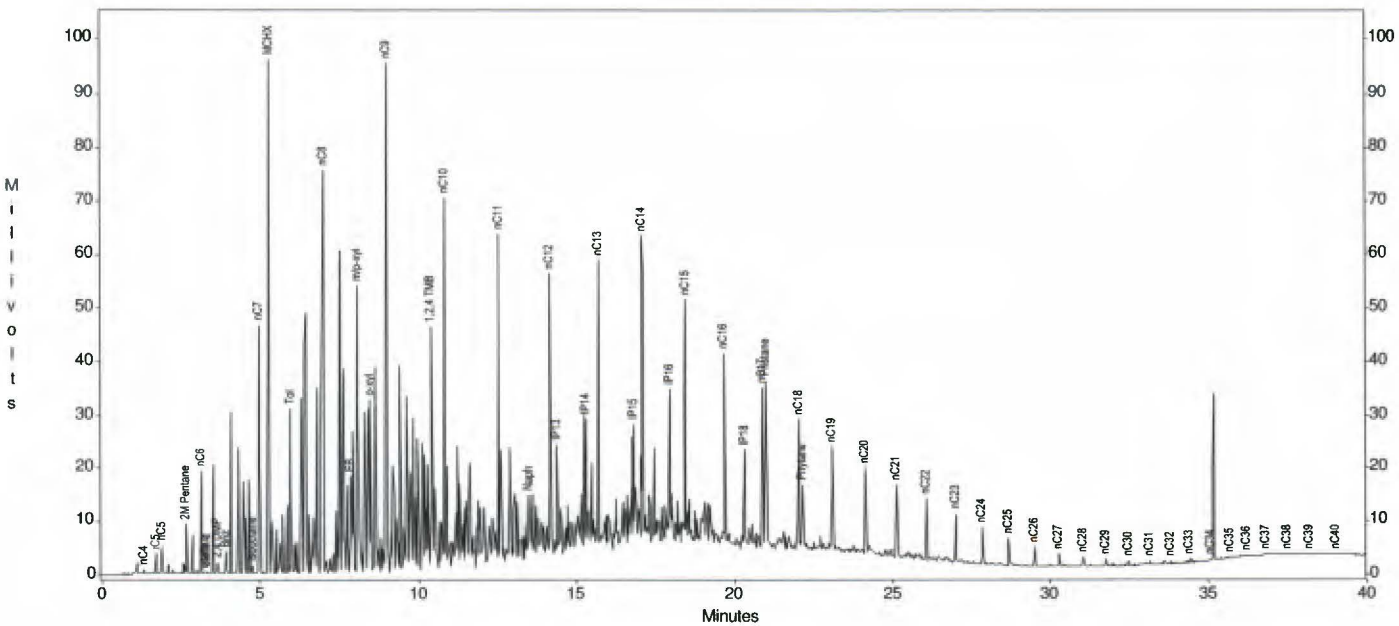
c:\ezchrom\chrom\12005\c-147 -- Channel A



c:\ezchrom\chrom\12005\c-147 -- Channel A



c:\ezchrom\chrom\12005\c-147 -- Channel A



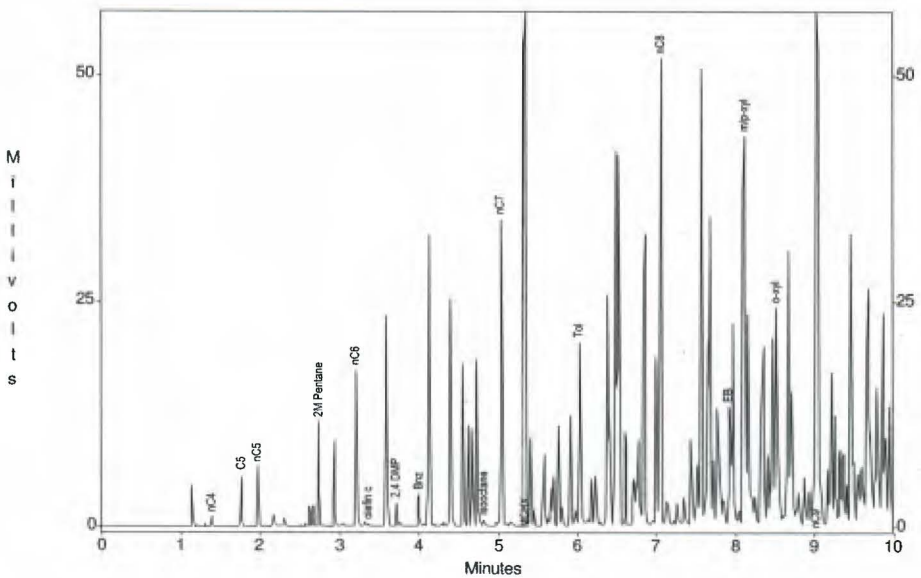
Channel A Results

Peak	Area	Height
nC4	454	766
iC5	2598	3802
nC5	3965	5352
MTBE	0	0
2M Pentane	8032	9158
nC6	17971	19104
olefin a	0	0
olefin b	127	149
olefin c	349	274
2,4 DMP	2112	2046
Bnz	5186	3978
Isooctane	1667	1381
nC7	55890	46471
MCHX	142794	95372
Tol	38514	30867
nC8	121850	75589
EB	25978	17963
m/p-xyl	116673	53726
o-xyl	60368	32475
nC9	227880	94801
1,2,4 TMB	99927	45581
nC10	130939	69473
nC11	108843	62080
Naph	37305	12641
nC12	104288	53920
IP13	49209	21930
IP14	46835	26257
nC13	123840	55712
IP15	43818	24617
nC14	125767	59480
IP16	61258	30370
nC15	98917	46883
nC16	72718	36207
IP18	41466	18694
nC17	58473	30374
Pristane	75622	31421
nC18	46306	24443
Phytane	26004	12035
nC19	38533	19870
nC20	29739	16207
nC21	23694	13568
nC22	19038	11383
nC23	15504	8834
nC24	10986	6671
nC25	10724	4918
nC26	6248	3443
nC27	4262	2433
nC28	3053	1709
nC29	2578	1379
nC30	1662	927
nC31	1236	745
nC32	858	498
nC33	906	457
nC34	410	234
nC35	295	189
nC36	297	161
nC37	443	207
nC38	551	145
nC39	340	97
nC40	490	154

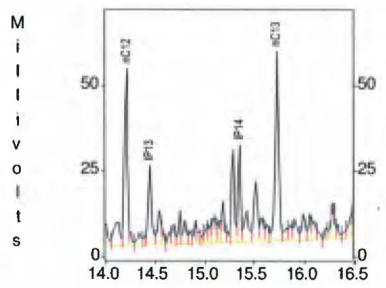
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-148
Acquired : Jan 24, 2012 10:59:28

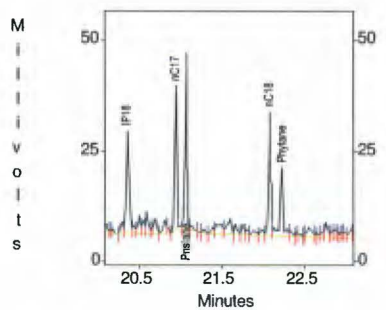
c:\ezchrom\chrom\12005\c-148 -- Channel A



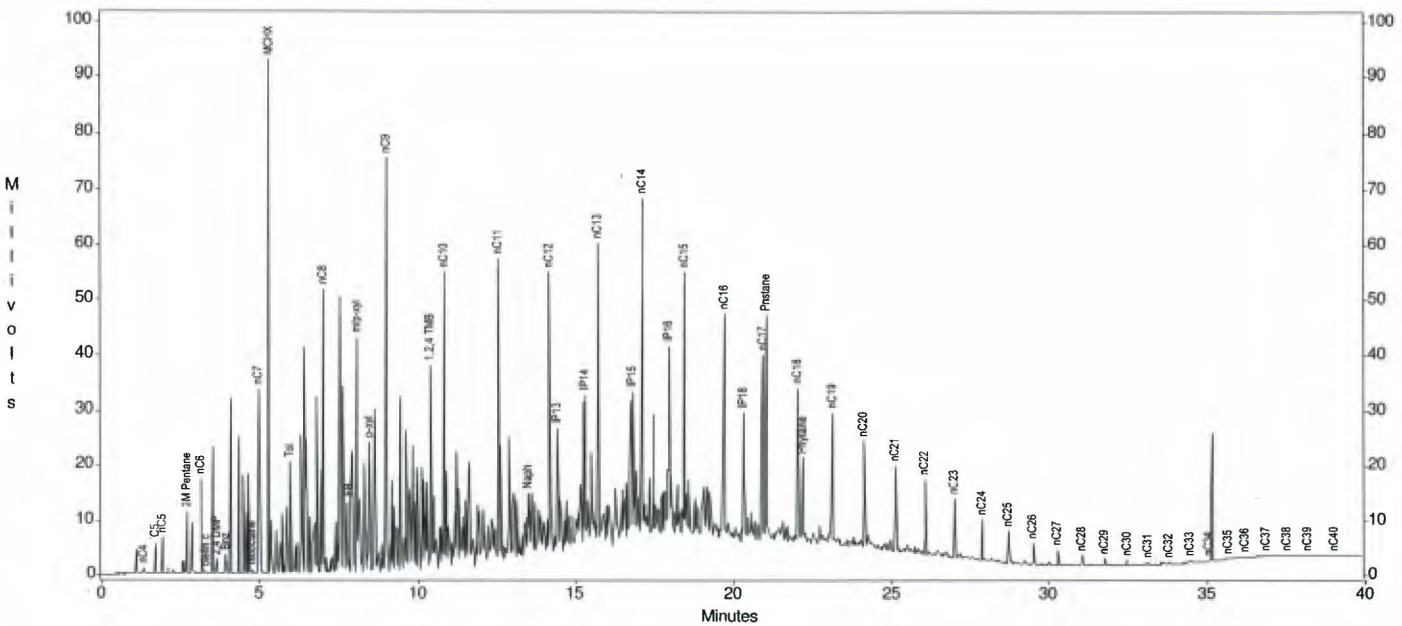
c:\ezchrom\chrom\12005\c-148 -- Channel A



c:\ezchrom\chrom\12005\c-148 -- Channel A



c:\ezchrom\chrom\12005\c-148 -- Channel A



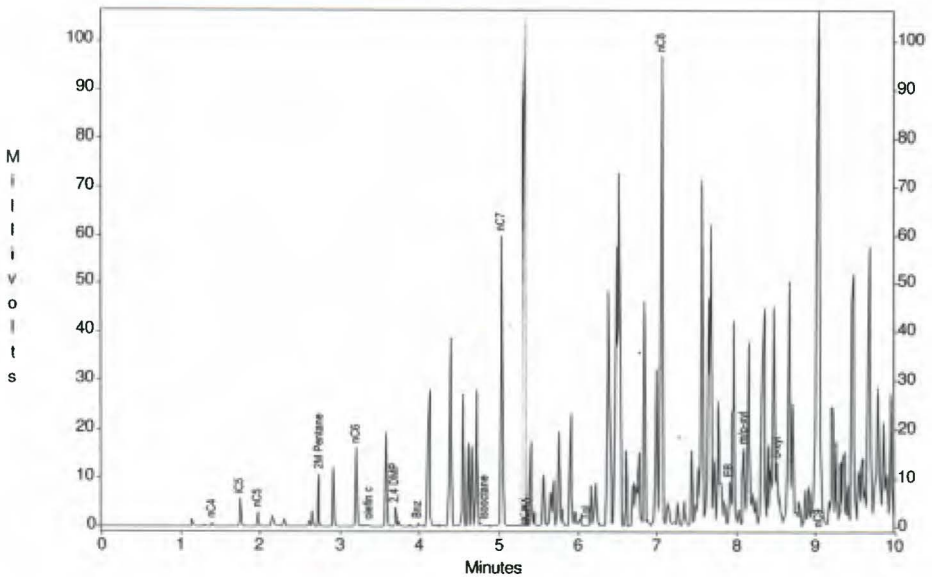
Channel A Results

Peak	Area	Height
nC4	695	1111
iC5	3790	5428
nC5	5082	6558
MTBE	0	0
2M Pentane	10504	11521
nC6	16629	17335
olefin a	0	0
olefin b	0	0
olefin c	594	300
2,4 DMP	2608	2487
Bnz	4812	3462
Isooctane	924	664
nC7	39771	33697
MCHX	138326	92607
Tol	26152	20338
nC8	72027	51509
EB	19420	13087
m/p-xyl	86389	42816
o-xyl	43119	23989
nC9	139965	75226
1,2,4 TMB	64732	37169
nC10	94706	53651
nC11	98152	55602
Naph	38066	12038
nC12	99376	51486
IP13	50390	23277
IP14	50934	28322
nC13	121970	55442
IP15	48836	27540
nC14	127644	62317
IP16	69462	34552
nC15	99761	47613
nC16	81256	40741
IP18	52268	23508
nC17	61111	32377
Pristane	92300	39745
nC18	54452	28055
Phytane	44372	15454
nC19	43761	24206
nC20	35020	19447
nC21	28257	15643
nC22	23199	13723
nC23	18834	10792
nC24	13224	7776
nC25	13388	5777
nC26	7321	3898
nC27	4906	2957
nC28	3293	1843
nC29	2548	1318
nC30	1489	800
nC31	1174	673
nC32	758	454
nC33	956	400
nC34	273	152
nC35	305	167
nC36	327	172
nC37	547	175
nC38	395	135
nC39	526	84
nC40	295	104

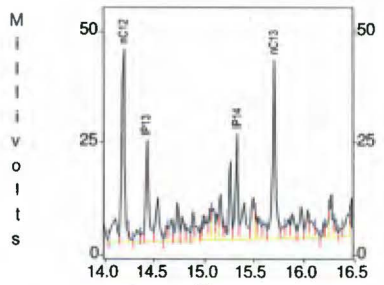
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-150
Acquired : Jan 24, 2012 19:46:11

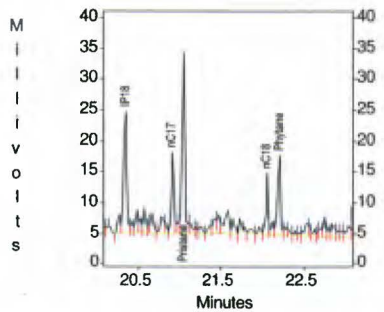
c:\ezchrom\chrom\12005\c-150 -- Channel A



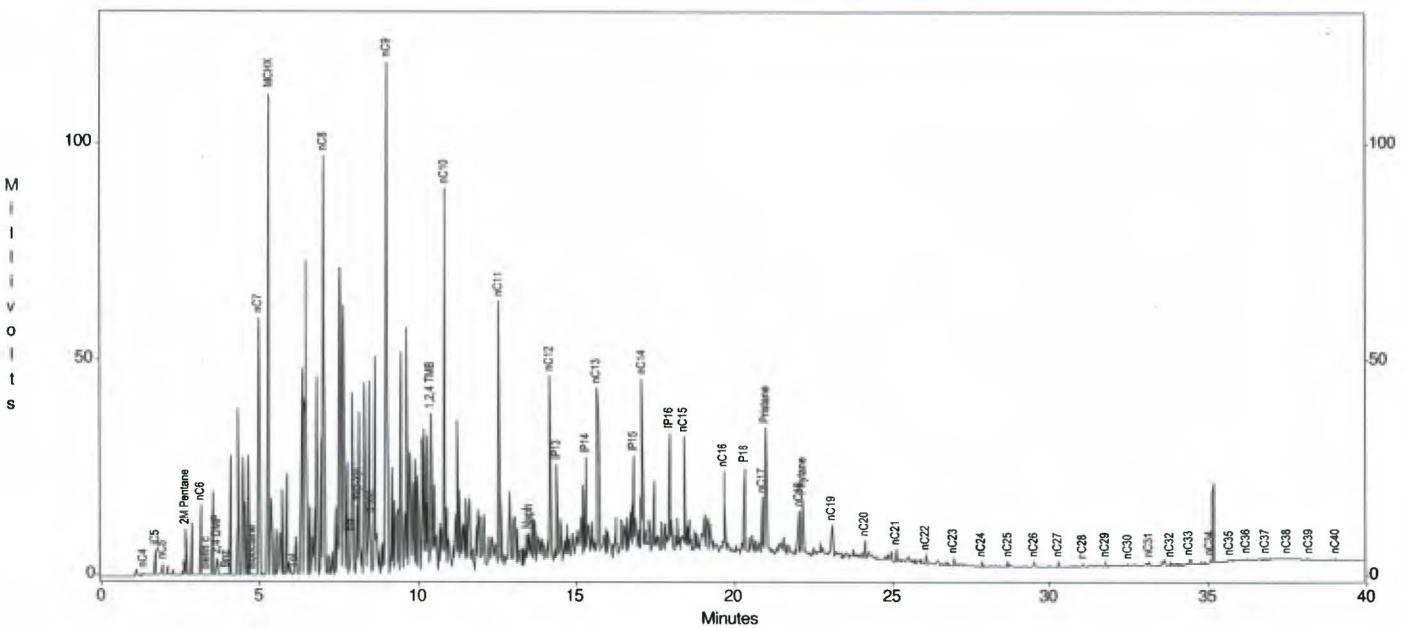
c:\ezchrom\chrom\12005\c-150 -- Channel A



c:\ezchrom\chrom\12005\c-150 -- Channel A



c:\ezchrom\chrom\12005\c-150 -- Channel A



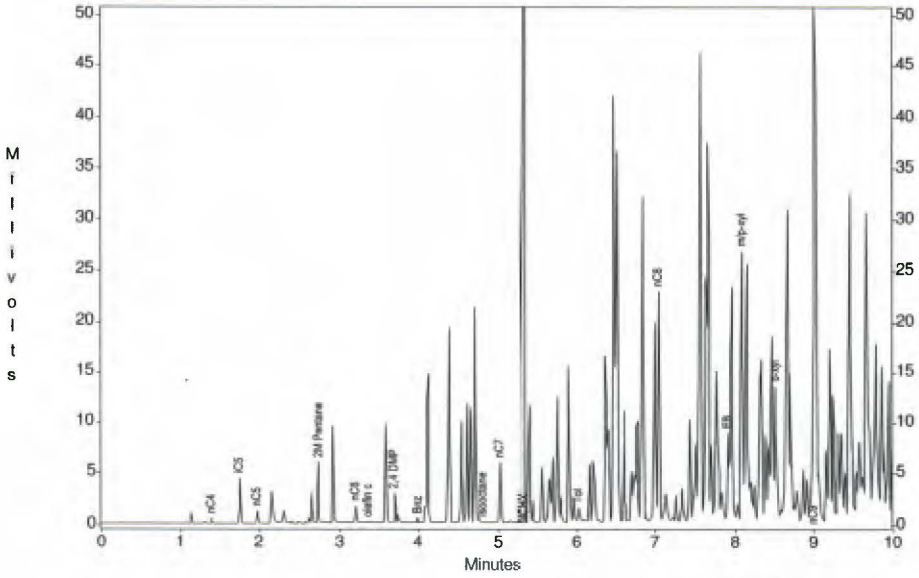
Channel A Results

Peak	Area	Height
nC4	315	465
iC5	4254	5773
nC5	2183	2674
MTBE	0	0
2M Pentane	9764	10718
nC6	15769	16123
olefin a	0	0
olefin b	0	0
olefin c	86	50
2,4 DMP	4017	3823
Bnz	906	645
Isooctane	178	72
nC7	77934	59716
MCHX	177463	111151
Tol	531	259
nC8	176839	96759
EB	13873	8788
m/p-xyl	31055	15657
o-xyl	17623	12876
nC9	339609	117682
1,2,4 TMB	64623	36652
nC10	197109	88428
nC11	108184	61721
Naph	18052	7065
nC12	80409	43360
IP13	43968	22535
IP14	40933	23692
nC13	86456	40035
IP15	38519	22997
nC14	77262	40620
IP16	54090	27731
nC15	44811	25221
nC16	34029	18524
IP18	45175	19730
nC17	27163	13188
Pristane	70534	29459
nC18	19689	9937
Phytane	28430	12735
nC19	12690	7396
nC20	8034	3992
nC21	4579	2716
nC22	4312	2294
nC23	3612	1729
nC24	2163	1272
nC25	1748	1048
nC26	2538	1357
nC27	2451	1250
nC28	2052	1026
nC29	2408	1042
nC30	1242	615
nC31	1260	724
nC32	1146	715
nC33	1752	804
nC34	731	409
nC35	542	339
nC36	903	347
nC37	504	255
nC38	539	207
nC39	311	114
nC40	603	165

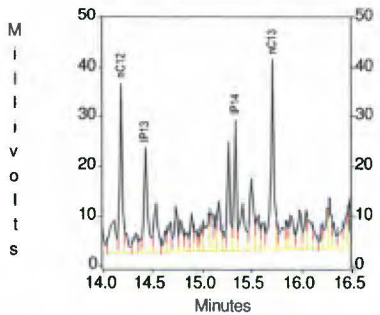
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-151
Acquired : Jan 24, 2012 15:57:06

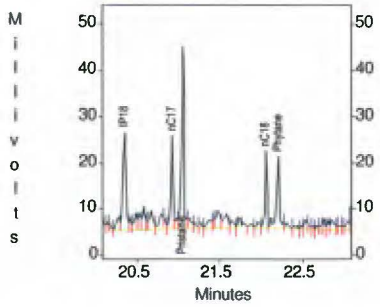
c:\ezchrom\chrom\12005\c-151 -- Channel A



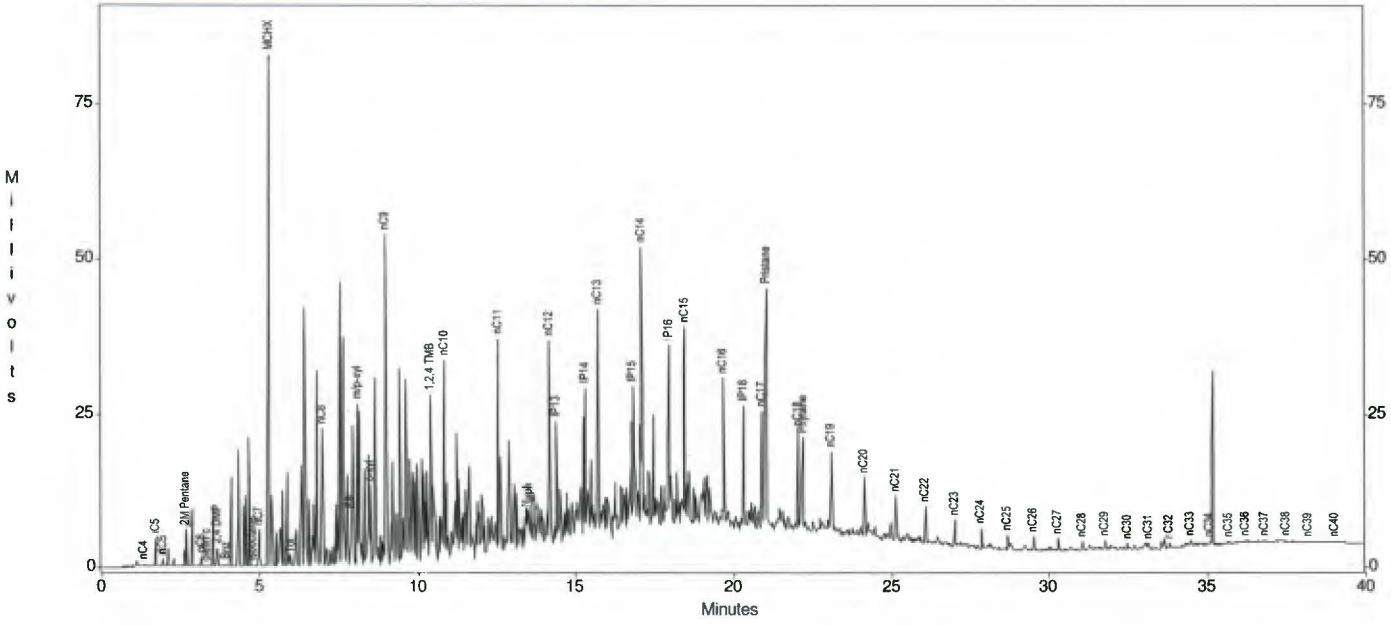
c:\ezchrom\chrom\12005\c-151 -- Channel A



c:\ezchrom\chrom\12005\c-151 -- Channel A



c:\ezchrom\chrom\12005\c-151 -- Channel A



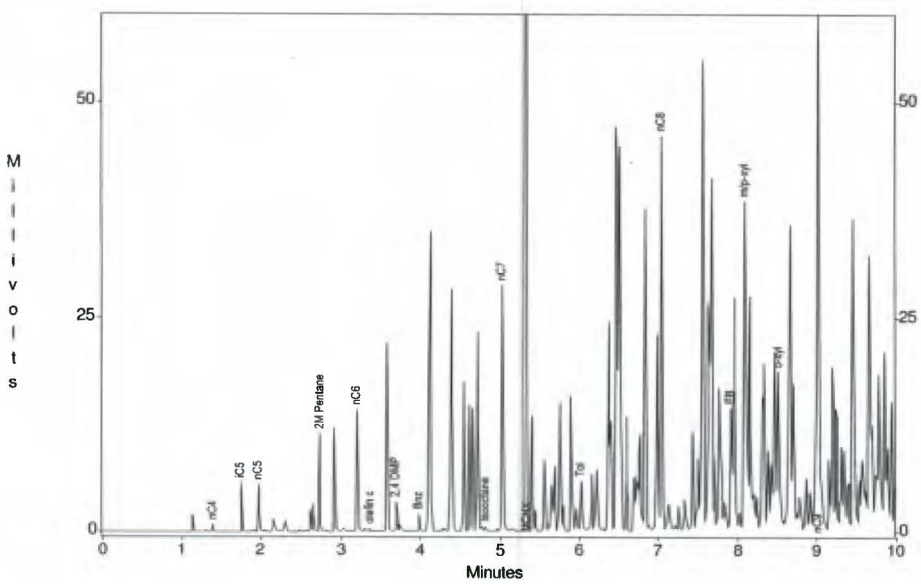
Channel A Results

Peak	Area	Height
nC4	234	382
iC5	3046	4460
nC5	914	1165
MTBE	0	0
2M Pentane	5331	5974
nC6	1640	1574
olefin a	0	0
olefin b	0	0
olefin c	103	62
2,4 DMP	2896	2848
Bnz	716	473
Isooctane	66	41
nC7	7070	5885
MCHX	118750	82641
Tol	2252	1424
nC8	28418	22630
EB	12738	8628
m/p-xyl	49388	26527
o-xyl	22471	13114
nC9	90754	53509
1,2,4 TMB	45846	27374
nC10	59247	32814
nC11	64170	35415
Naph	25829	6928
nC12	66253	34264
IP13	49845	21255
IP14	49850	26282
nC13	85330	38589
IP15	49383	25688
nC14	96552	48075
IP16	64590	32007
nC15	78059	34515
nC16	57676	25869
IP18	49948	21225
nC17	41749	20133
Pristane	95597	39594
nC18	31526	16497
Phytane	40586	15549
nC19	22901	13550
nC20	16982	9688
nC21	12912	7307
nC22	10640	6098
nC23	8570	4483
nC24	5305	3193
nC25	4746	2503
nC26	4705	2277
nC27	3767	1875
nC28	2875	1453
nC29	2716	1438
nC30	1655	812
nC31	1395	784
nC32	1163	683
nC33	1597	727
nC34	695	318
nC35	462	292
nC36	639	314
nC37	448	209
nC38	594	196
nC39	564	134
nC40	536	144

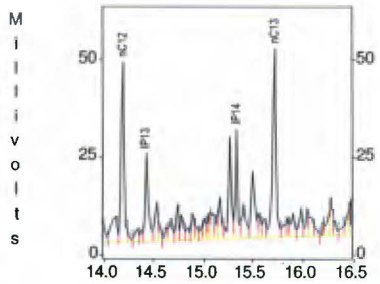
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-152
Acquired : Jan 24, 2012 14:19:23

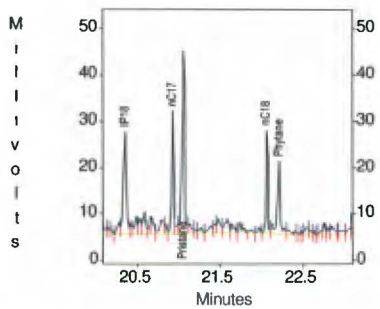
c:\ezchrom\chrom\12005\c-152 -- Channel A



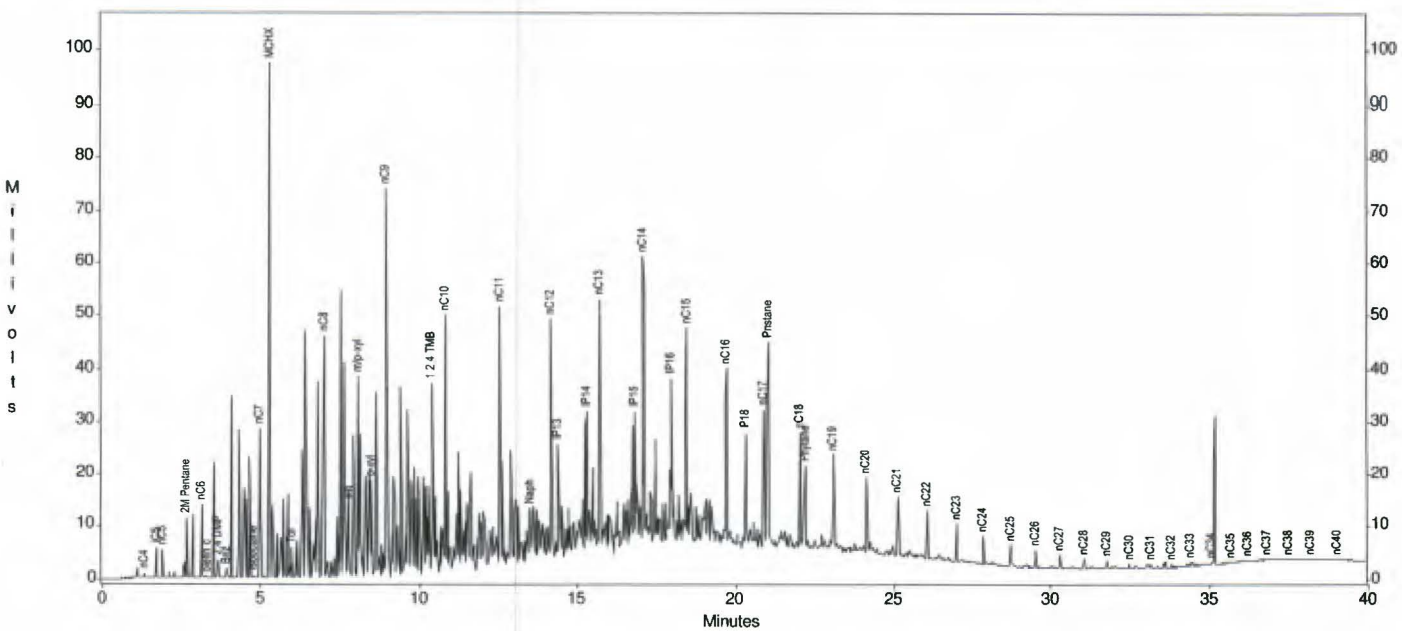
c:\ezchrom\chrom\12005\c-152 -- Channel A



c:\ezchrom\chrom\12005\c-152 -- Channel A



c:\ezchrom\chrom\12005\c-152 -- Channel A



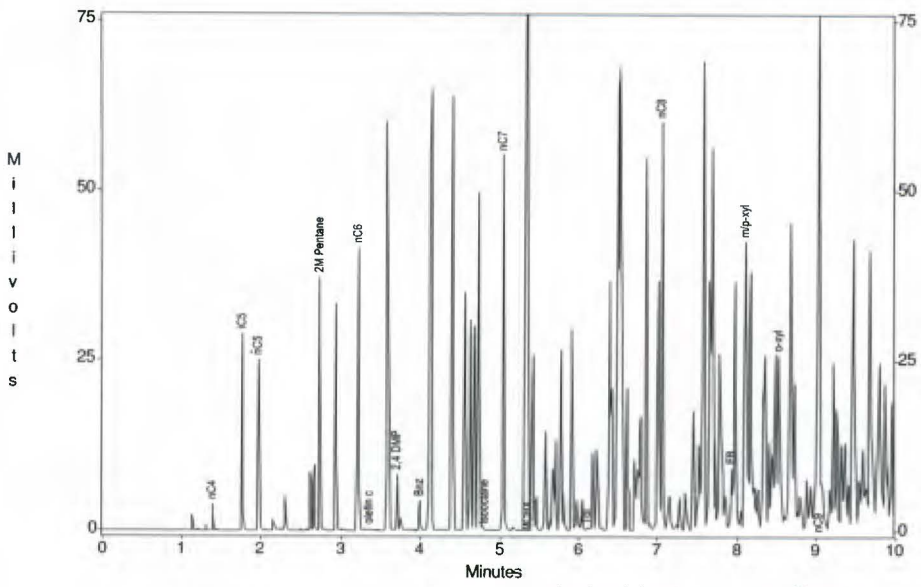
Channel A Results

Peak	Area	Height
nC4	462	744
iC5	3889	5647
nC5	4112	5394
MTBE	0	0
2M Pentane	10100	11310
nC6	13461	14036
olefin a	0	0
olefin b	0	0
olefin c	384	201
2,4 DMP	3530	3404
Bnz	2718	1888
Isooctane	684	515
nC7	33655	28728
MCHX	148823	97236
Tol	8082	5766
nC8	62197	45873
EB	20398	14063
m/p-xyl	74676	38228
o-xyl	30990	18345
nC9	135072	73968
1,2,4 TMB	61303	36440
nC10	86821	49317
nC11	86273	49931
Naph	37482	10700
nC12	86280	46328
IP13	48312	22379
IP14	49035	27821
nC13	106150	48719
IP15	44813	26301
nC14	106816	54836
IP16	53484	29371
nC15	80599	40839
nC16	64754	34020
IP18	48153	21884
nC17	51822	26524
Pristane	96786	39449
nC18	41638	22424
Phytane	41760	15716
nC19	33689	18447
nC20	25021	14275
nC21	19781	11317
nC22	15997	9477
nC23	12959	7195
nC24	9159	5434
nC25	10796	4164
nC26	6248	3218
nC27	4241	2476
nC28	3085	1735
nC29	2606	1435
nC30	1559	796
nC31	1072	670
nC32	764	466
nC33	983	427
nC34	161	116
nC35	290	180
nC36	351	141
nC37	362	153
nC38	341	113
nC39	494	89
nC40	452	145

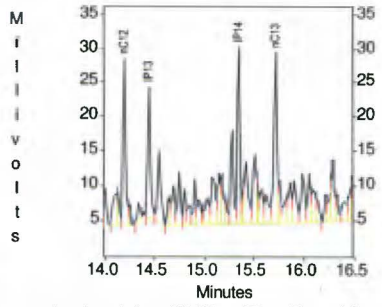
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-153
Acquired : Jan 24, 2012 10:10:30

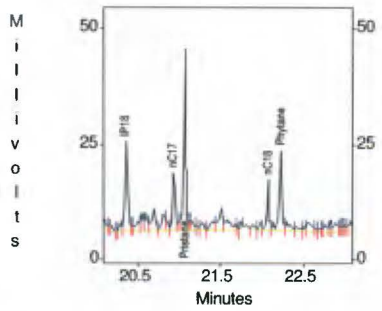
c:\ezchrom\chrom\12005\c-153 -- Channel A



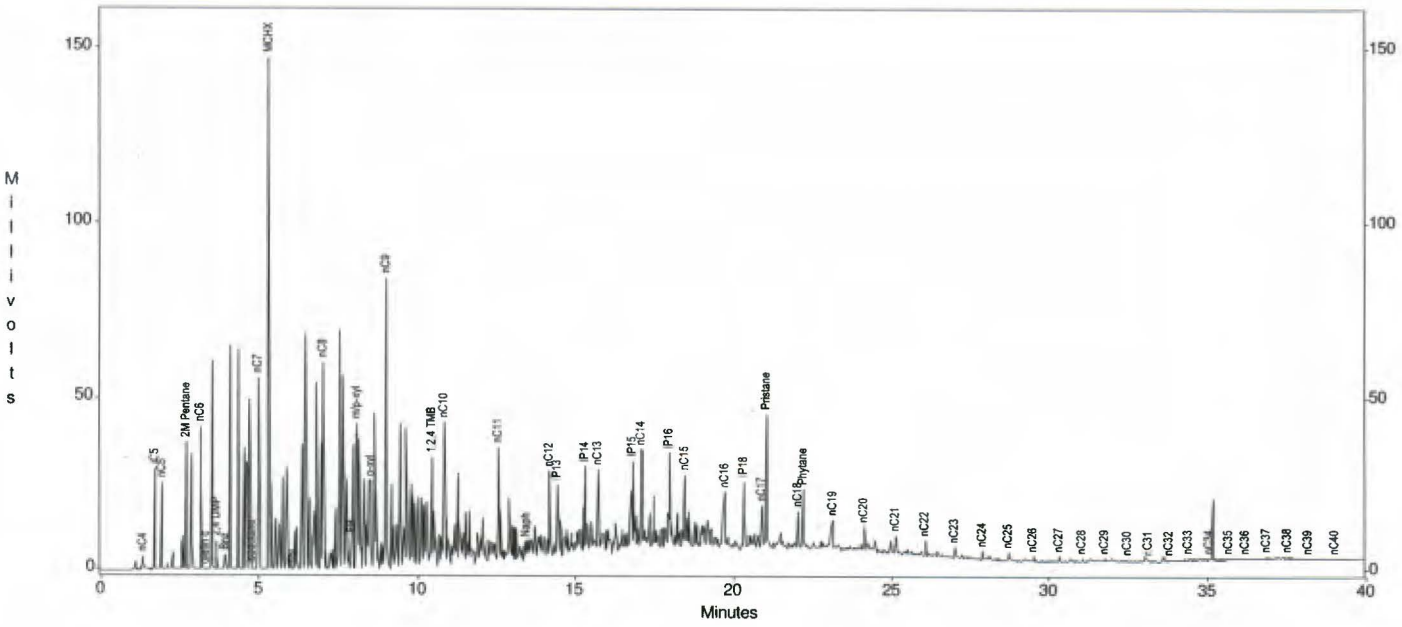
c:\ezchrom\chrom\12005\c-153 -- Channel A



c:\ezchrom\chrom\12005\c-153 -- Channel A



c:\ezchrom\chrom\12005\c-153 -- Channel A



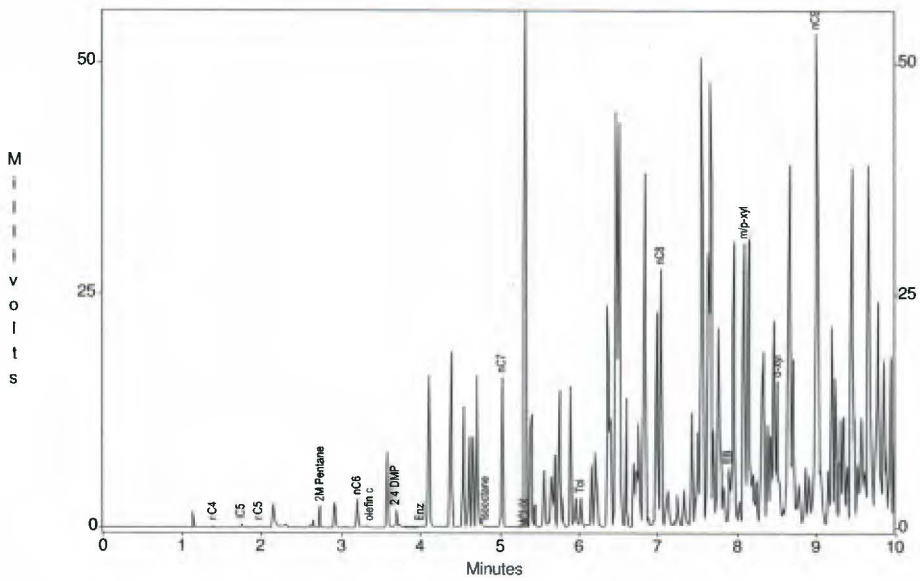
Channel A Results

Peak	Area	Height
nC4	2190	3740
iC5	19153	28836
nC5	18270	25068
MTBE	0	0
2M Pentane	32203	36952
nC6	39425	41355
olefin a	0	0
olefin b	0	0
olefin c	329	126
2,4 DMP	8260	8029
Bnz	5514	4272
Isooctane	335	216
nC7	71245	55127
MCHX	270068	147082
Tol	418	217
nC8	87418	59848
EB	13744	8885
m/p-xyl	84121	42150
o-xyl	48745	25370
nC9	155698	83545
1,2,4 TMB	53195	31270
nC10	76181	41624
nC11	55349	32314
Naph	7585	4391
nC12	42356	24198
IP13	35057	19202
IP14	45266	25820
nC13	48329	24768
IP15	44133	25971
nC14	60351	29396
IP16	50791	27072
nC15	32409	18803
nC16	35029	16444
IP18	42784	19430
nC17	26992	12578
Pristane	94491	39270
nC18	22015	10867
Phytane	41748	17286
nC19	14220	8504
nC20	14403	6825
nC21	9976	5150
nC22	8069	4178
nC23	6640	3170
nC24	4281	2412
nC25	7681	1948
nC26	3044	1489
nC27	2141	1195
nC28	1886	850
nC29	2115	960
nC30	888	378
nC31	565	345
nC32	406	226
nC33	688	335
nC34	139	120
nC35	94	66
nC36	218	121
nC37	177	95
nC38	207	83
nC39	182	31
nC40	324	95

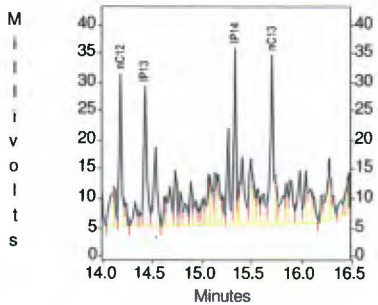
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-154
Acquired : Jan 24, 2012 21:25:45

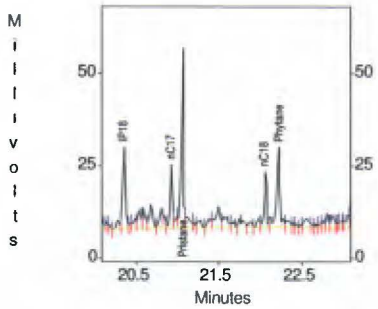
c:\ezchrom\chrom\12005\c-154 -- Channel A



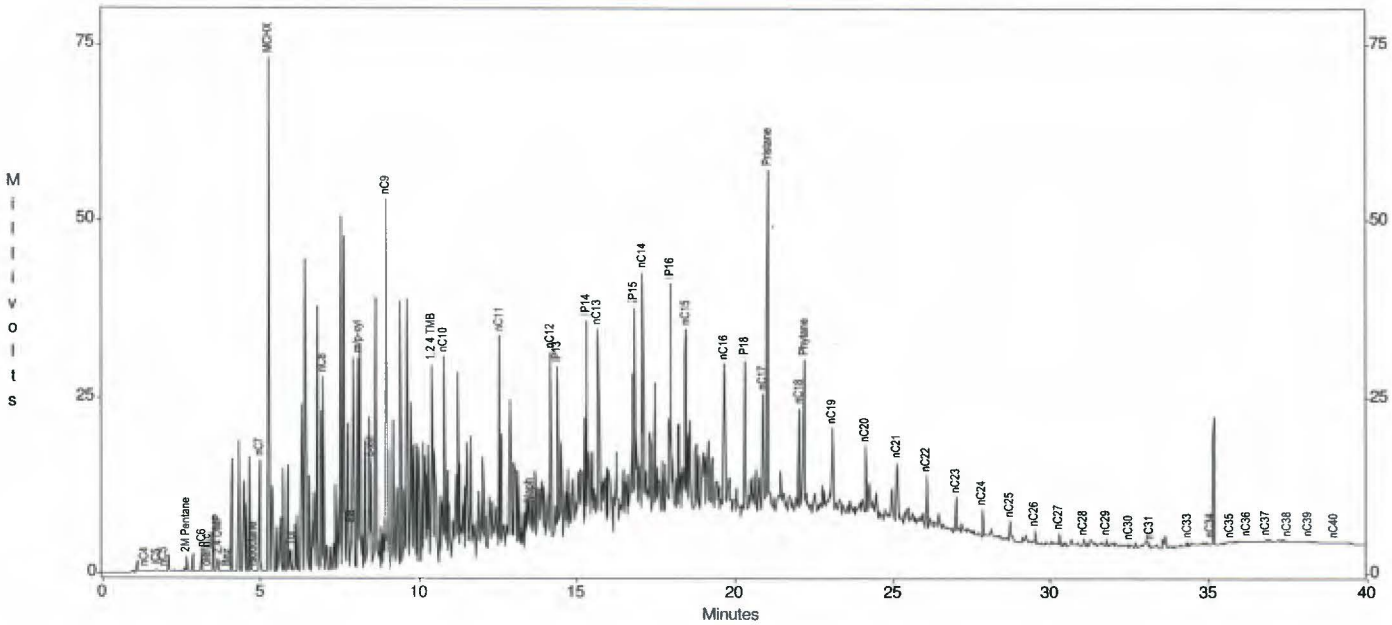
c:\ezchrom\chrom\12005\c-154 -- Channel A



c:\ezchrom\chrom\12005\c-154 -- Channel A



c:\ezchrom\chrom\12005\c-154 -- Channel A



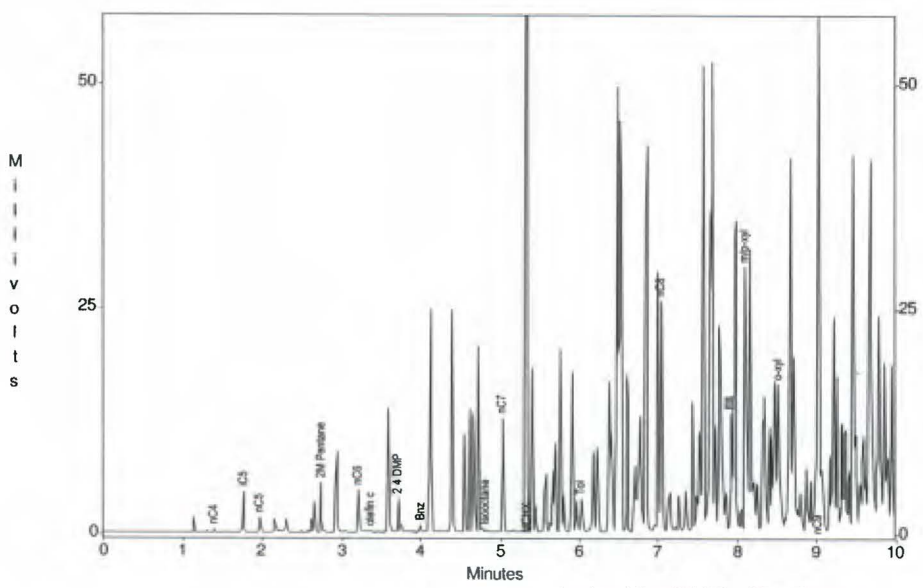
Channel A Results

Peak	Area	Height
nC4	44	46
iC5	272	382
nC5	150	182
MTBE	0	0
2M Pentane	1934	2128
nC6	2878	2845
olefin a	0	0
olefin b	0	0
olefin c	49	26
2,4 DMP	1744	1686
Bnz	272	172
Isooctane	214	145
nC7	18152	15855
MCHX	100718	72707
Tol	4124	3037
nC8	34763	27560
EB	9772	5965
m/p-xyl	56112	30345
o-xyl	22931	15224
nC9	98393	52581
1,2,4 TMB	45923	28539
nC10	55143	29386
nC11	54519	30408
Naph	13238	3582
nC12	48569	26245
IP13	49609	24268
IP14	55503	30601
nC13	63092	29269
IP15	35413	24907
nC14	63745	33401
IP16	61686	32500
nC15	62764	26318
nC16	46330	21837
IP18	49320	22215
nC17	35904	17194
Pristane	118888	48774
nC18	31040	14962
Phytane	62345	21968
nC19	19904	12493
nC20	21231	10254
nC21	16674	8596
nC22	13350	7172
nC23	11069	5163
nC24	6797	3850
nC25	11756	2950
nC26	3342	1890
nC27	2977	1586
nC28	2587	1002
nC29	2245	1063
nC30	930	342
nC31	423	285
nC32	0	0
nC33	858	417
nC34	210	123
nC35	49	48
nC36	279	142
nC37	212	50
nC38	64	31
nC39	20	21
nC40	343	85

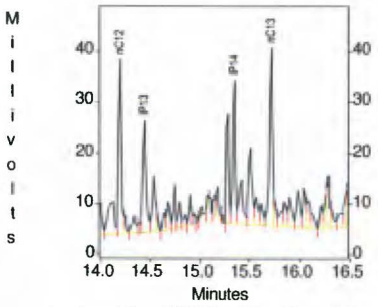
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-161
Acquired : Jan 24, 2012 11:49:58

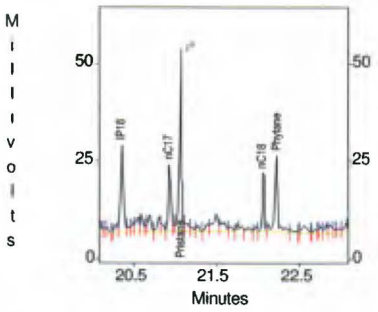
c:\ezchrom\chrom\12005\c-161 -- Channel A



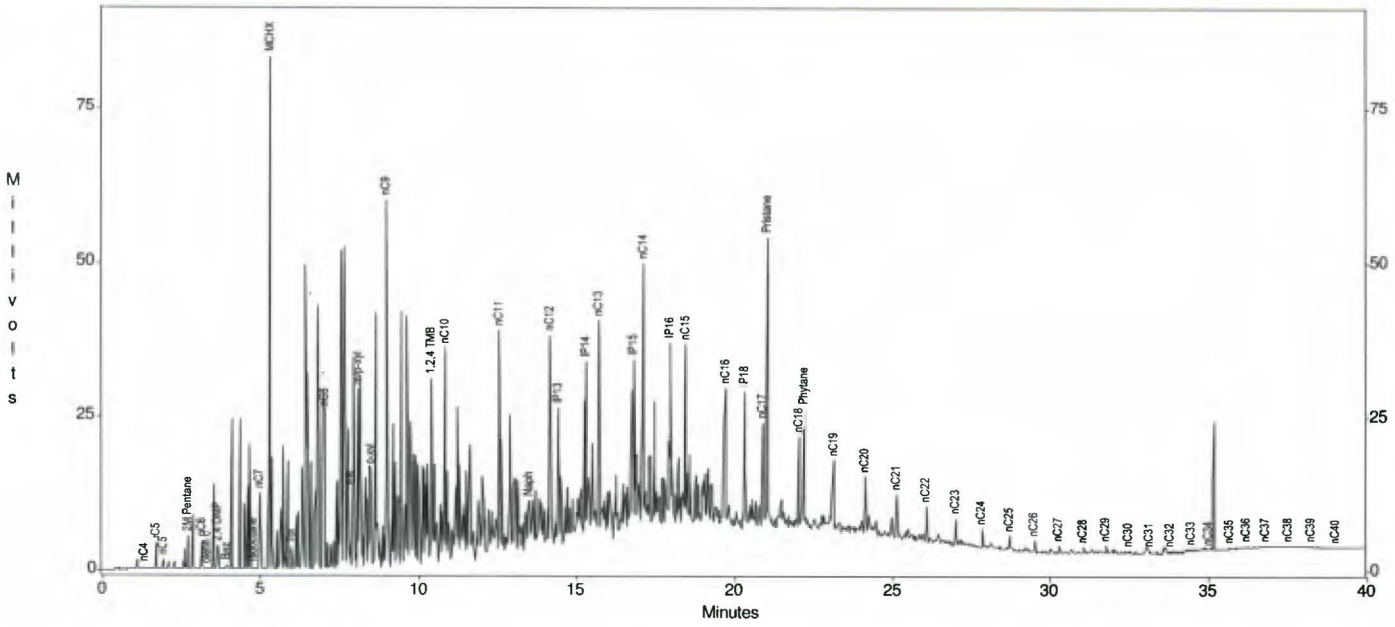
c:\ezchrom\chrom\12005\c-161 -- Channel A



c:\ezchrom\chrom\12005\c-161 -- Channel A



c:\ezchrom\chrom\12005\c-161 -- Channel A



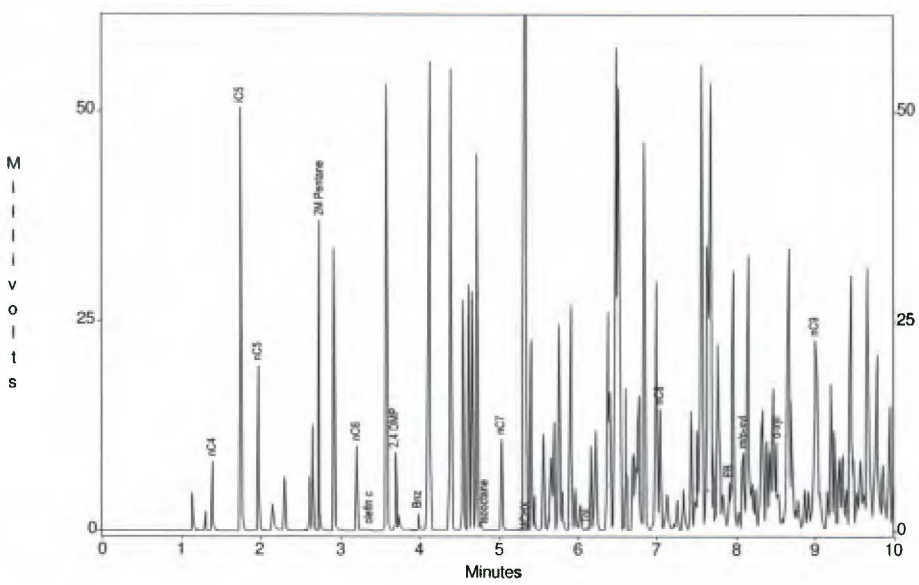
Channel A Results

Peak	Area	Height
nC4	192	295
iC5	3108	4432
nC5	1280	1566
MTBE	0	0
2M Pentane	4790	5341
nC6	4592	4525
olefin a	0	0
olefin b	0	0
olefin c	139	79
2,4 DMP	3768	3665
Bnz	1055	699
Isooctane	338	238
nC7	14510	12415
MCHX	118853	82776
Tol	4921	3495
nC8	32266	25587
EB	18849	12839
m/p-xyl	55592	29323
o-xyl	24985	16142
nC9	105492	59845
1,2,4 TMB	49675	30289
nC10	62050	34655
nC11	64488	36741
Naph	26151	7897
nC12	60568	34128
IP13	46636	22159
IP14	47509	27957
nC13	69877	35052
IP15	51900	28408
nC14	85909	43627
IP16	59616	30029
nC15	59367	29202
nC16	45574	22645
IP18	48569	22451
nC17	35324	17348
Pristane	113068	47189
nC18	28624	14947
Phytane	55560	19465
nC19	19544	11671
nC20	16992	9088
nC21	12759	7188
nC22	10831	5807
nC23	8749	4287
nC24	5524	3188
nC25	9398	2504
nC26	4033	1837
nC27	2621	1329
nC28	1967	887
nC29	1938	968
nC30	1021	391
nC31	467	275
nC32	429	260
nC33	904	277
nC34	227	118
nC35	128	93
nC36	280	142
nC37	138	76
nC38	61	44
nC39	70	53
nC40	253	90

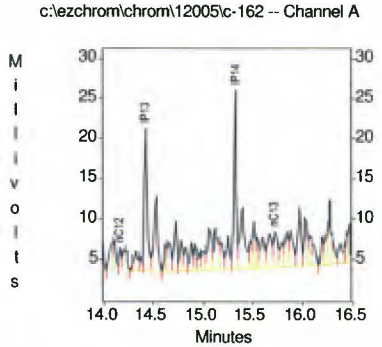
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-162
Acquired : Jan 24, 2012 18:57:14

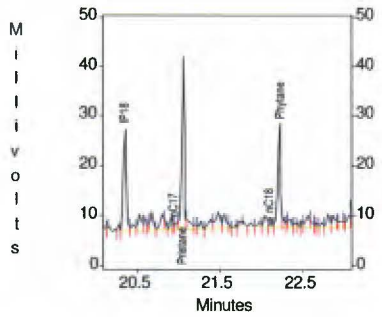
c:\ezchrom\chrom\12005\c-162 -- Channel A



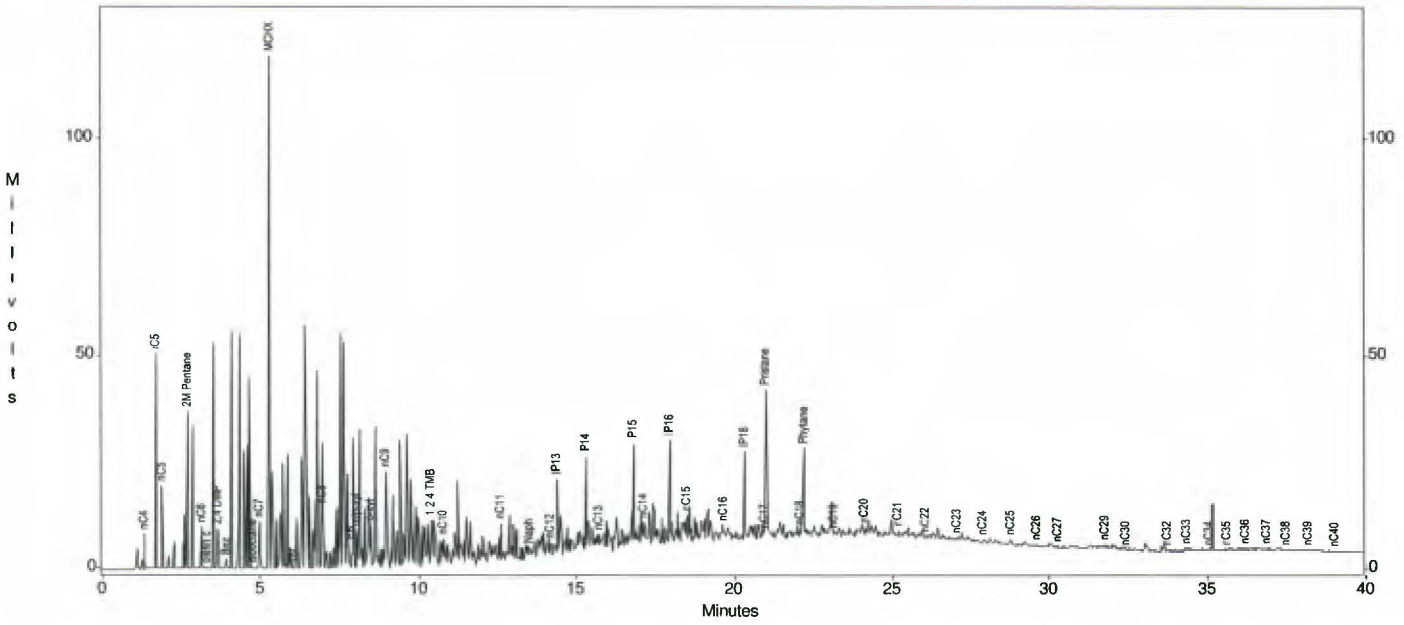
c:\ezchrom\chrom\12005\c-162 -- Channel A



c:\ezchrom\chrom\12005\c-162 -- Channel A



c:\ezchrom\chrom\12005\c-162 -- Channel A



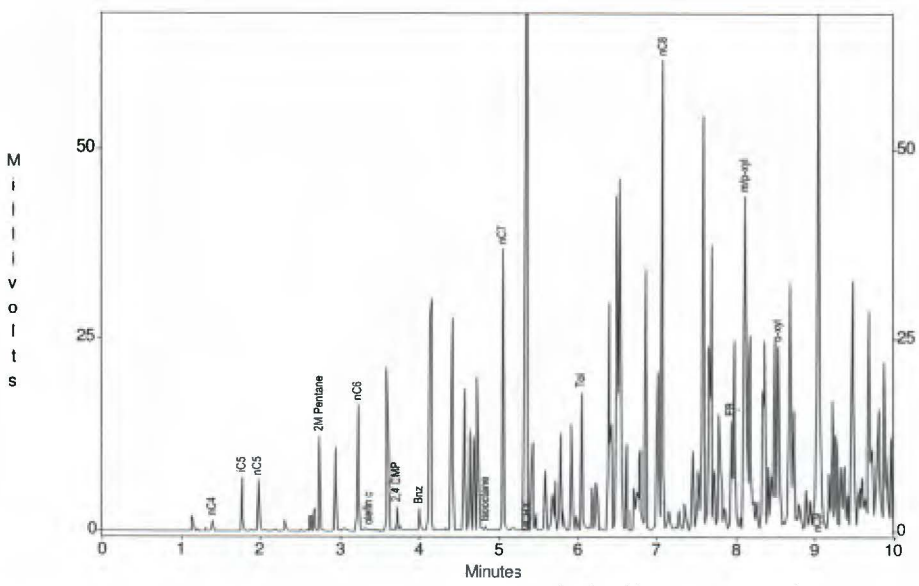
Channel A Results

Peak	Area	Height
nC4	4799	8182
iC5	33723	50217
nC5	14378	19603
MTBE	0	0
2M Pentane	32518	36865
nC6	9711	9997
olefin a	0	0
olefin b	0	0
olefin c	156	62
2,4 DMP	9366	9217
Bnz	2635	1998
Isooctane	63	32
nC7	13020	10805
MCHX	198829	118768
Tol	344	146
nC8	17411	14202
EB	8671	5527
m/p-xyl	17343	9020
o-xyl	14859	10194
nC9	53706	22467
1,2,4 TMB	16981	10727
nC10	16900	6012
nC11	12757	8650
Naph	5132	1717
nC12	2601	2040
IP13	34664	17800
IP14	37324	22287
nC13	11699	4283
IP15	41264	24255
nC14	12307	5595
IP16	44195	24282
nC15	10174	4921
nC16	6927	3232
IP18	45930	20442
nC17	2253	1664
Pristane	81826	34787
nC18	3252	1815
Phytane	44062	20564
nC19	2459	874
nC20	5918	1941
nC21	3843	1287
nC22	2635	600
nC23	2200	683
nC24	4587	634
nC25	8372	1173
nC26	1932	566
nC27	1015	440
nC28	0	0
nC29	2065	794
nC30	164	0
nC31	0	0
nC32	513	195
nC33	1263	595
nC34	17	0
nC35	137	80
nC36	324	117
nC37	100	97
nC38	129	81
nC39	118	37
nC40	271	73

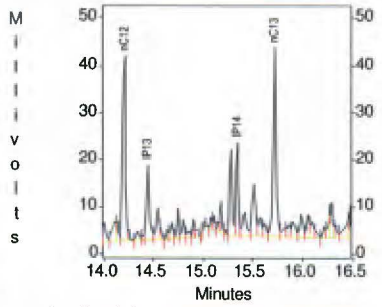
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-166
Acquired : Jan 24, 2012 09:20:57

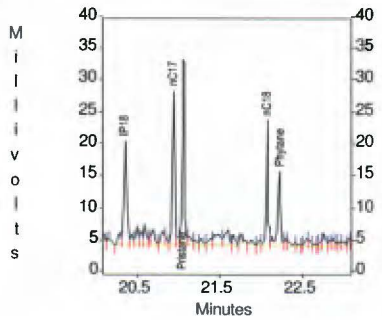
c:\ezchrom\chrom\12005\c-166 -- Channel A



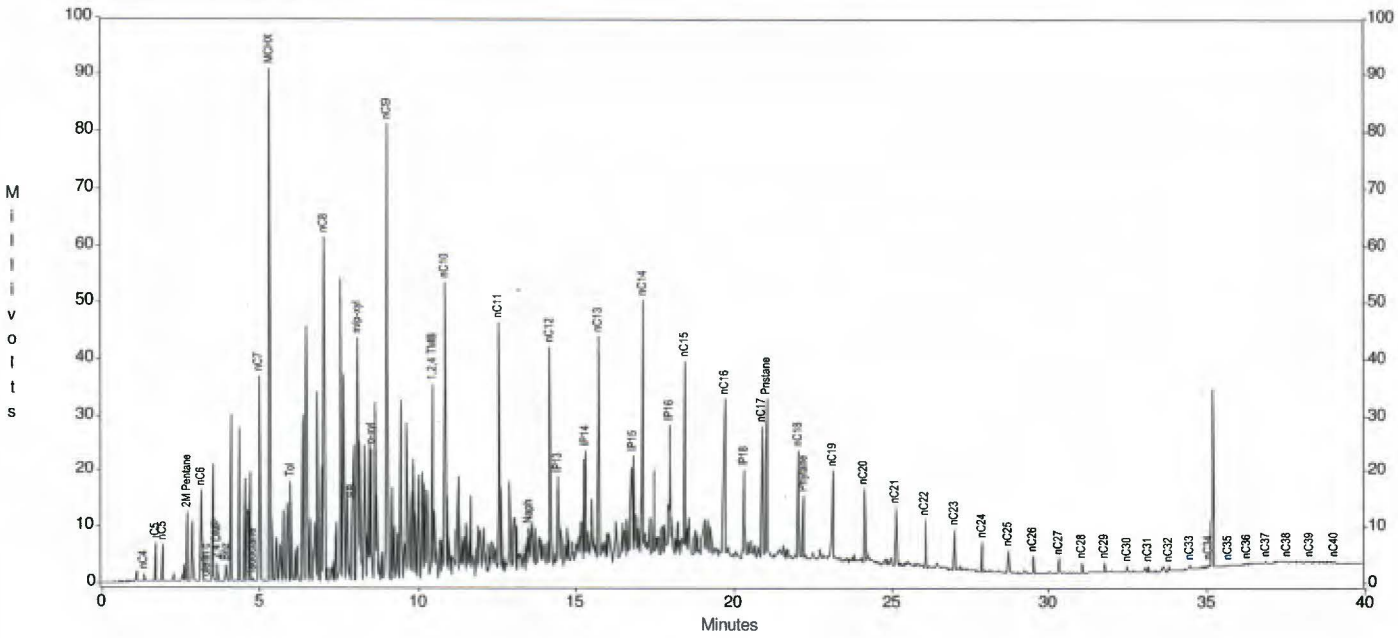
c:\ezchrom\chrom\12005\c-166 -- Channel A



c:\ezchrom\chrom\12005\c-166 -- Channel A



c:\ezchrom\chrom\12005\c-166 -- Channel A



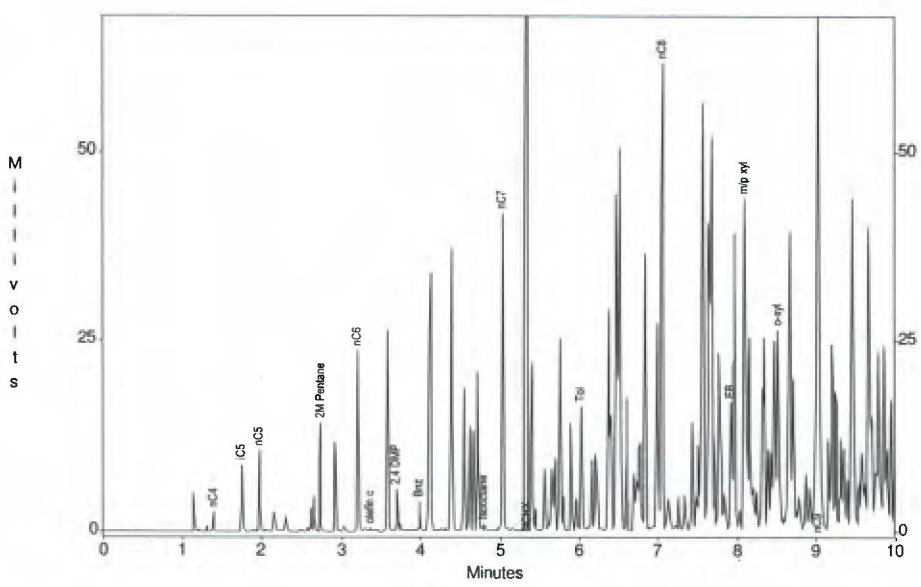
Channel A Results

Peak	Area	Height
nC4	849	1336
iC5	5057	7028
nC5	5278	6470
MTBE	0	0
2M Pentane	11302	12284
nC6	16267	16306
olefin a	0	0
olefin b	0	0
olefin c	343	161
2,4 DMP	3193	3020
Bnz	4078	2898
Isooctane	739	538
nC7	43938	36788
MCHX	134238	90607
Tol	23551	17802
nC8	91164	61309
EB	20398	14109
m/p-xyl	85846	43325
o-xyl	43237	23733
nC9	169139	80946
1,2,4 TMB	71193	34703
nC10	91736	52767
nC11	74044	44815
Naph	24375	7374
nC12	69503	39465
IP13	32531	16036
IP14	31435	19776
nC13	80407	40273
IP15	32851	19061
nC14	88878	46648
IP16	47179	24262
nC15	71287	35574
nC16	54708	28465
IP18	35696	16042
nC17	43673	23795
Pristane	68022	28779
nC18	35405	19450
Phytane	28561	11428
nC19	30165	16208
nC20	22807	13203
nC21	17576	10429
nC22	14563	8641
nC23	12697	7155
nC24	8619	5397
nC25	9894	3846
nC26	5771	3010
nC27	4194	2395
nC28	3148	1744
nC29	3088	1614
nC30	1855	1026
nC31	1447	823
nC32	1002	613
nC33	1212	566
nC34	340	215
nC35	418	249
nC36	406	214
nC37	721	223
nC38	449	155
nC39	738	128
nC40	574	180

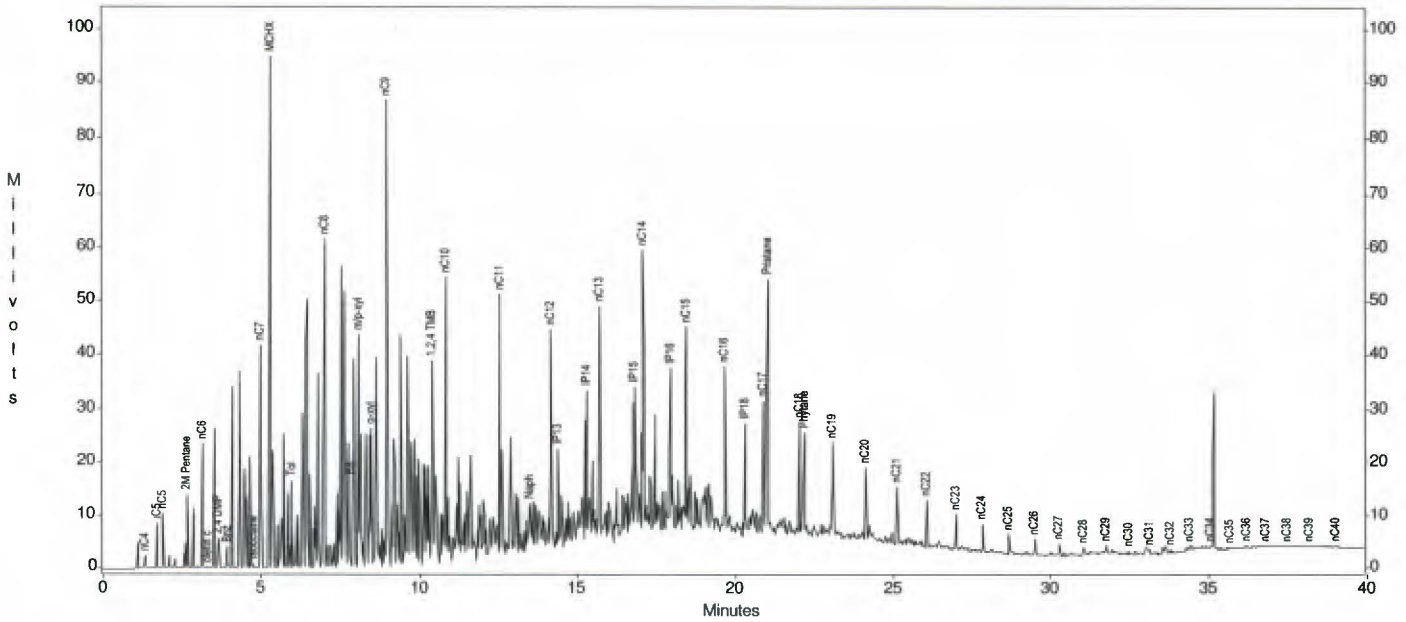
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-167
Acquired : Jan 24, 2012 20:35:48

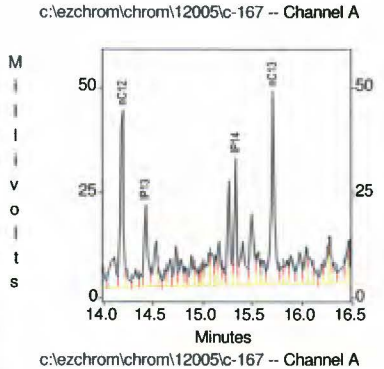
c:\ezchrom\chrom\12005\c-167 -- Channel A



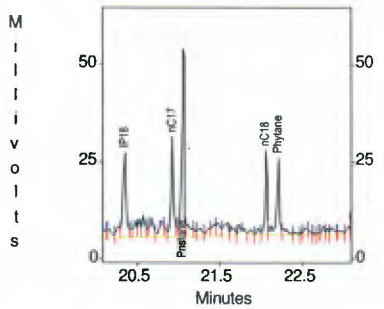
c:\ezchrom\chrom\12005\c-167 -- Channel A



c:\ezchrom\chrom\12005\c-167 -- Channel A



c:\ezchrom\chrom\12005\c-167 -- Channel A



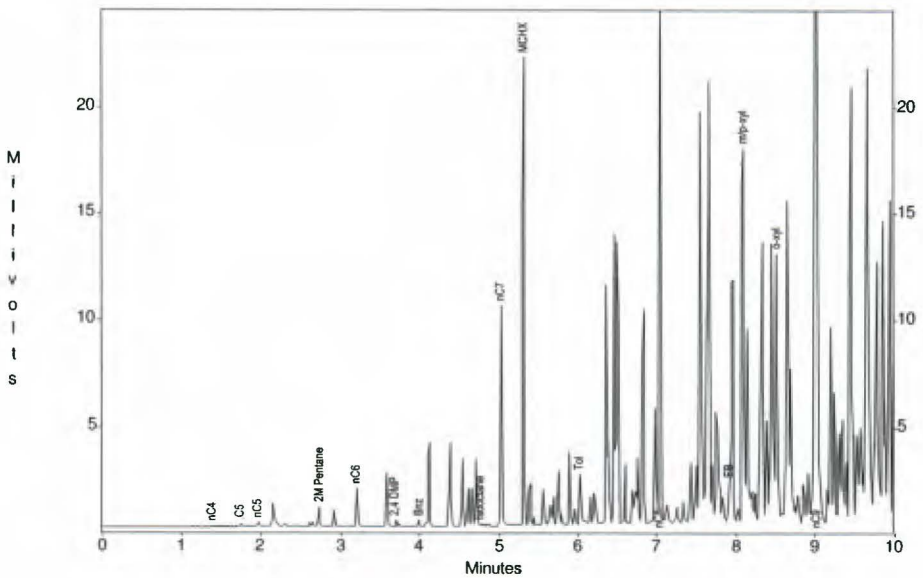
Channel A Results

Peak	Area	Height
nC4	1429	2383
iC5	5768	8508
nC5	7763	10443
MTBE	0	0
2M Pentane	12213	13971
nC6	22266	23604
olefin a	0	0
olefin b	0	0
olefin c	527	258
2,4 DMP	5553	5454
Bnz	5172	3850
Isooctane	970	726
nC7	50183	41546
MCHX	141421	94580
Tol	21026	16318
nC8	58452	61405
EB	24200	16665
m/p-xyl	87198	43453
o-xyl	50381	26099
nC9	181020	86187
1,2,4 TMB	63385	38037
nC10	95686	53057
nC11	84298	49654
Naph	32270	10045
nC12	82140	41917
IP13	46401	19723
IP14	56737	30221
nC13	107923	45829
IP15	56182	30206
nC14	111664	55371
IP16	68162	32922
nC15	89154	40323
nC16	70969	32520
IP18	50309	21653
nC17	51828	25339
Pristane	119819	47886
nC18	40379	21150
Phytane	47725	19418
nC19	30359	17806
nC20	24097	13469
nC21	19130	10953
nC22	15869	9015
nC23	12926	7002
nC24	8568	5214
nC25	10776	3823
nC26	5603	2921
nC27	3964	2156
nC28	2949	1544
nC29	3503	1485
nC30	1536	713
nC31	807	534
nC32	700	456
nC33	1564	475
nC34	254	195
nC35	317	162
nC36	444	203
nC37	312	156
nC38	417	135
nC39	393	88
nC40	347	140

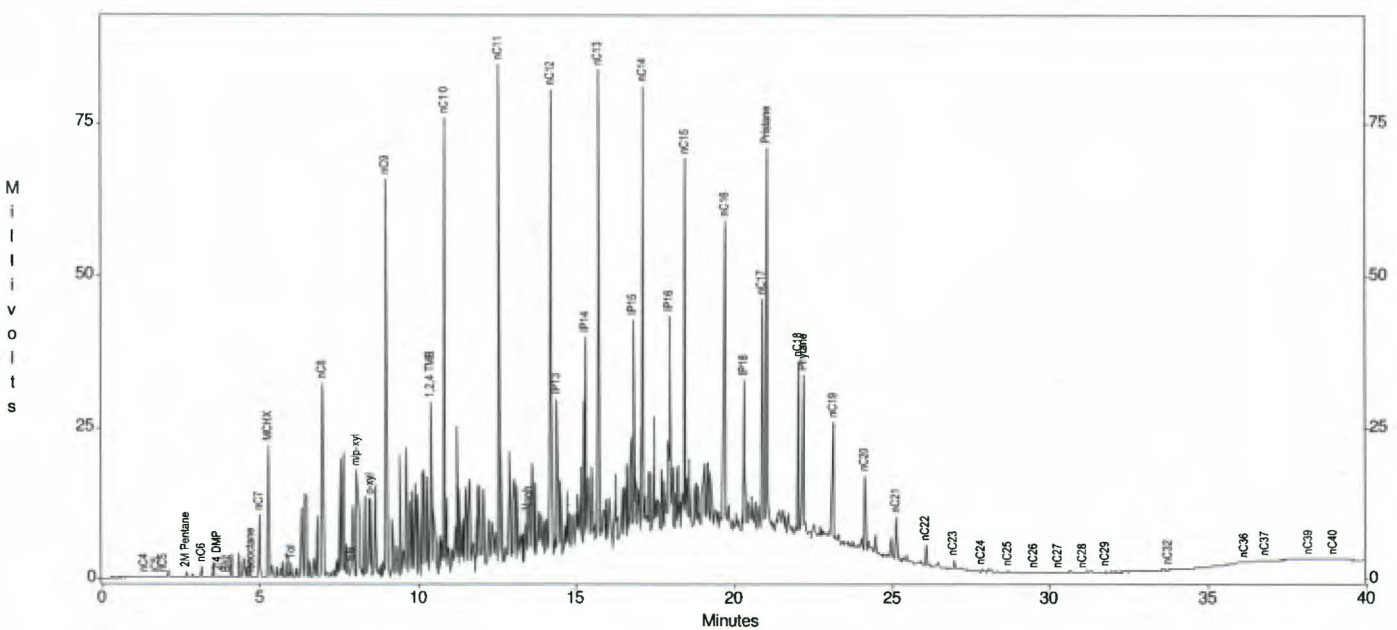
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : C-168
Acquired : Jan 24, 2012 15:09:04

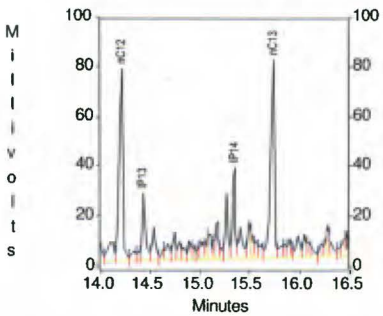
c:\ezchrom\chrom\12005\c-168 -- Channel A



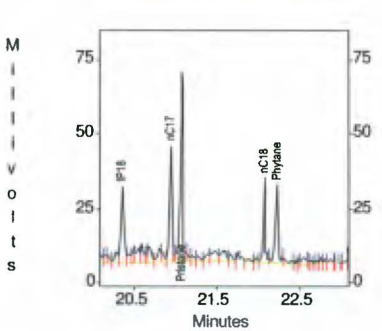
c:\ezchrom\chrom\12005\c-168 -- Channel A



c:\ezchrom\chrom\12005\c-168 -- Channel A



c:\ezchrom\chrom\12005\c-168 -- Channel A



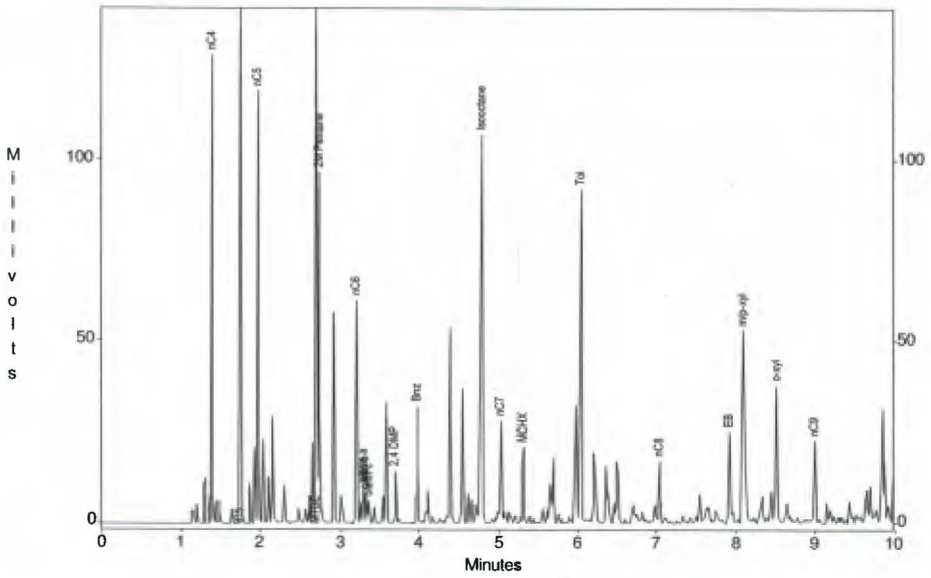
Channel A Results

Peak	Area	Height
nC4	11	12
iC5	115	156
nC5	195	232
MTBE	0	0
2M Pentane	885	953
nC6	1909	1823
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	295	287
Bnz	312	194
Isooctane	76	60
nC7	11974	10315
MCHX	25429	22037
Tol	3858	2337
nC8	40960	31925
EB	2662	1957
m/p-xyl	30680	17628
o-xyl	22332	12633
nC9	118847	65605
1,2,4 TMB	45877	28496
nC10	145999	75009
nC11	173758	82527
Naph	32399	8294
nC12	180165	77417
IP13	57246	27044
IP14	67235	36445
nC13	192895	79816
IP15	72293	38540
nC14	184524	75949
IP16	79240	38208
nC15	153891	63876
nC16	118275	52667
IP18	63620	26141
nC17	86918	39289
Pristane	175971	63916
nC18	59191	28919
Phytane	67345	26693
nC19	33012	19448
nC20	21603	12427
nC21	11921	6957
nC22	5979	3462
nC23	2696	1429
nC24	961	547
nC25	1474	235
nC26	202	109
nC27	306	112
nC28	179	64
nC29	185	85
nC30	0	0
nC31	0	0
nC32	187	69
nC33	0	0
nC34	0	0
nC35	0	0
nC36	41	27
nC37	64	24
nC38	0	0
nC39	61	24
nC40	94	19

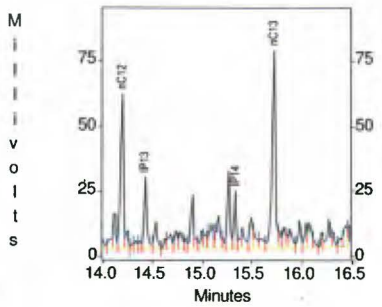
Torkelson Geochemistry, Inc.

Sunoco Philadelphia Refinery, AOI-7
Sample ID : Gas/Dies/Wax std
Acquired : Jan 24, 2012 13:30:21

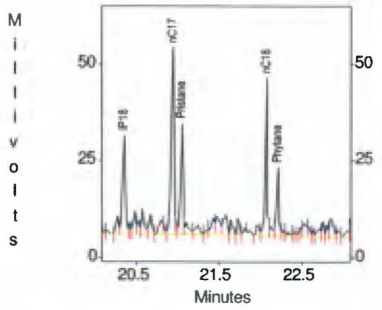
c:\ezchrom\chrom\12005\gadiwax2.2 -- Channel A



c:\ezchrom\chrom\12005\gadiwax2.2 -- Channel A



c:\ezchrom\chrom\12005\gadiwax2.2 -- Channel A



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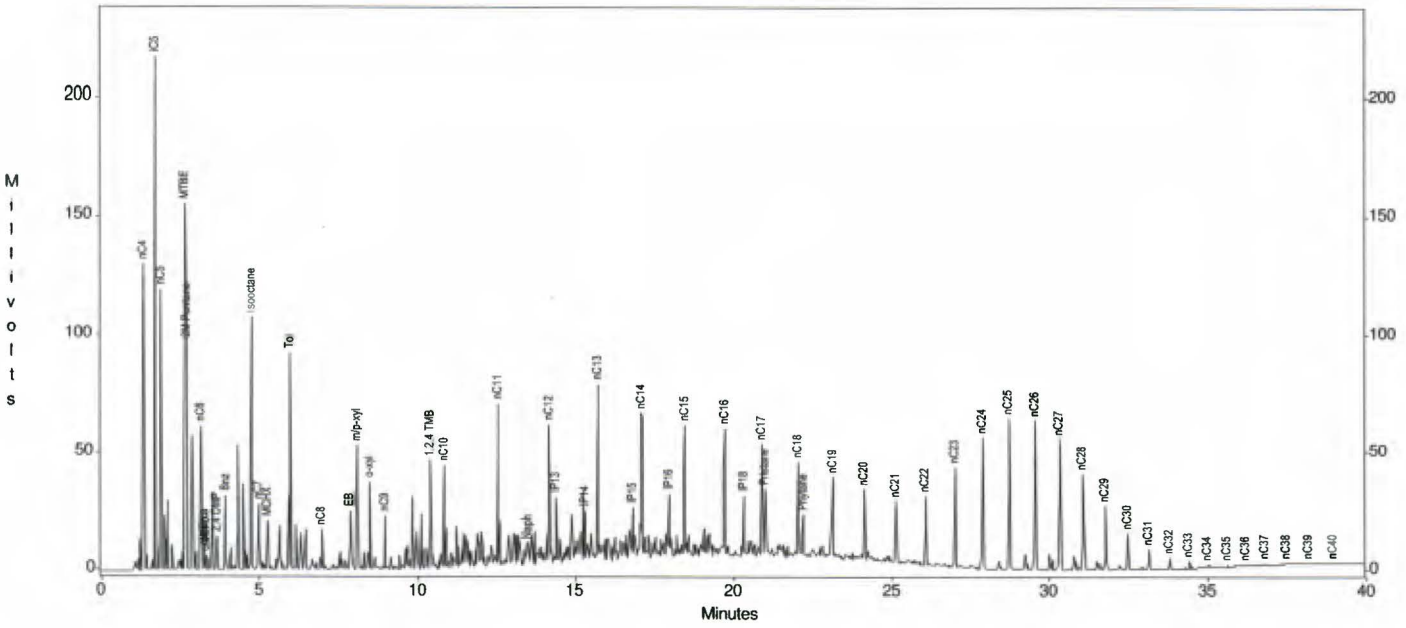


Channel A Results

Peak	Area	Height
nC4	73677	129792
iC5	145823	215819
nC5	85492	119411
MTBE	151834	155860
2M Pentane	85085	96815
nC6	61598	61432
olefin a	10809	10081
olefin b	7874	8007
olefin c	6846	5946
2,4 DMP	14668	14373
Bnz	39340	31842
Isooctane	167239	107228
nC7	35207	28244
MCHX	26058	20919
Tol	150402	91900
nC8	21004	16923
EB	36082	25246
m/p-xyl	134827	53054
o-xyl	58505	37390
nC9	32241	22687
1,2,4 TMB	86691	46650
nC10	71952	43762
nC11	127900	68904
Naph	31375	8295
nC12	119021	59727
IP13	52298	27730
IP14	37044	21964
nC13	160353	75839
IP15	35677	22111
nC14	140349	62687
IP16	61833	26272
nC15	123382	55956
nC16	121923	54574
IP18	54321	25492
nC17	106879	48520
Pristane	63743	28696
nC18	86076	40226
Phytane	37026	17440
nC19	73280	34629
nC20	55905	29936
nC21	47488	25689
nC22	59371	29366
nC23	97609	41933
nC24	153433	55661
nC25	188037	64550
nC26	198010	63488
nC27	155317	56010
nC28	100271	40467
nC29	56747	26733
nC30	26819	14455
nC31	14271	7815
nC32	7519	4349
nC33	4074	2417
nC34	2207	1225
nC35	1243	712
nC36	602	370
nC37	445	207
nC38	745	113
nC39	320	82
nC40	150	56

Torkelson Geochemistry, Inc.				
Density Measurements				
Paar DMA 512 / DMA 60			ASTM Method 4052	
Sample	Density gm/ml	Temp. of Measurement	Job Number	Date
C-147	0.8409	60F	12005	1/31/12
C-148	0.8512	60F	12005	1/31/12
C-150	0.8428	60F	12005	1/31/12
C-151	QNS	60F	12005	1/31/12
C-152	0.8597	60F	12005	1/31/12
C-153	0.8620	60F	12005	1/31/12
C-154	0.8807	60F	12005	1/31/12
C-161	0.8737	60F	12005	1/31/12
C-162	0.8833	60F	12005	1/31/12
C-166	0.8486	60F	12005	1/31/12
C-167	0.8601	60F	12005	1/31/12
C-168	0.8487	60F	12005	1/31/12

Sunoco Refinery - Philadelphia						
TGI Job 12005	AOI-7					
Interpretation of Product Type(s), Proportions and Weathering				Similarities to Other Samples in this Study		
Sample	Product Type(s)	Proportions	Weathering	Quite Similar to	Fairly Similar to	Somewhat Similar to
C-147	Light Crude Oil	100%	Severe		C-148 & C-166	C-152
C-148	Light Crude Oil	100%	Severe		C-147 & C-166	C-152
C-150	Light Crude Oil	100%	Extreme-Severe	Unique		
C-151	Light Crude Oil	100%	Extreme-Severe		C-154 & C-161	C-167
C-152	Light Crude Oil	100%	Severe			C-147, C-148 & C-166
C-153	Light Crude Oil	100%	Extreme	Unique		
C-154	Light Crude Oil	100%	Extreme		C-151 & C-161	C-167
C-161	Light Crude Oil	100%	Extreme		C-154 & C-151	C-157
C-162	Light Crude Oil	100%	Extreme	Unique		
C-166	Light Crude Oil	100%	Severe		C-147 & C-148	C-152
C-167	Light Crude Oil	100%	Extreme			C-151, C-154 & C-161
C-168	Very Light Crude Oil	100%	High-Severe	Unique		

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.323	Gauged January 2012
		AOI 7 / C-65
	1.060	feet

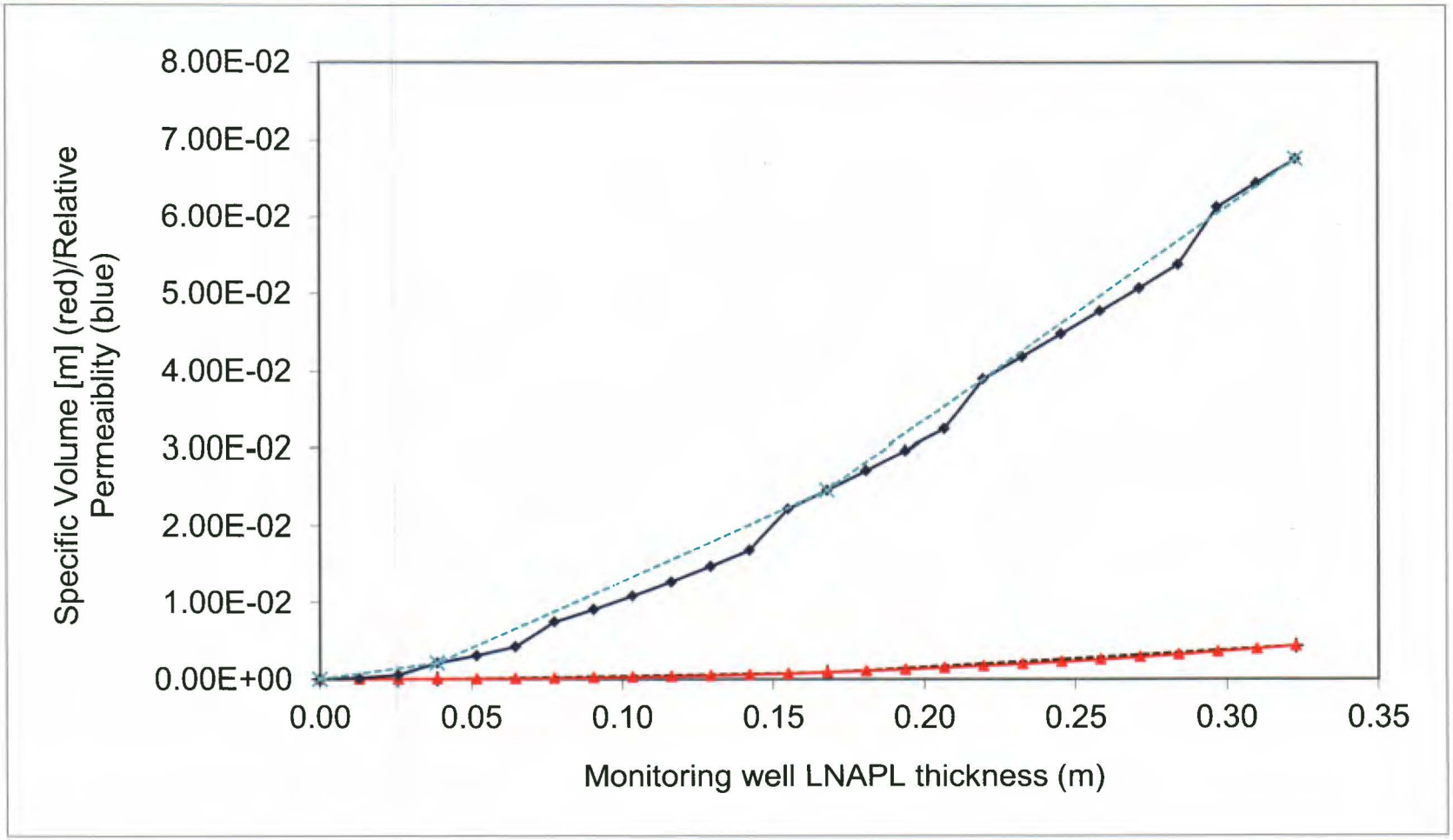
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Lubrication Oil**
ρ_o =	0.9126	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	31.000	air/oil (dynes/cm)
σ_{ow} =	24.400	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	14.983	air/LNAPL "α"
α_{ow} =	1.823	LNAPL/water "α"
z_{ao} =	0.028	elevation of air-LNAPL interface
z_{ow} =	-0.295	elevation of LNAPL-water interface
z_{max} =	0.078	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-65	
0.039	0.000	0.002	0.0000	0.000516	0.0000	0.053982		
0.168	0.001	0.025	0.0358	0.006724	0.0268	0.174421	1	Eps-Do
0.323	0.004	0.068	0.1277	0.022051	0.0791	0.277231	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.323	Gauged January 2012
D_o =	4.308E-03	k_{ro} =	6.761E-02	AOI 7 / C-65

Press Ctrl+Shift+S to calculate sheet

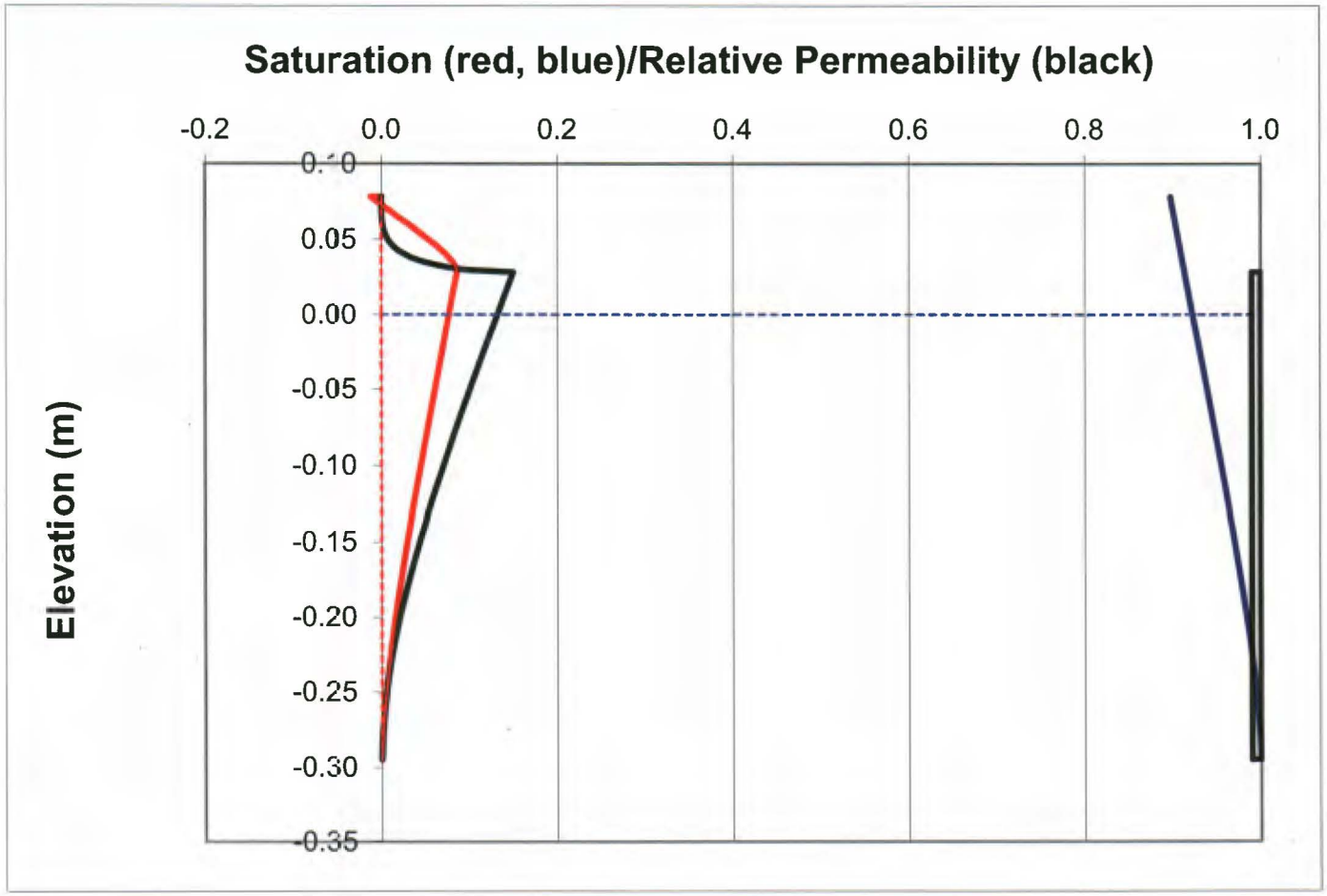


Figure H.02 C-106 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	1.760	Gauged January 2012
		AOI 7 / C-106
	0.536	feet

Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

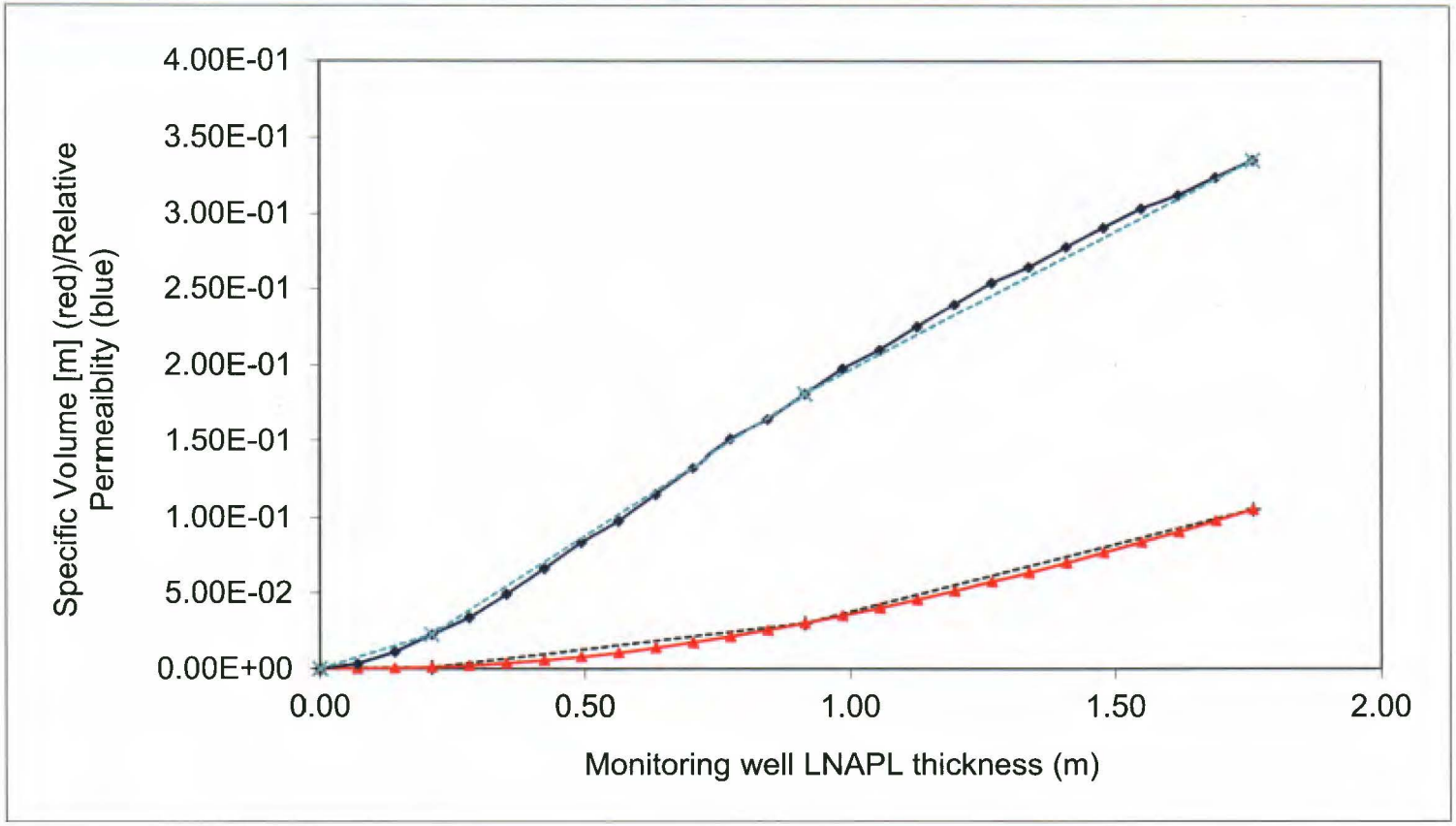
Fluid Characteristics:		**Lubrication Oil**
ρ_o =	0.9306	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	31.000	air/oil (dynes/cm)
σ_{ow} =	24.400	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	15.278	air/LNAPL "α"
α_{ow} =	1.448	LNAPL/water "α"
z_{ao} =	0.122	elevation of air-LNAPL interface
z_{ow} =	-1.638	elevation of LNAPL-water interface
z_{max} =	0.312	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments								
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-106	
0.211	0.001	0.023	0.0000	0.004752	0.0000	0.106751		
0.915	0.030	0.181	0.1869	0.041297	0.1111	0.225239	1	Eps-Do
1.760	0.105	0.335	0.5779	0.089172	-0.0767	0.182595	1	Eps-kro

Press Ctrl+Shift+S to calculate sheet



Monitoring Well LNAPL Thickness b_o (m) =			1.760	Gauged January 2012
	D_o = 1.054E-01	k_{ro} =	3.354E-01	AOI 7 / C-106

Press Ctrl+Shift+S to calculate sheet

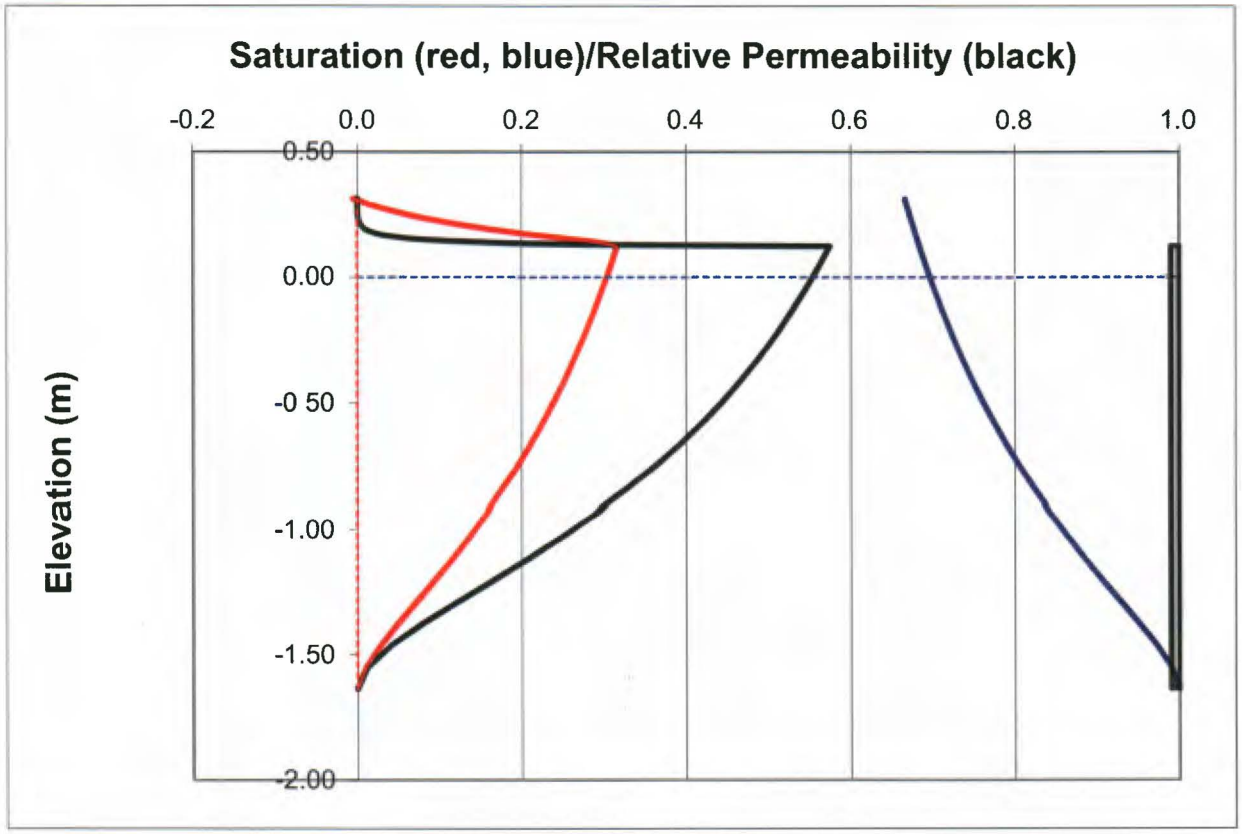


Figure H.03 C-107 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		Gauged January 2012 AOI 7 / C-107
b_o =	0.101	0.330 feet

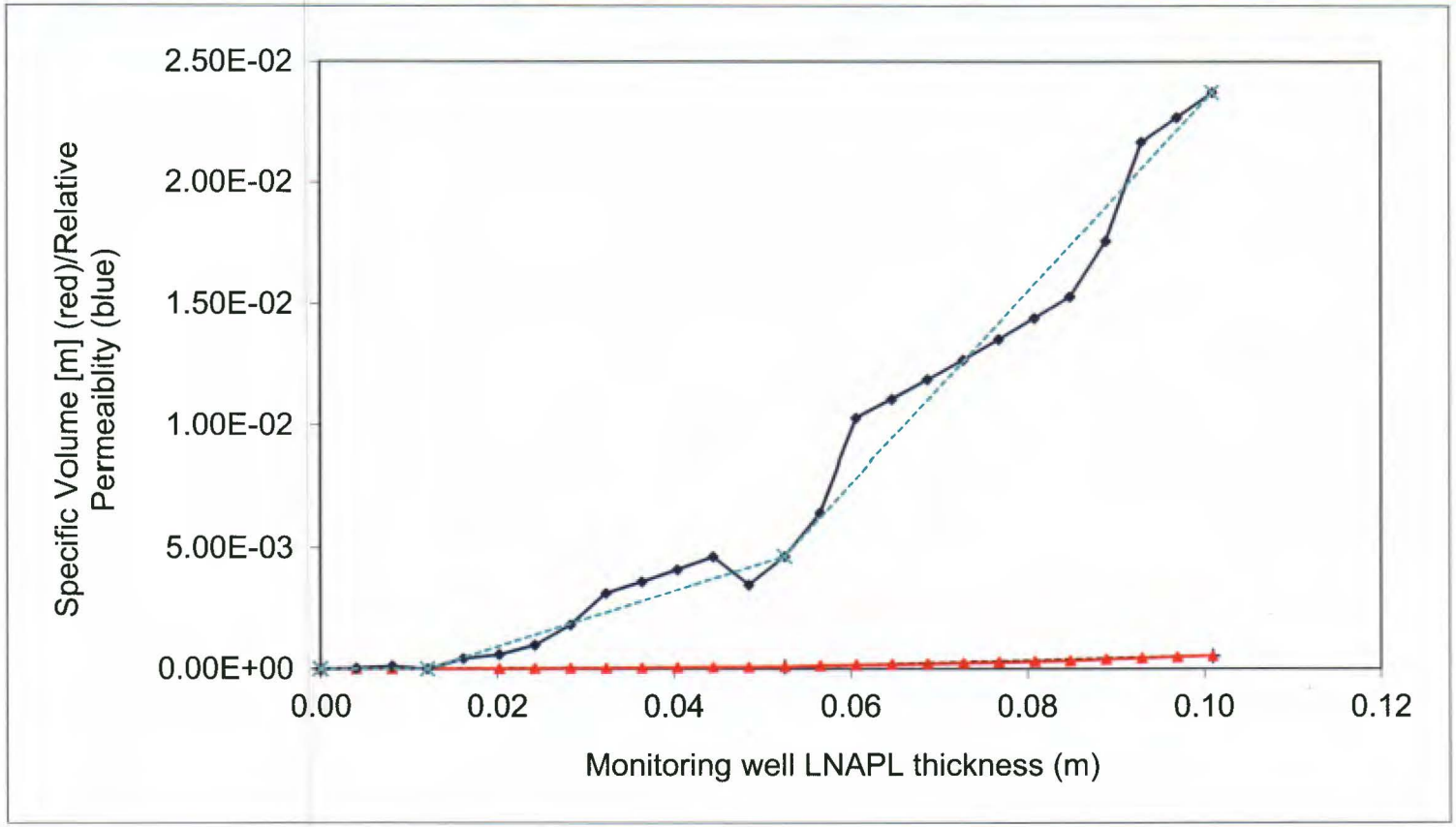
Soil Characteristic		(GP)s
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		Residual Oil
ρ_o =	0.8487	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	32.100	air/cil (dynes/cm)
σ_{ow} =	30.200	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	13.456	air/LNAPL "α"
α_{ow} =	2.550	LNAPL/water "α"
z_{ao} =	0.015	elevation of air-LNAPL interface
z_{ow} =	-0.086	elevation of LNAPL-water interface
z_{max} =	0.045	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-107	
0.012	0.000	#VALUE!	#DIV/0!	0.000000	#VALUE!	#VALUE!		
0.053	0.000	0.005	0.0148	0.002266	#VALUE!	#VALUE!	1	Eps-Do
0.101	0.001	0.024	0.0432	0.009213	0.0407	0.393494	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.101	Gauged January 2012
	D_o = 5.321E-04	k_{ro} =	2.372E-02	AOI 7 / C-107

Press Ctrl+Shift+S to calculate sheet

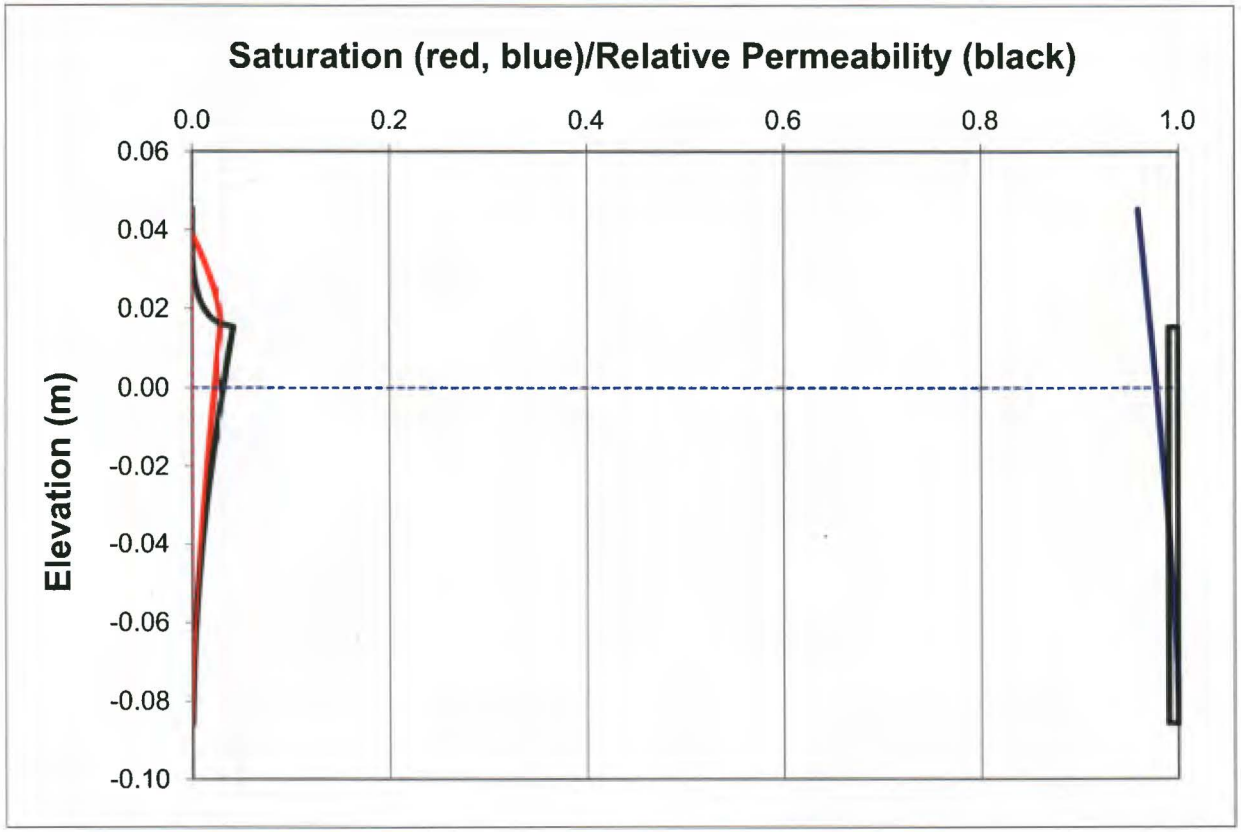


Figure H.04 C-143 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.735	Gauged January 2012 **AOI 7 / C-143** 2.410 feet

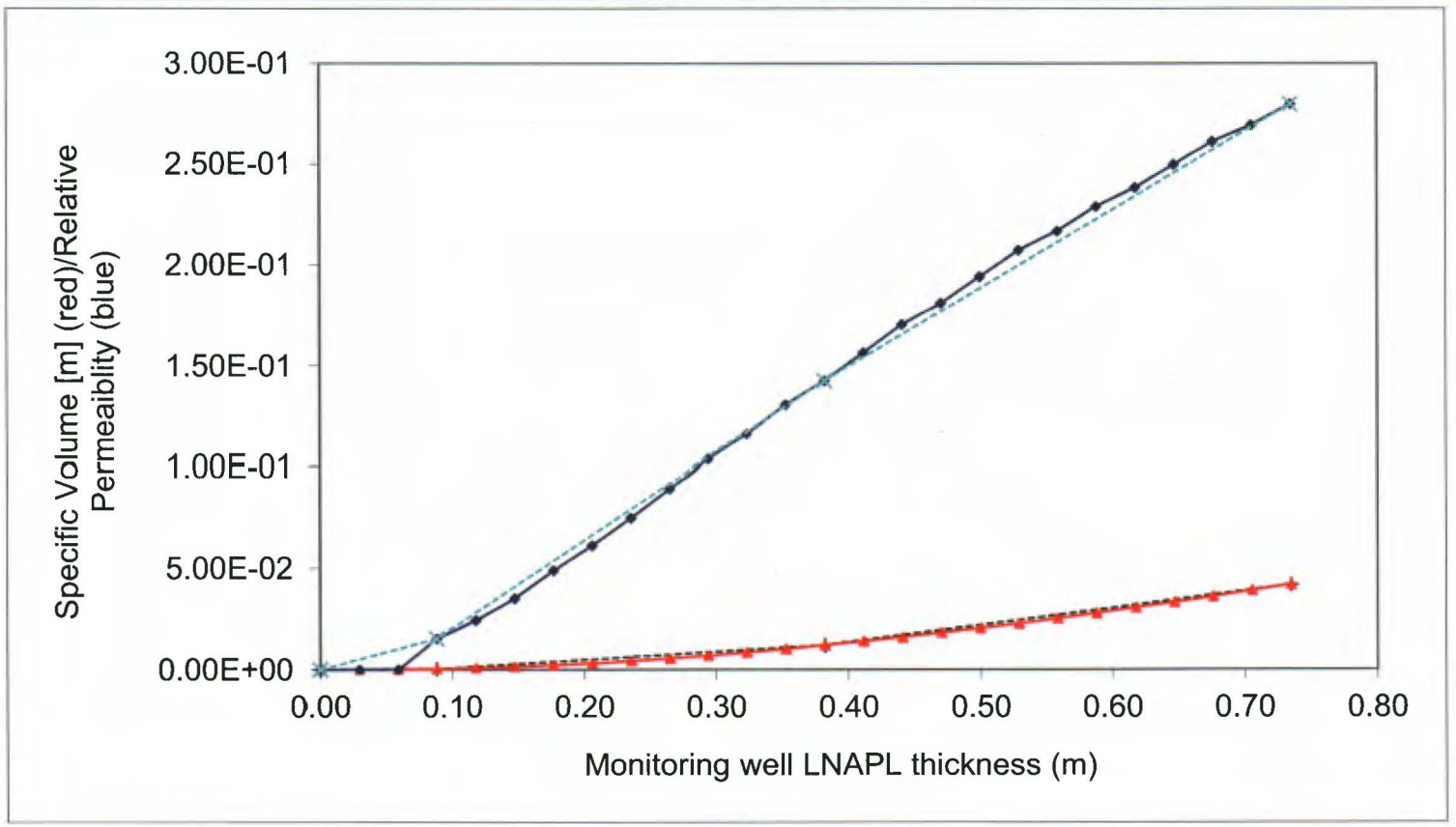
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Middle Distillate**
ρ_o =	0.8676	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	27.300	air/oil (dynes/cm)
σ_{ow} =	24.000	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.175	air/LNAPL "α"
α_{ow} =	2.808	LNAPL/water "α"
z_{ao} =	0.097	elevation of air-LNAPL interface
z_{ow} =	-0.638	elevation of LNAPL-water interface
z_{max} =	0.257	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-143	
0.088	0.000	0.015	0.0000	0.004730	0.0000	0.173826		
0.382	0.012	0.142	0.0777	0.039829	0.0527	0.432181	0.1	Eps-Do
0.735	0.042	0.280	0.2386	0.084424	0.0166	0.389518	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.735	Gauged January 2012
	D_o =	4.191E-02	k_{ro} = 2.798E-01	AOI 7 / C-143

Press Ctrl+Shift+S to calculate sheet

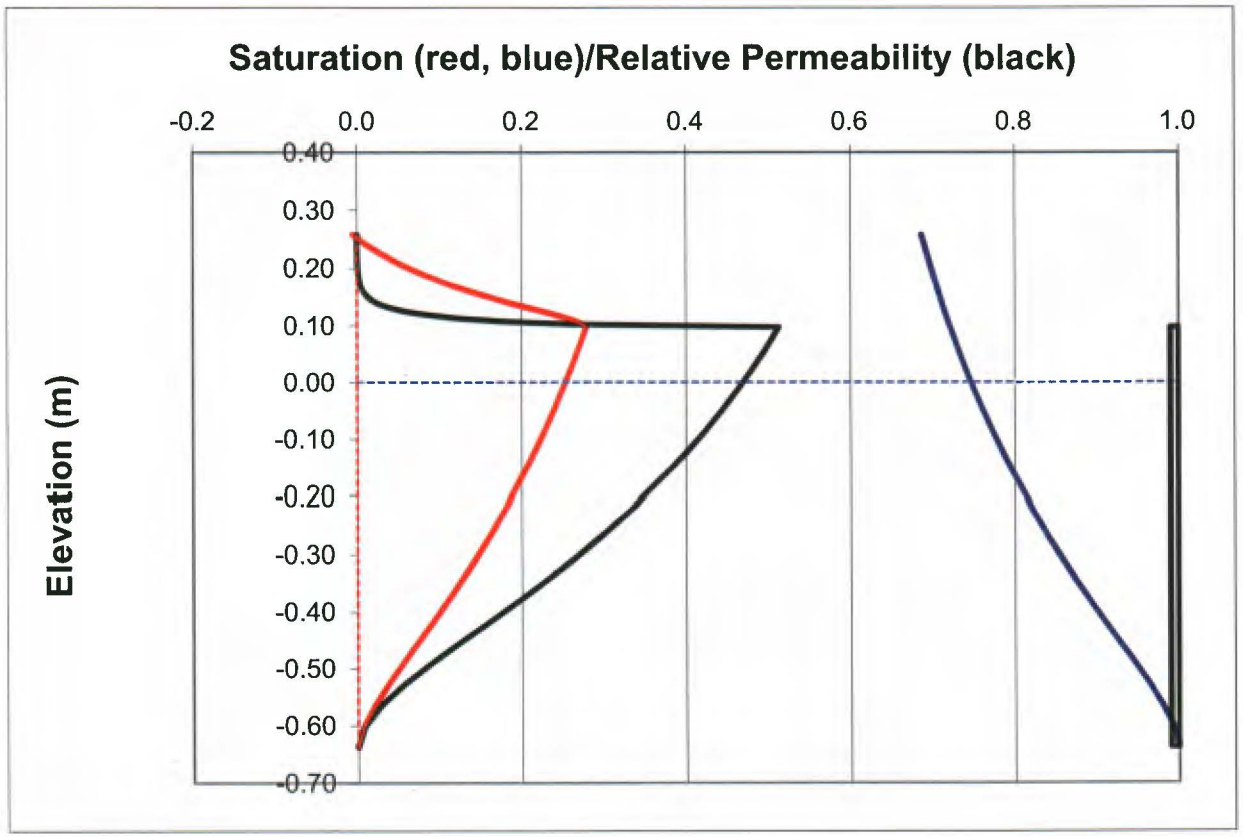


Figure H.05 C-64 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.344	Gauged January 2012
		AOI 7 / C-64
	1.130	feet

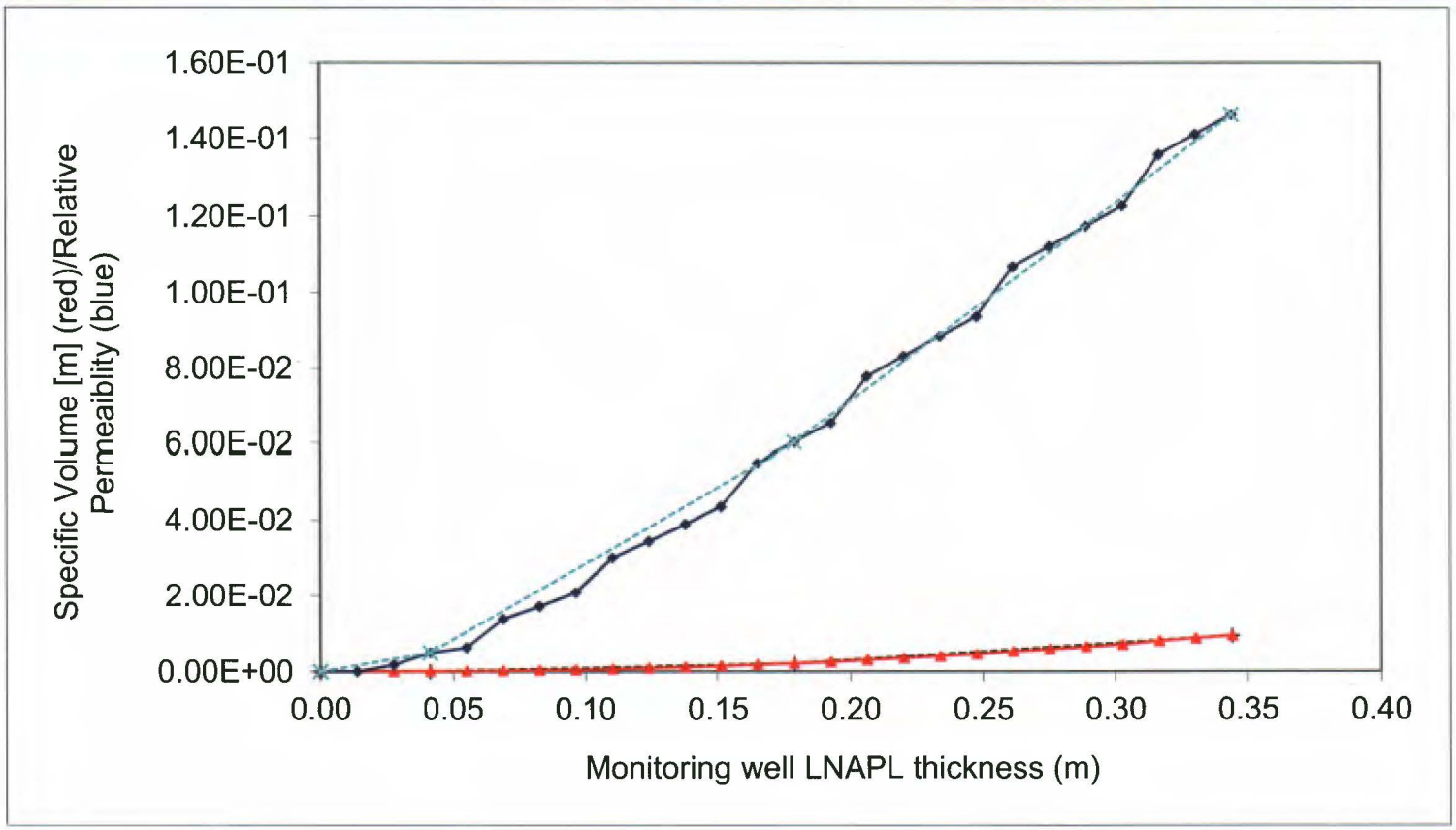
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8807	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.851	air/LNAPL "α"
α_{ow} =	2.772	LNAPL/water "α"
z_{ao} =	0.041	elevation of air-LNAPL interface
z_{ow} =	-0.303	elevation of LNAPL-water interface
z_{max} =	0.111	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-64	
0.041	0.000	0.005	0.0000	0.001401	0.0000	0.119070		
0.179	0.002	0.060	0.0375	0.015290	0.0290	0.401224	1	Eps-Do
0.344	0.009	0.146	0.1293	0.043561	0.0637	0.521793	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.344
	D_o = 9.355E-03	k_{ro} =	1.463E-01

Gauged January 2012
AOI 7 / C-64

Press Ctrl+Shift+S to calculate sheet

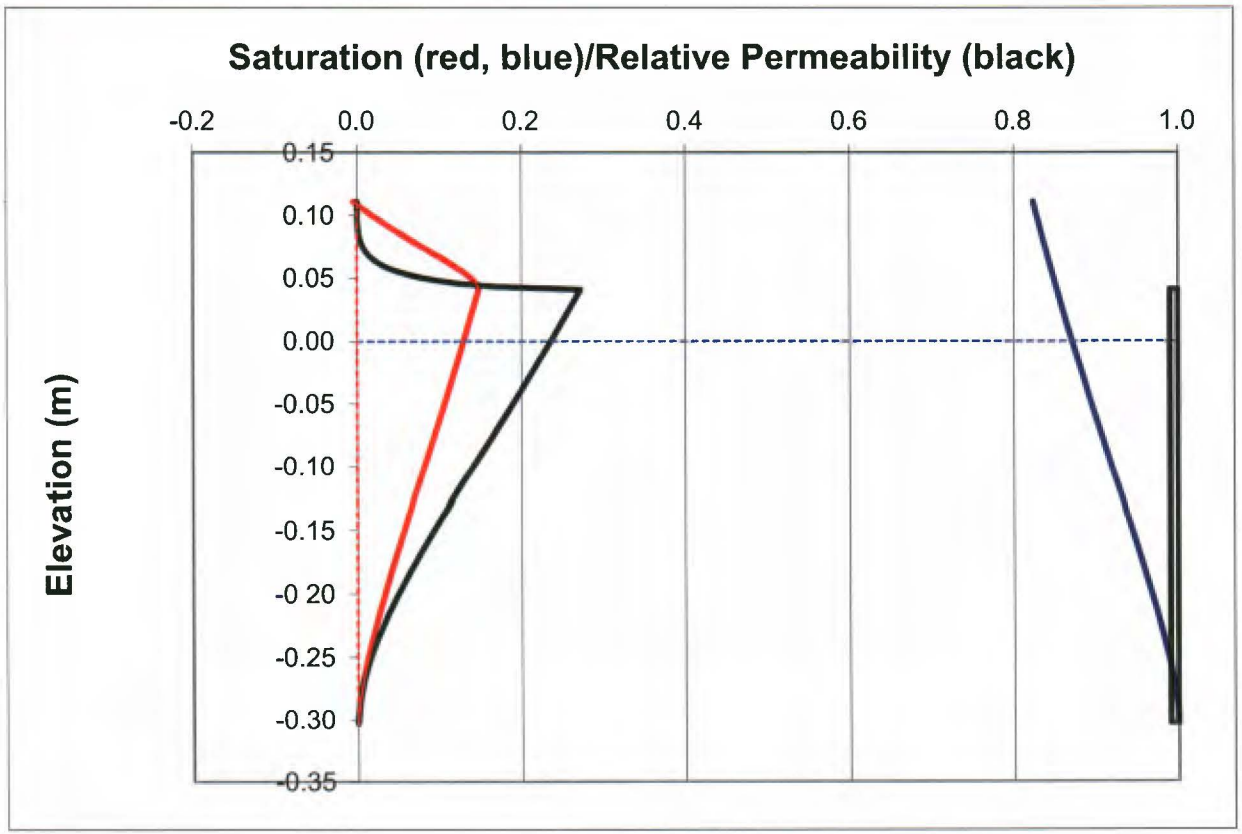


Figure H.06 C-97 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.034	Gauged January 2012
	0.110	AOI 7 / C-97 feet

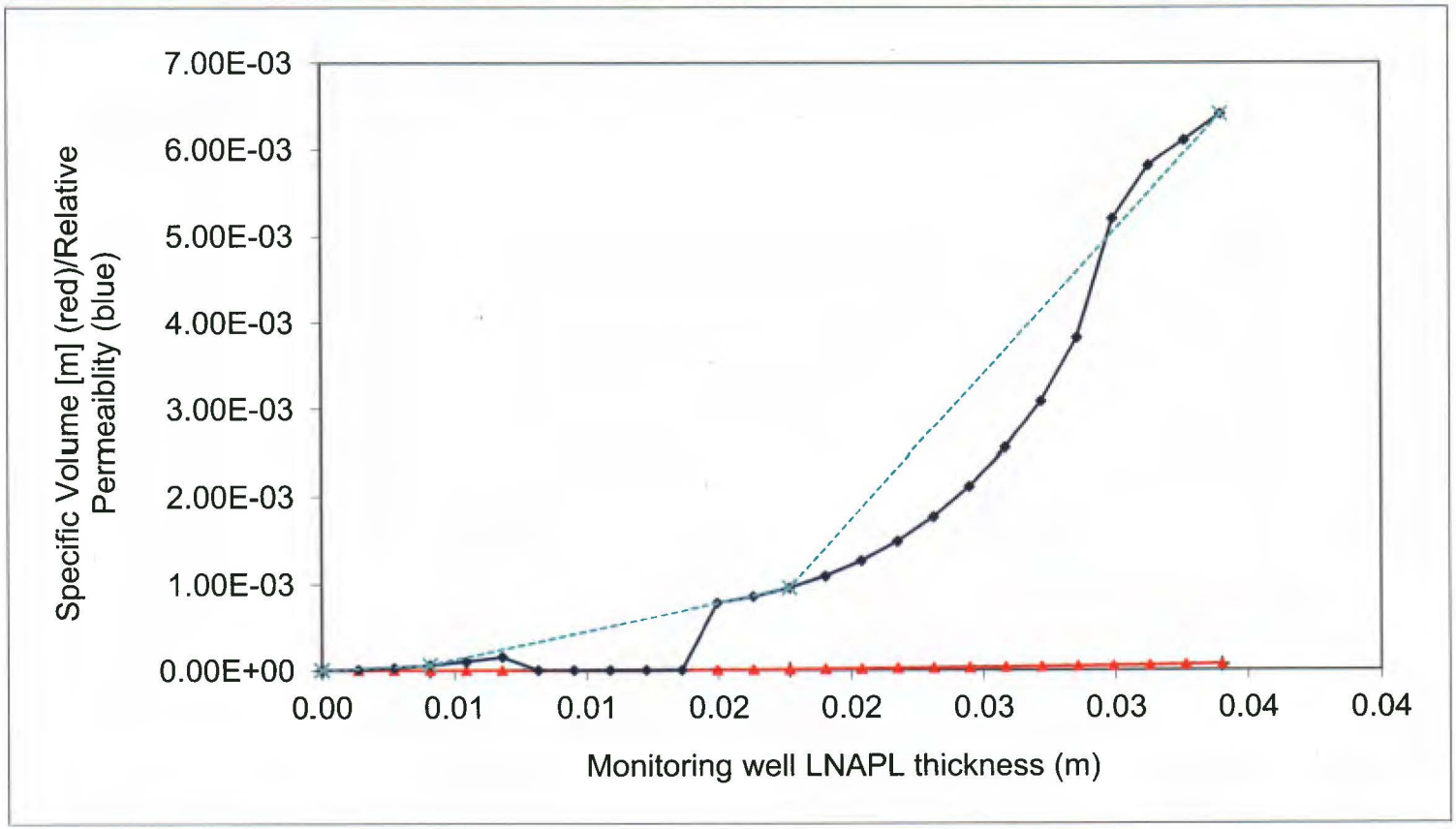
Soil Characteristic		(SW)g
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		Light Crude
ρ_o =	0.8428	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.126	air/LNAPL "α"
α_{ow} =	3.653	LNAPL/water "α"
z_{ao} =	0.005	elevation of air-LNAPL interface
z_{ow} =	-0.029	elevation of LNAPL-water interface
z_{max} =	0.015	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012 AOI 7 / C-97	
0.000	0.000	0.000						
0.004	0.000	0.000	0.0000	0.000048	0.0000	0.014507		
0.018	0.000	0.001	0.0037	0.000529	0.0032	0.065887	1	Eps-Do
0.034	0.000	0.006	0.0156	0.003512	0.0148	0.334233	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.034
	D_o = 6.471E-05	k_{ro} =	6.410E-03

Gauged January 2012
AOI 7 / C-97

Press Ctrl+Shift+S to calculate sheet

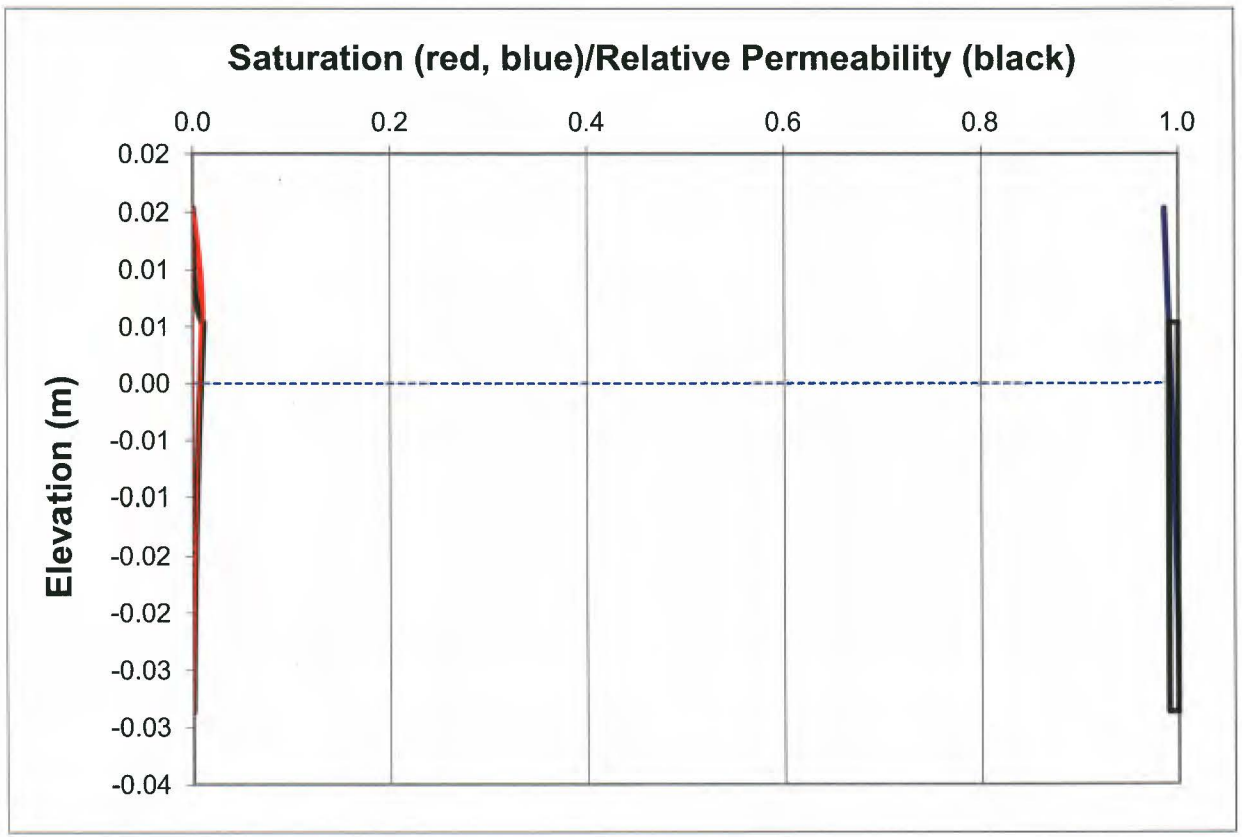


Figure H.07 C-147 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	1.009	Gauged January 2012 **AOI 7 / C-147** 3.310 feet

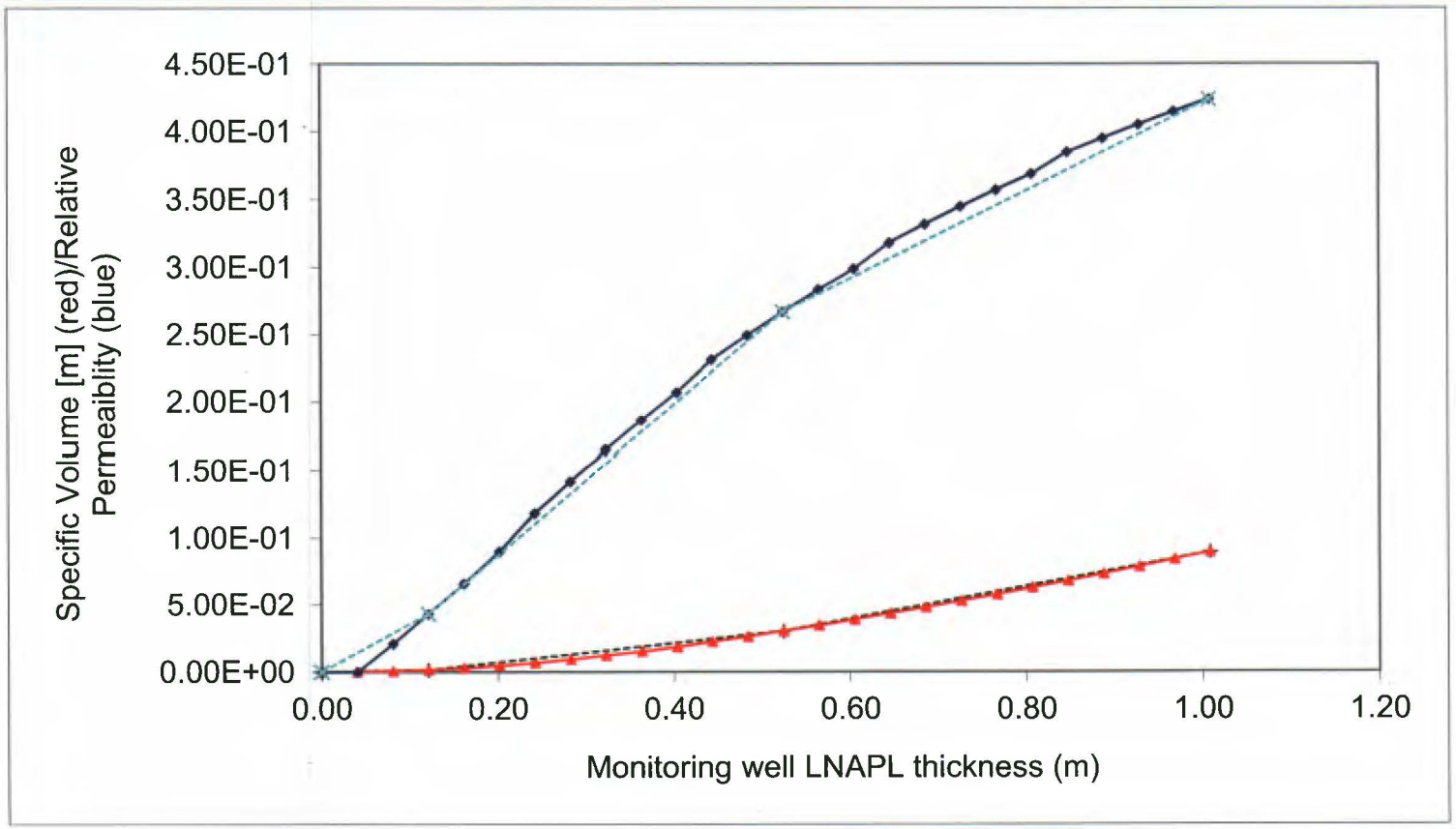
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8409	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/cil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.089	air/LNAPL "α"
α_{ow} =	3.697	LNAPL/water "α"
z_{ao} =	0.161	elevation of air-LNAPL interface
z_{ow} =	-0.848	elevation of LNAPL-water interface
z_{max} =	0.461	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-147	
0.121	0.001	0.043	0.0000	0.011839	0.0000	0.356779		
0.525	0.030	0.267	0.1010	0.071411	0.0430	0.553362	0.1	Eps-Do
1.009	0.089	0.424	0.2772	0.122254	-0.2959	0.324829	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			1.009	Gauged January 2012
	D_o = 8.947E-02	k_{ro} =	4.239E-01	AOI 7 / C-147

Press Ctrl+Shift+S to calculate sheet

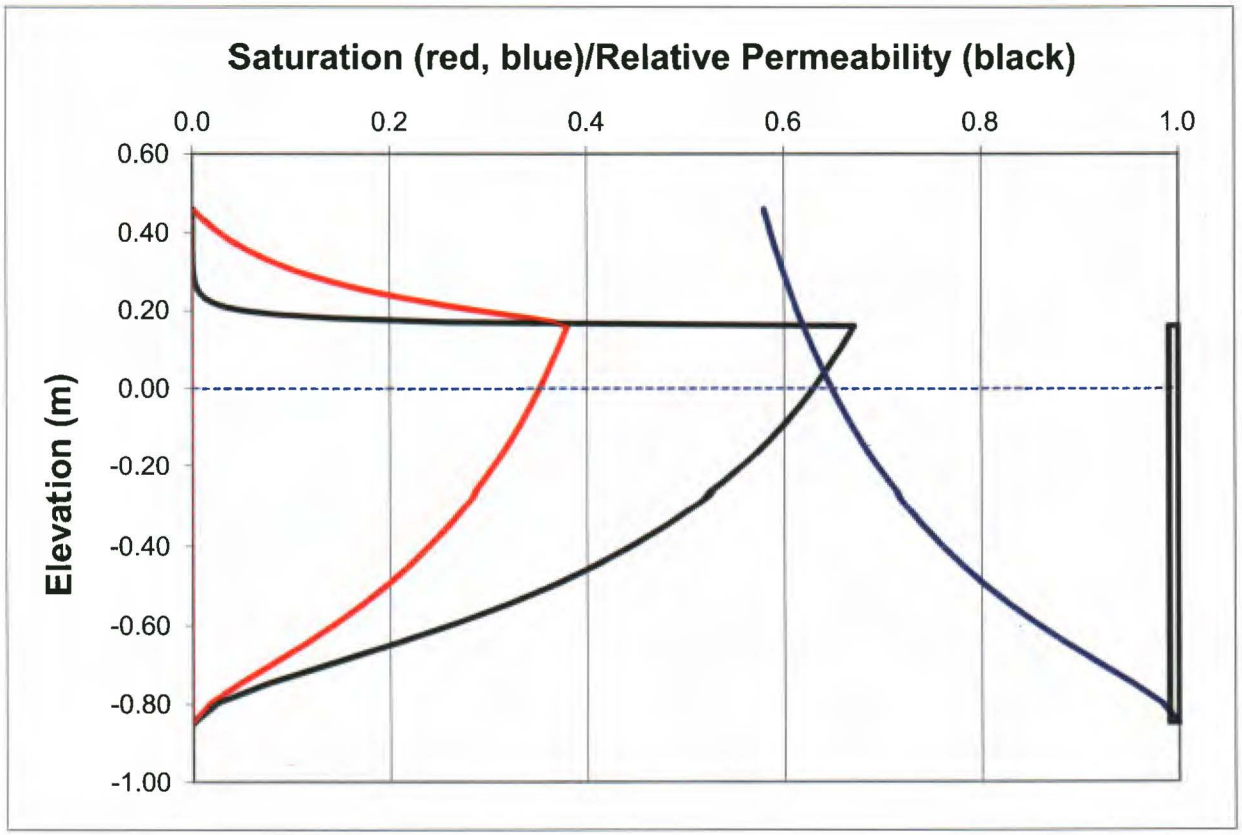


Figure H.08 C-148 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	1.618	Gauged January 2012 **AOI 7 / C-148** 5.310 feet

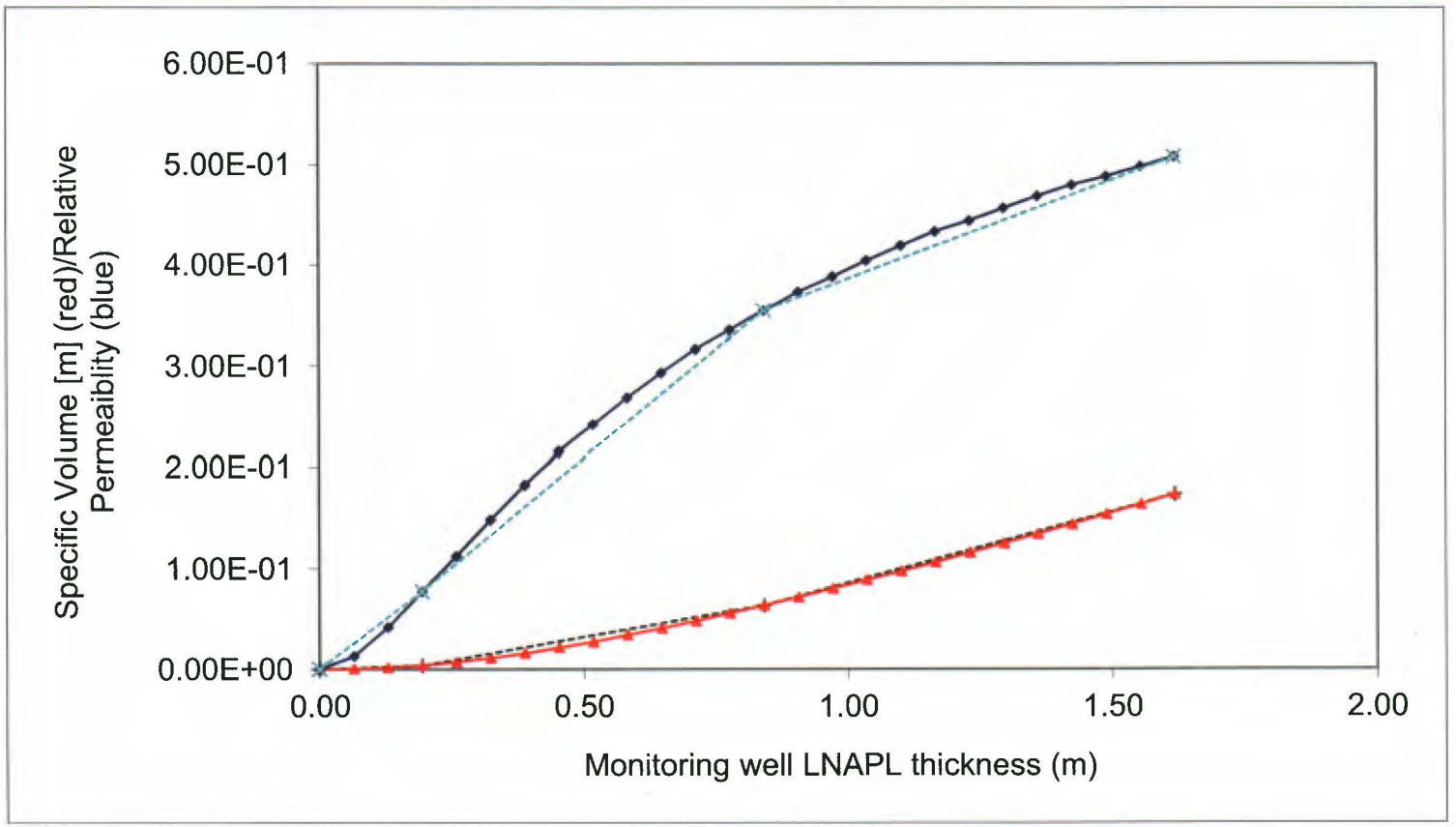
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8512	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/cil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.286	air/LNAPL "α"
α_{ow} =	3.458	LNAPL/water "α"
z_{ao} =	0.241	elevation of air-LNAPL interface
z_{ow} =	-1.377	elevation of LNAPL-water interface
z_{max} =	0.681	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-148	
0.194	0.004	0.078	0.0000	0.019207	0.0000	0.399809		
0.841	0.064	0.355	0.1540	0.092886	0.0130	0.428584	0.1	Eps-Do
1.618	0.174	0.508	0.3895	0.141286	-0.9572	0.197383	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			1.618	Gauged January 2012
	D_o = 1.736E-01	k_{ro} =	5.083E-01	AOI 7 / C-148

Press Ctrl+Shift+S to calculate sheet

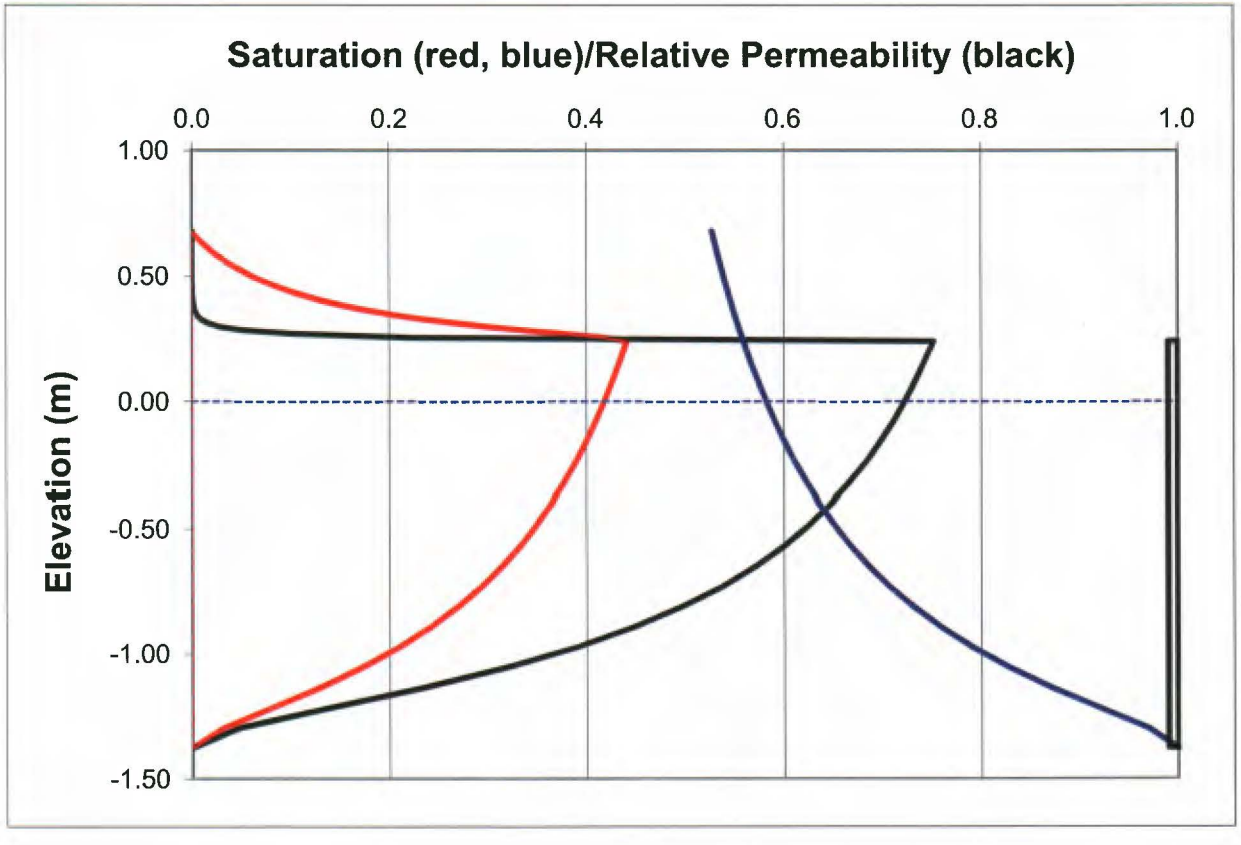


Figure H.09 C-150 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.098	Gauged January 2012 **AOI 7 / C-150** 0.320 feet

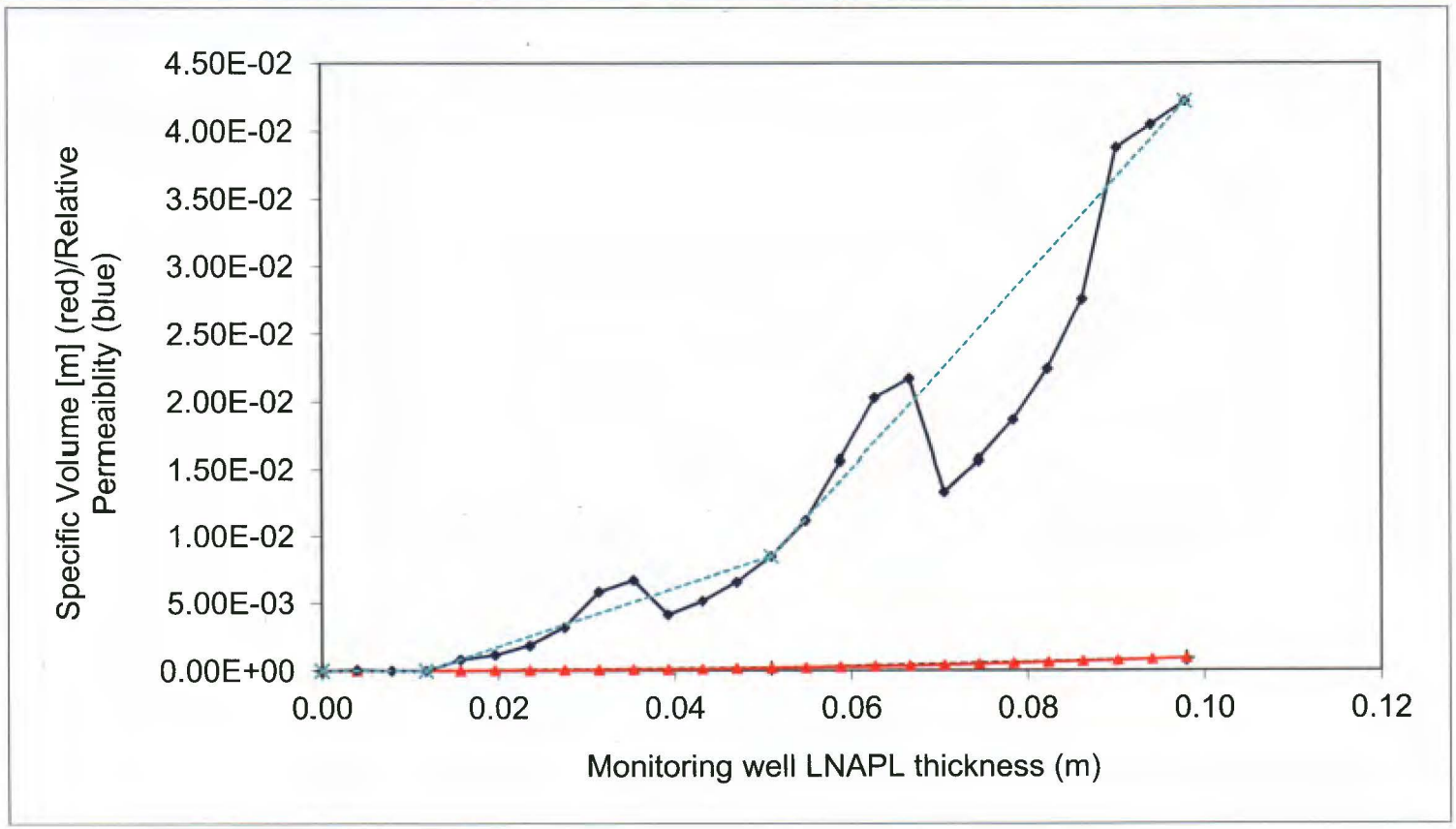
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8428	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/cil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.126	air/LNAPL "α"
α_{ow} =	3.653	LNAPL/water "α"
z_{ao} =	0.015	elevation of air-LNAPL interface
z_{ow} =	-0.083	elevation of LNAPL-water interface
z_{max} =	0.045	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-150	
0.012	0.000	#VALUE!	#DIV/0!	0.000000	#VALUE!	#VALUE!		
0.051	0.000	0.008	0.0128	0.004794	#VALUE!	#VALUE!	1	Eps-Do
0.098	0.001	0.042	0.0390	0.015268	0.0392	0.717525	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.098
	D_o = 9.011E-04	k_{ro} =	4.222E-02

Gauged January 2012
AOI 7 / C-150

Press Ctrl+Shift+S to calculate sheet

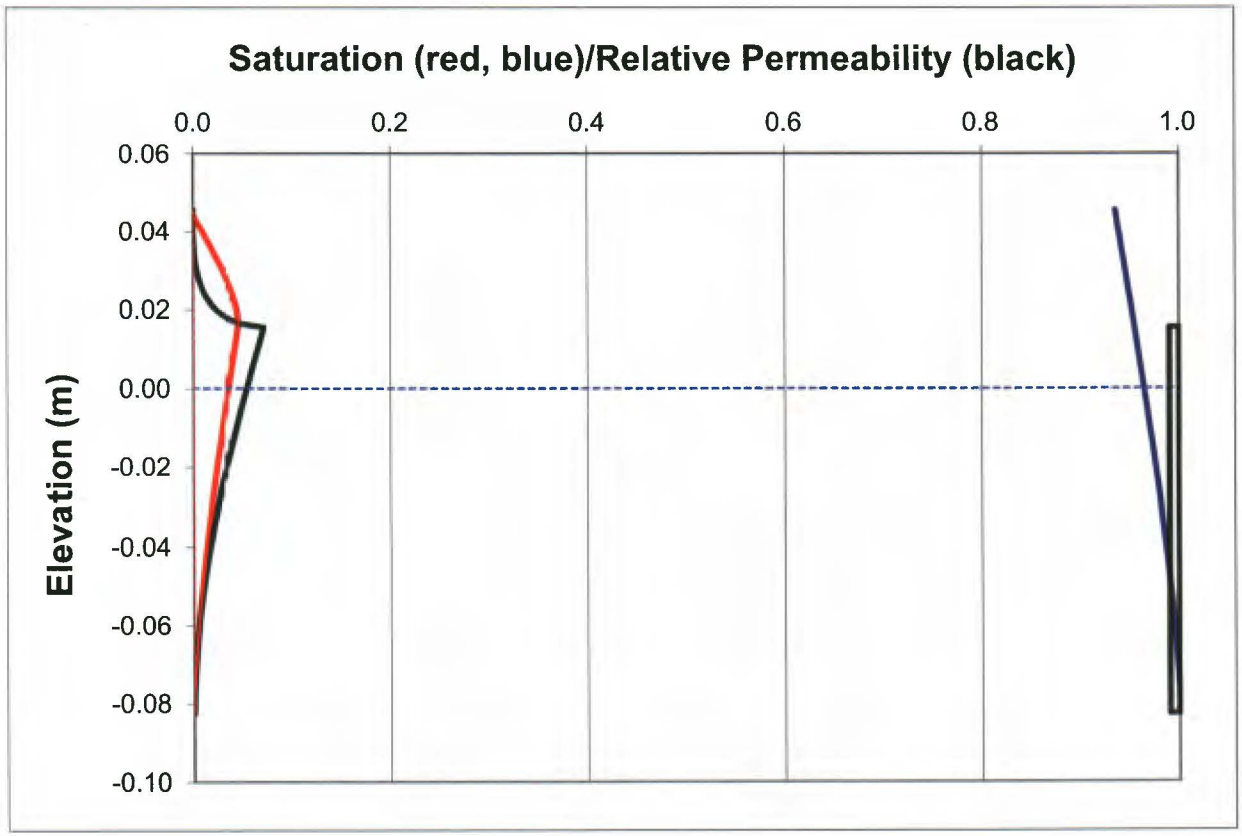


Figure H.10 C-151 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.012	Gauged January 2012 AOI 7 / C-151 0.040 feet

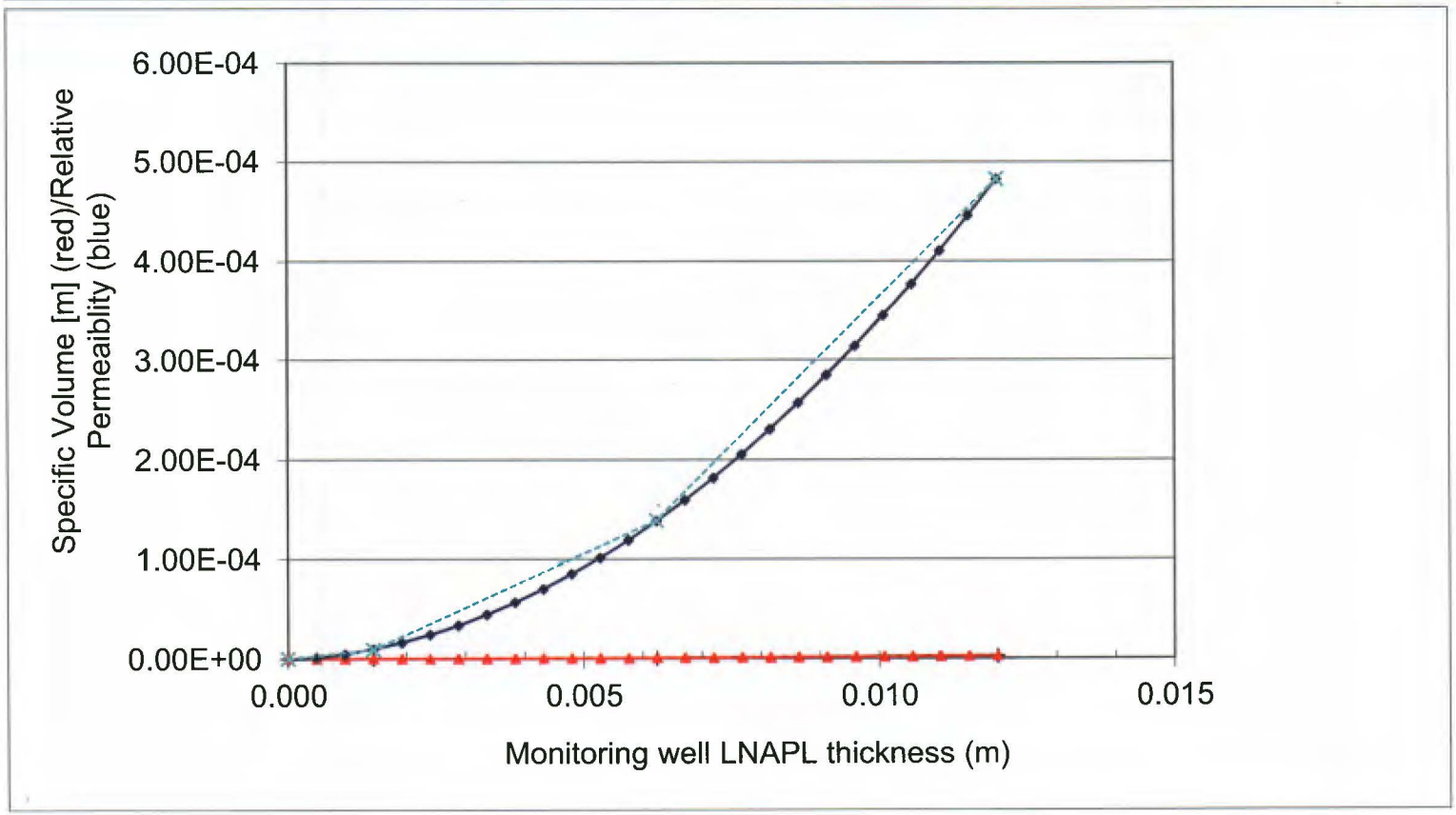
Soil Characteristic		(SW)g
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		Light Crude
ρ_o =	0.8597	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.449	air/LNAPL "α"
α_{ow} =	3.261	LNAPL/water "α"
z_{ao} =	0.002	elevation of air-LNAPL interface
z_{ow} =	-0.010	elevation of LNAPL-water interface
z_{max} =	0.012	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	**Gauged January 2012**	
0.000E+00	0.000E+00	0.000E+00					**AOI 7 / C-151**	
1.440E-03	8.921E-09	8.918E-06	0.0000	0.000006	0.0000	0.006193		
6.240E-03	4.719E-07	1.392E-04	0.0013	0.000096	0.0011	0.027143	0.001	Eps-Do
1.200E-02	2.595E-06	4.824E-04	0.0050	0.000369	0.0039	0.059584	0.001	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.012
	D_o = 1.277E-05	kro =	4.657E-04

Gauged January 2012
AOI 7 / C-151

Press Ctrl+Shift+S to calculate sheet

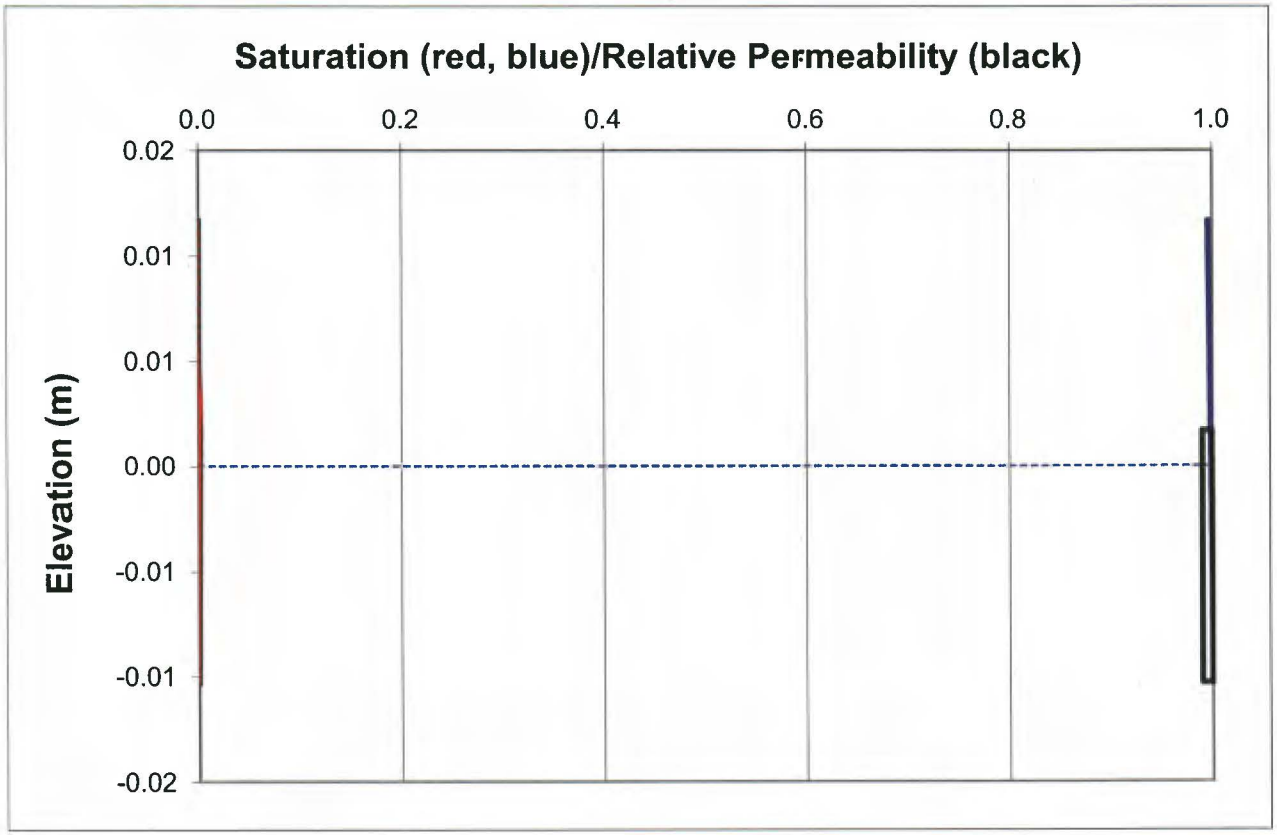


Figure H.11 C-152 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.774	Gauged January 2012 **AOI 7 / C-152** 2.540 feet

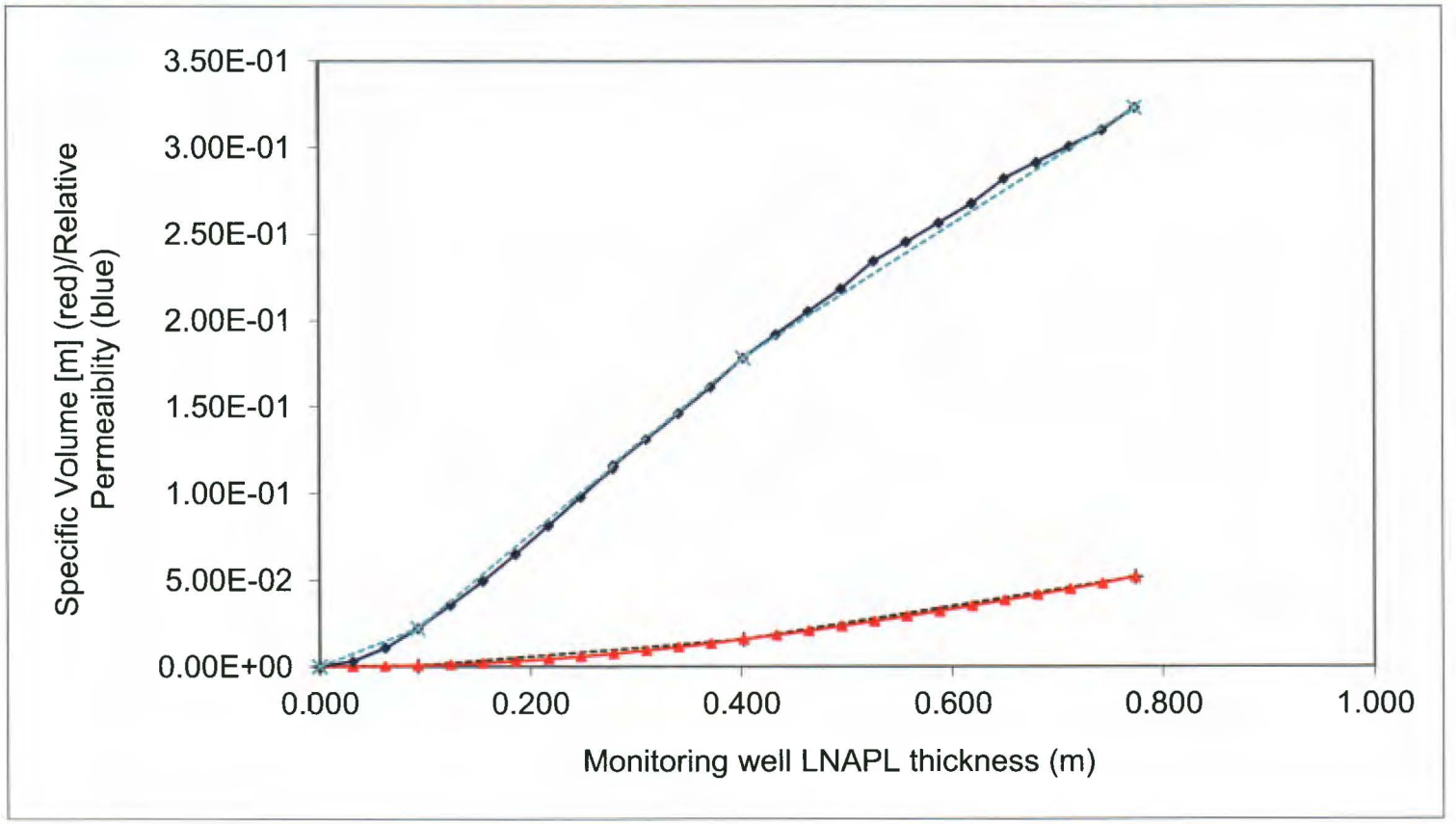
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8597	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.449	air/LNAPL "α"
α_{ow} =	3.261	LNAPL/water "α"
z_{ao} =	0.109	elevation of air-LNAPL interface
z_{ow} =	-0.665	elevation of LNAPL-water interface
z_{max} =	0.299	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-152	
0.093	0.001	0.022	0.0000	0.006337	0.0000	0.237807		
0.402	0.016	0.178	0.0809	0.049298	0.0491	0.504730	0.1	Eps-Do
0.774	0.052	0.323	0.2385	0.096653	-0.0549	0.389957	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.774	Gauged January 2012
	D_o = 5.176E-02	k_{ro} =	3.232E-01	AOI 7 / C-152

Press Ctrl+Shift+S to calculate sheet

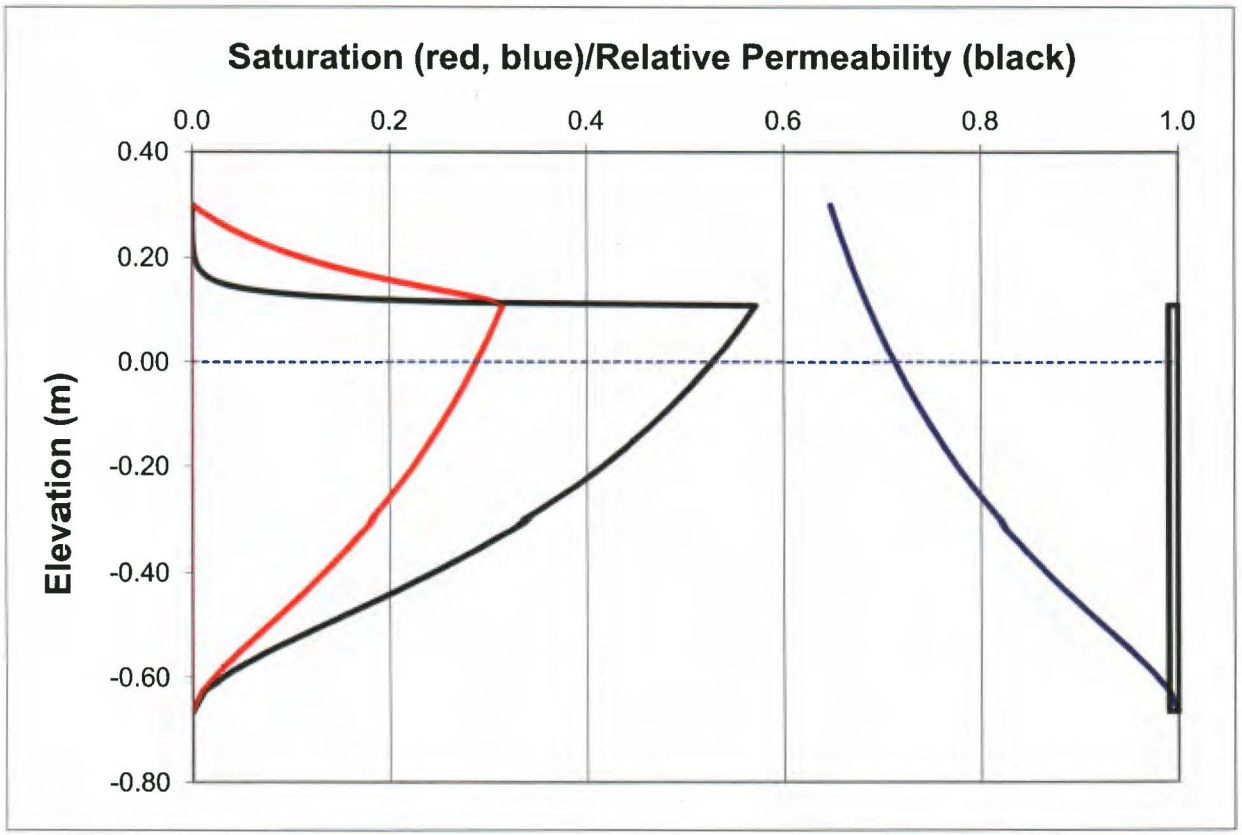


Figure H.12 C-153 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		Gauged January 2012 **AOI 7 / C-153**
b_o =	0.143	0.470 feet

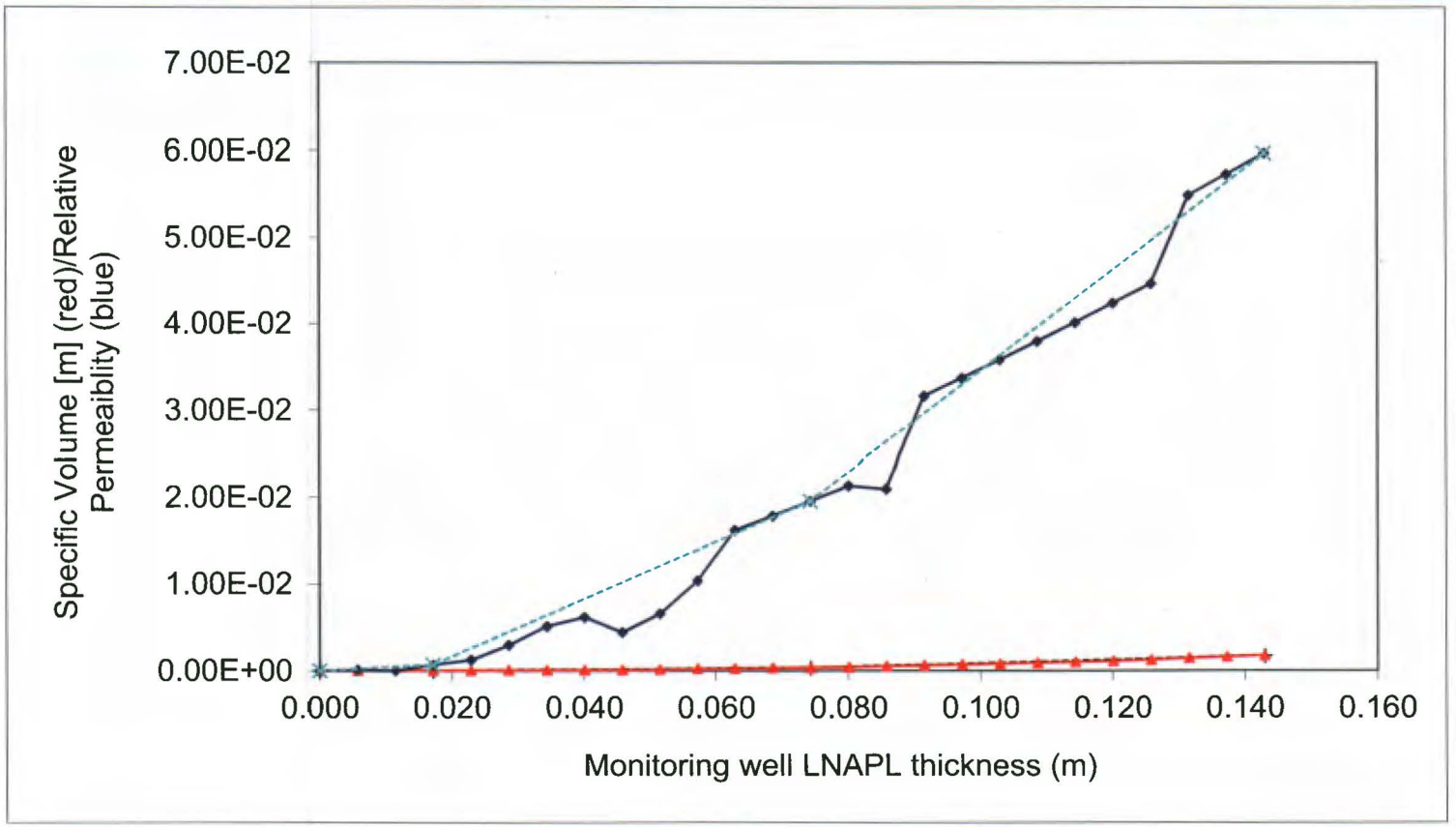
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8620	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/cil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.493	air/LNAPL "α"
α_{ow} =	3.207	LNAPL/water "α"
z_{ao} =	0.020	elevation of air-LNAPL interface
z_{ow} =	-0.123	elevation of LNAPL-water interface
z_{max} =	0.060	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-153	
0.017	0.000	0.001	0.0000	0.000035	0.0000	0.040126		
0.074	0.000	0.020	0.0171	0.006053	0.0151	0.329594	1	Eps-Do
0.143	0.002	0.060	0.0570	0.019998	0.0409	0.584623	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.143	Gauged January 2012
	D_o = 1.720E-03	k_{ro} =	5.967E-02	AOI 7 / C-153

Press Ctrl+Shift+S to calculate sheet

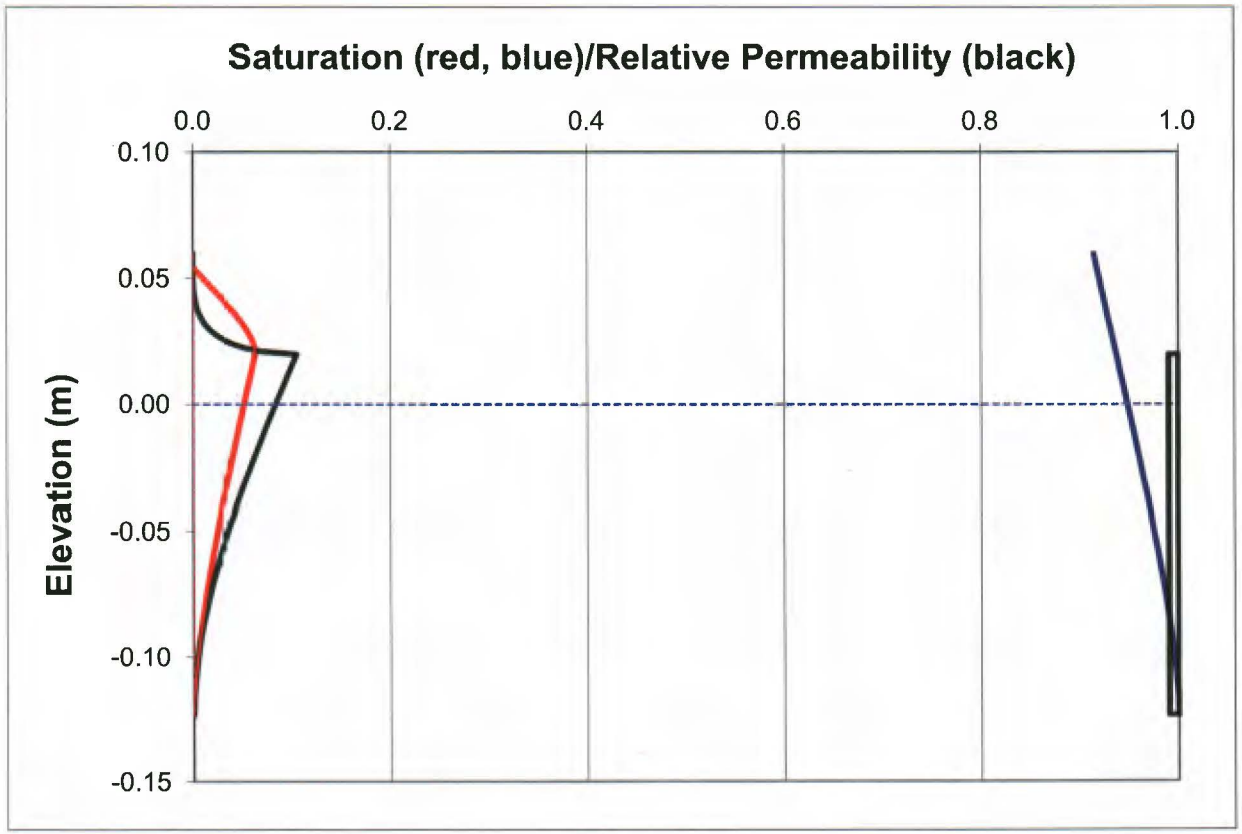


Figure H.13 C-154 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.027	Gauged January 2012
		AOI 7 / C-154
	0.090	feet

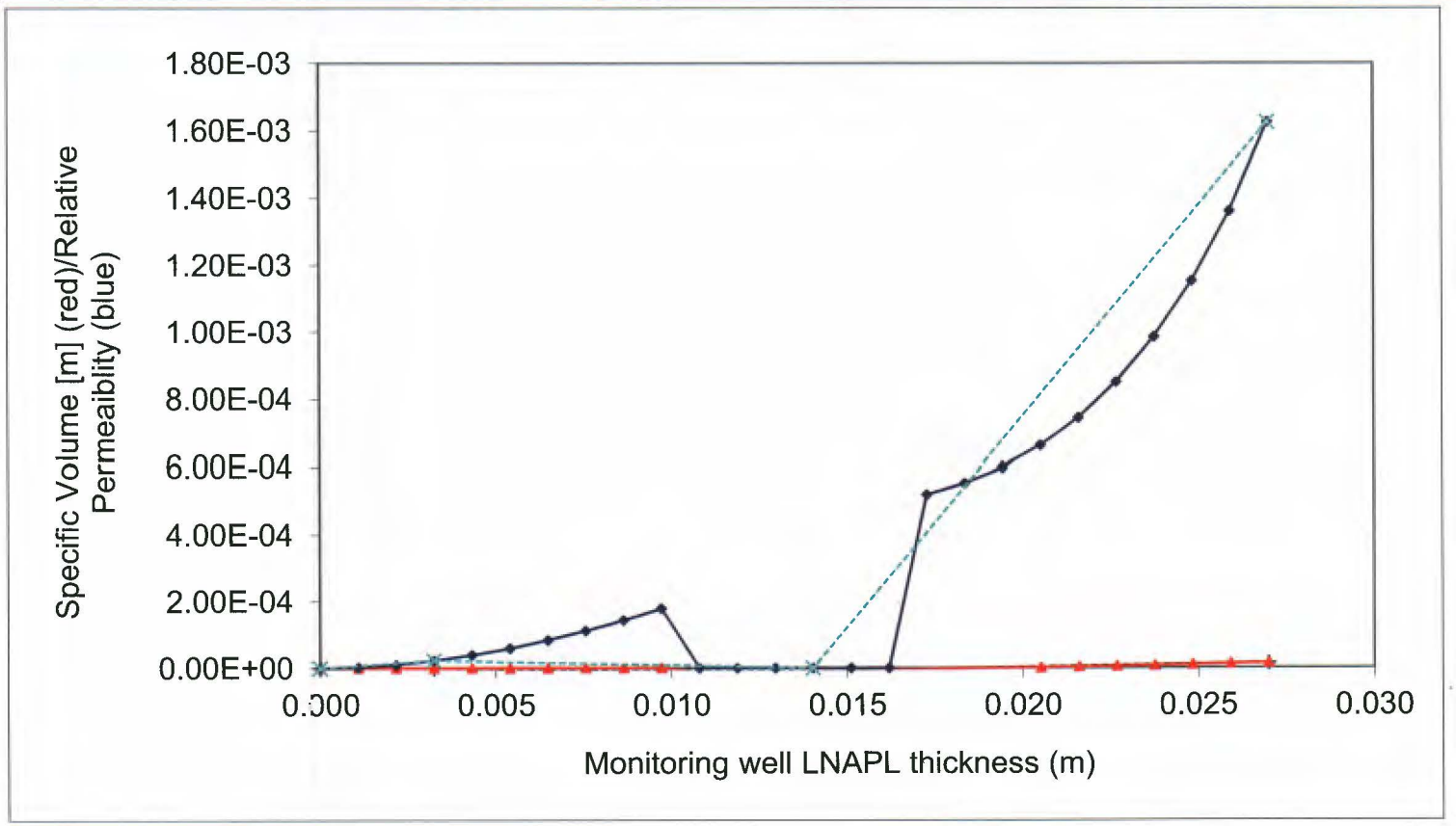
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8807	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.851	air/LNAPL "α"
α_{ow} =	2.772	LNAPL/water "α"
z_{ao} =	0.003	elevation of air-LNAPL interface
z_{ow} =	-0.024	elevation of LNAPL-water interface
z_{max} =	0.013	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	**Gauged January 2012**	
0.000	0.000	0.000					**AOI 7 / C-154**	
0.003	0.000	0.000	0.0000	0.000022	0.0000	0.007072		
0.014	0.000	#VALUE!	#DIV/0!	0.000000	#VALUE!	#VALUE!	1	Eps-Do
0.027	0.000	0.002	0.0188	0.001773	#VALUE!	#VALUE!	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.027	Gauged January 2012
	D_o = 1.459E-05	k_{ro} =	1.625E-03	AOI 7 / C-154

Press Ctrl+Shift+S to calculate sheet

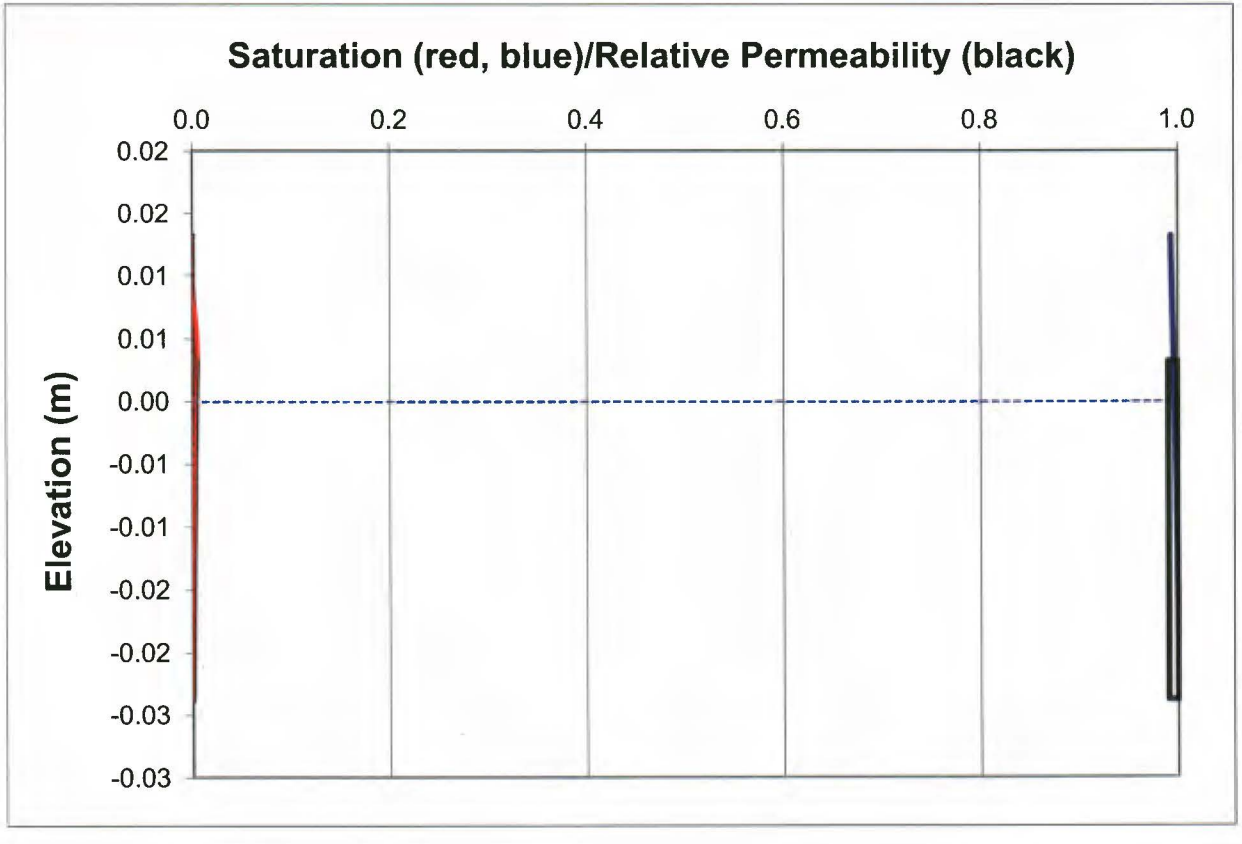


Figure H.14 C-161 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.780	Gauged January 2012 AOI 7 / C-161
	0.238	feet

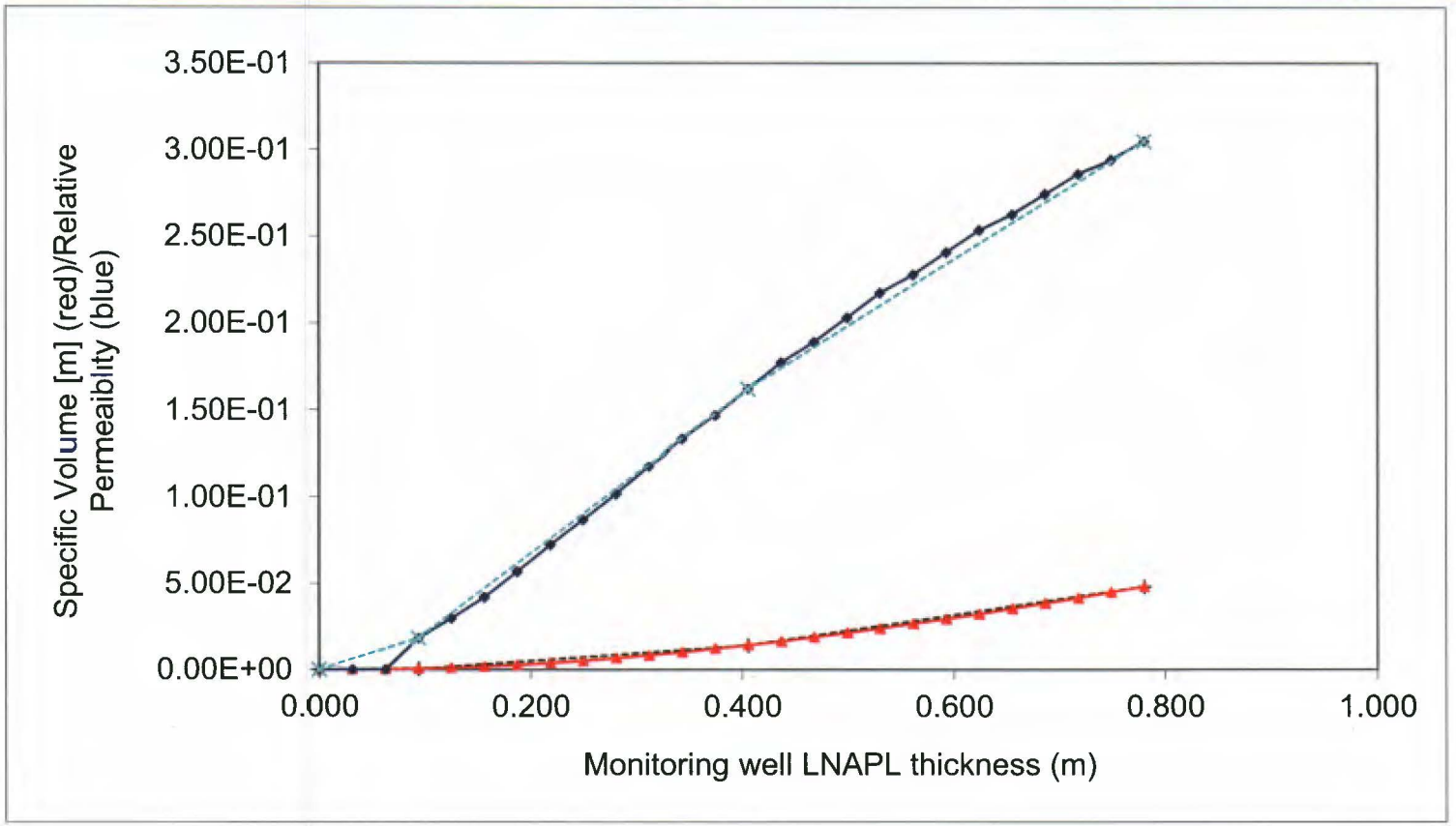
Soil Characteristic		(SW)g
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irrecucible water saturation
S_{orv} =	0.000	resicual LNAPL saturation (saturated)
S_{ors} =	0.000	resicual LNAPL saturation (vadose)

Fluid Characteristics:		Light Crude
ρ_o =	0.8737	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.717	air/LNAPL "α"
α_{ow} =	2.935	LNAPL/water "α"
z_{ao} =	0.099	elevation of air-LNAPL interface
z_{ow} =	-0.681	elevation of LNAPL-water interface
z_{max} =	0.269	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-161	
0.094	0.001	0.018	0.0000	0.005547	0.0000	0.194626		
0.406	0.014	0.162	0.0818	0.044023	0.0541	0.461661	0.1	Eps-Do
0.780	0.048	0.305	0.2481	0.090497	-0.0202	0.381091	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.780	Gauged January 2012
	D_o = 4.814E-02	k_{ro} =	3.049E-01	AOI 7 / C-161

Press Ctrl+Shift+S to calculate sheet

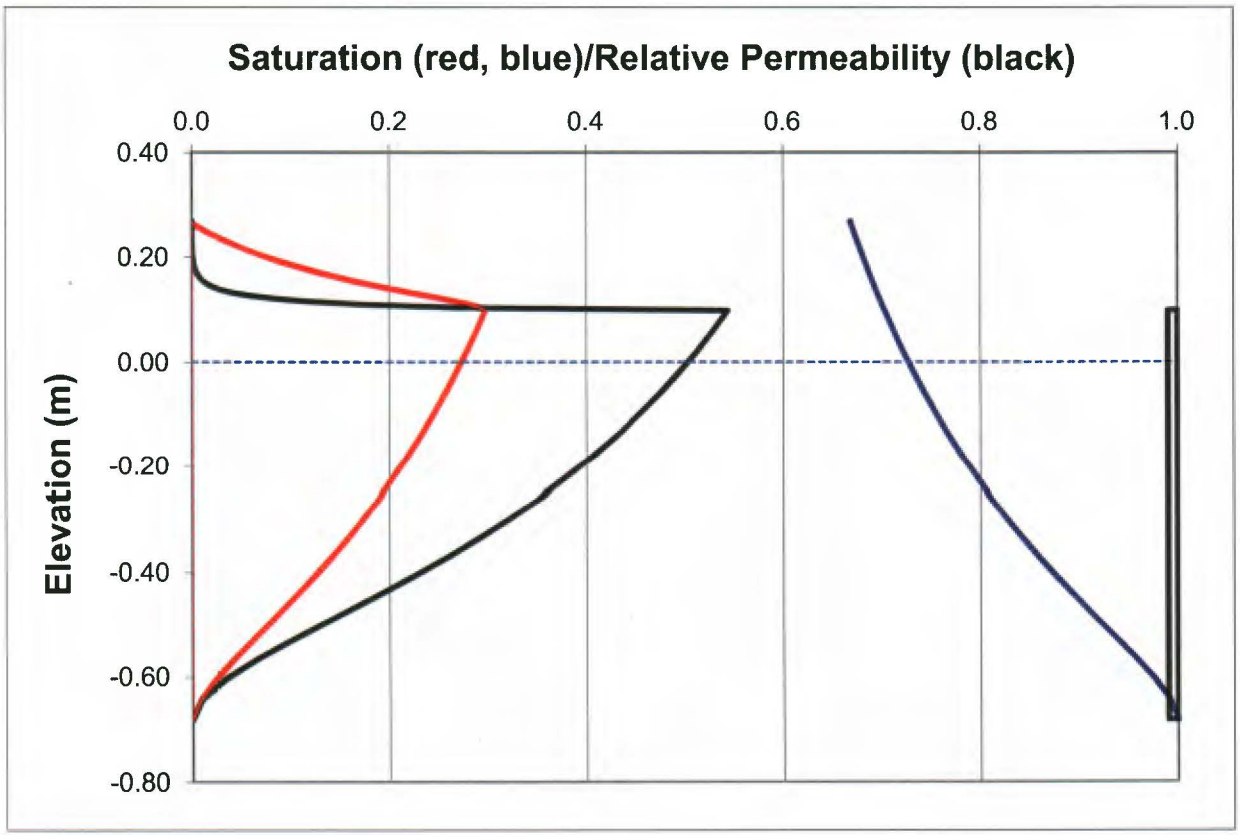


Figure H.15 C-162 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.314	Gauged January 2012 AOI 7 / C-162
	1.030	feet

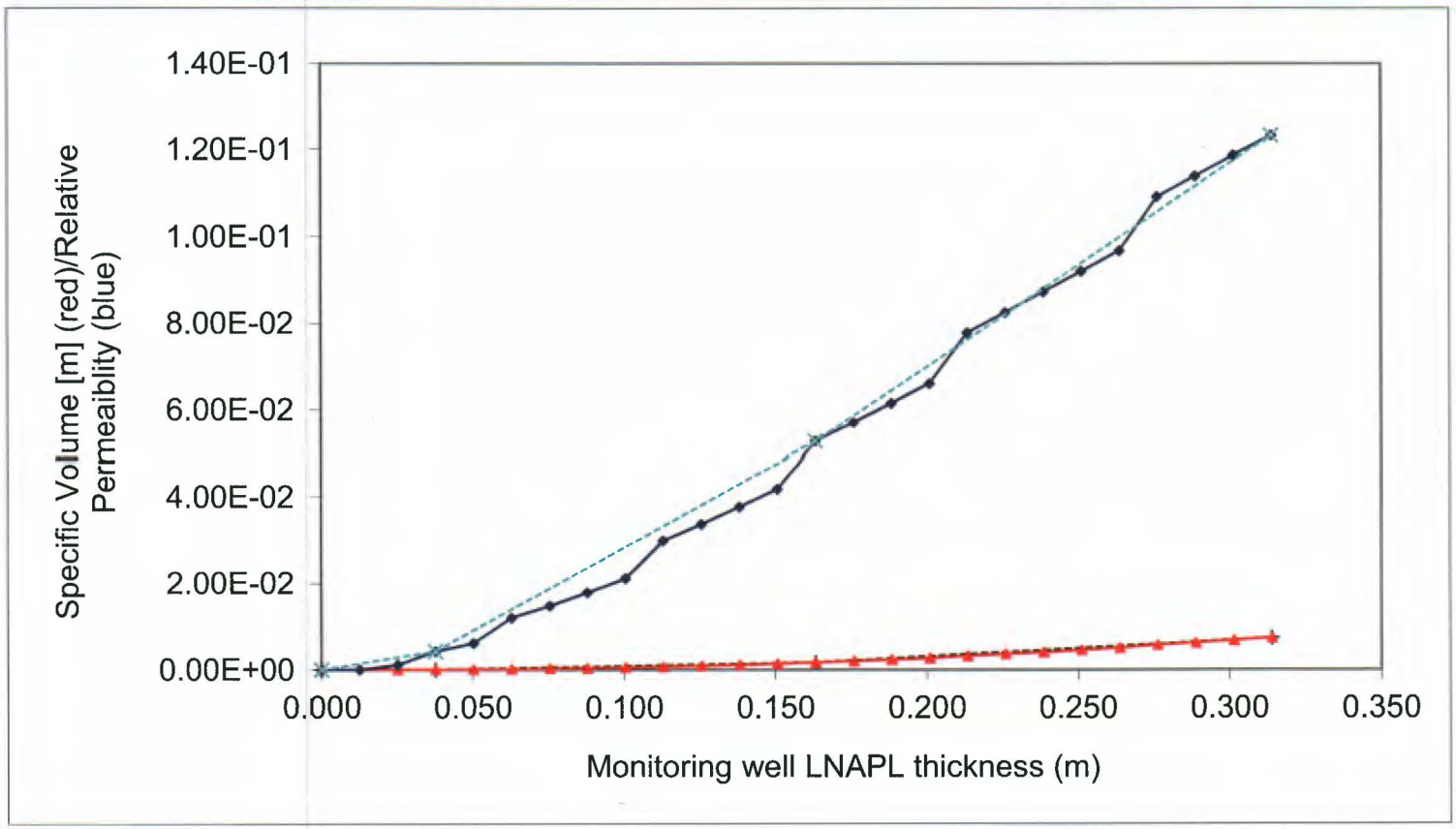
Soil Characteristic		(SW)g
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		Light Crude
ρ_o =	0.8833	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.901	air/LNAPL "α"
α_{ow} =	2.712	LNAPL/water "α"
z_{ao} =	0.037	elevation of air-LNAPL interface
z_{ow} =	-0.277	elevation of LNAPL-water interface
z_{max} =	0.097	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-162	
0.038	0.000	0.004	0.0000	0.001162	0.0000	0.111640		
0.163	0.002	0.053	0.0344	0.013160	0.0268	0.385056	1	Eps-Do
0.314	0.007	0.123	0.1181	0.037518	0.0513	0.469582	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.314	Gauged January 2012
	D_o = 7.351E-03	k_{ro} =	1.233E-01	AOI 7 / C-162

Press Ctrl+Shift+S to calculate sheet

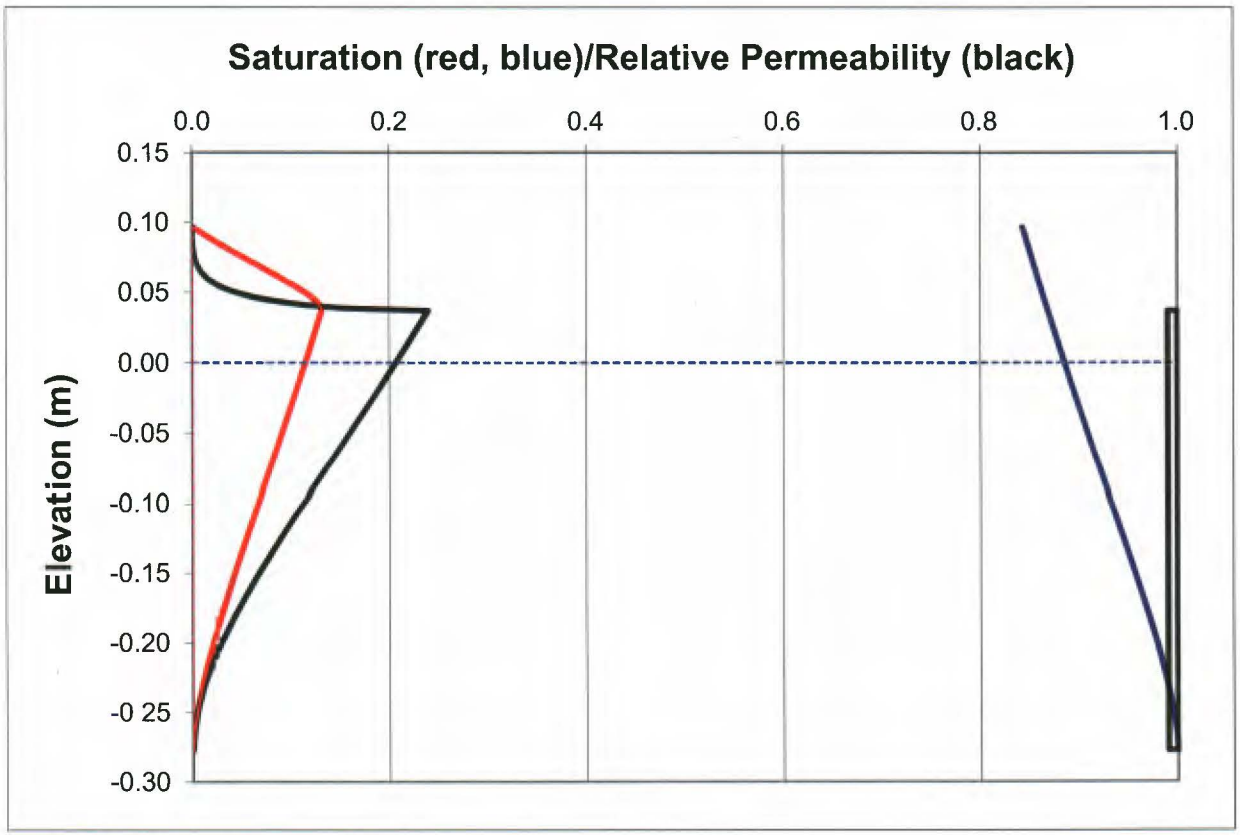


Figure H.16 C-166 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.223	Gauged January 2012 **AOI 7 / C-166** 0.730 feet

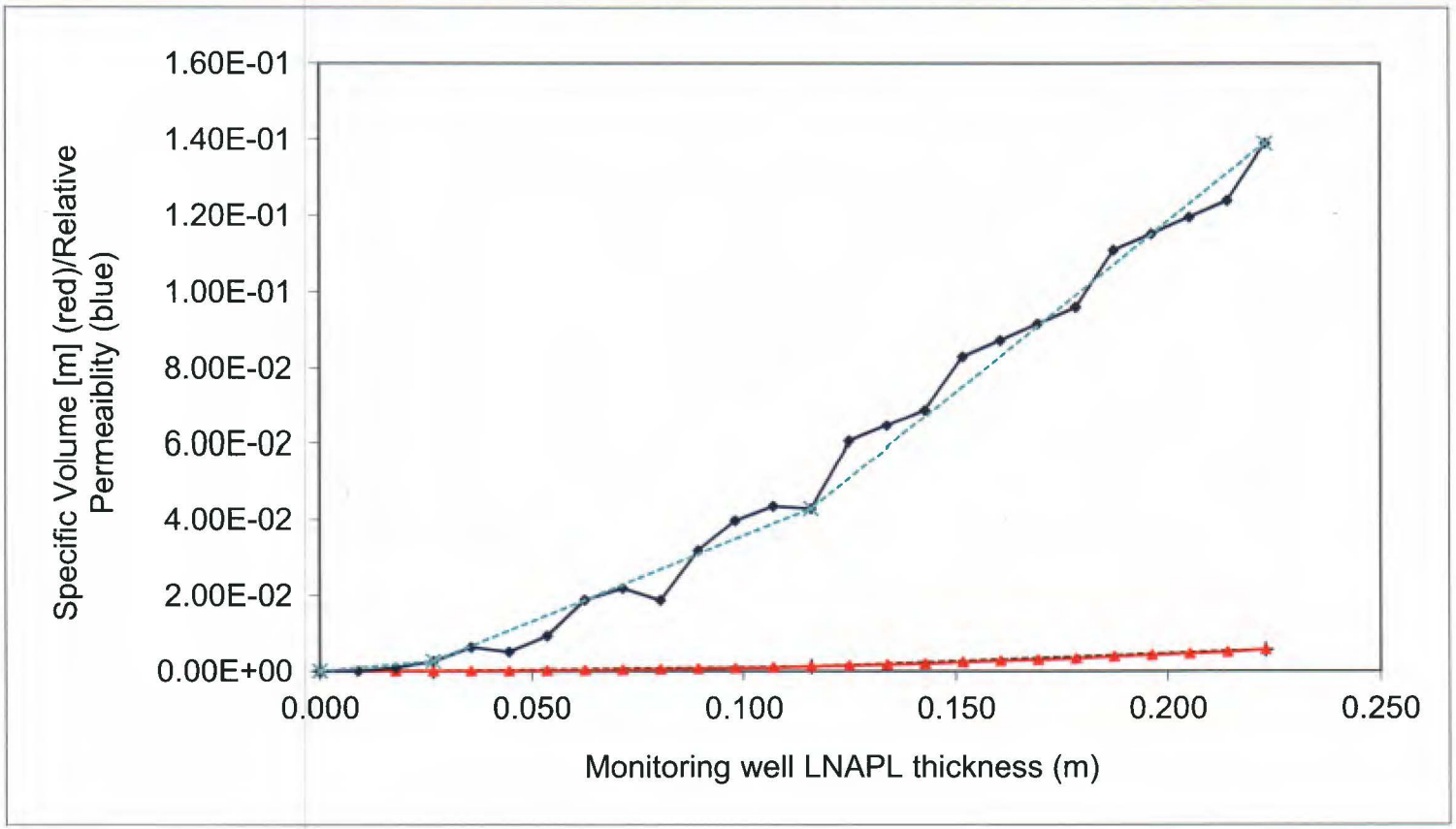
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8486	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.237	air/LNAPL "α"
α_{ow} =	3.518	LNAPL/water "α"
z_{ao} =	0.034	elevation of air-LNAPL interface
z_{ow} =	-0.189	elevation of LNAPL-water interface
z_{max} =	0.104	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-166	
0.027	0.000	0.003	0.0000	0.001250	0.0000	0.099592		
0.116	0.001	0.043	0.0244	0.014236	0.0209	0.451557	1	Eps-Do
0.223	0.006	0.139	0.0846	0.041519	0.0681	0.897575	1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.223	Gauged January 2012
	D_o = 5.747E-03	k_{ro} =	1.390E-01	AOI 7 / C-166

Press Ctrl+Shift+S to calculate sheet

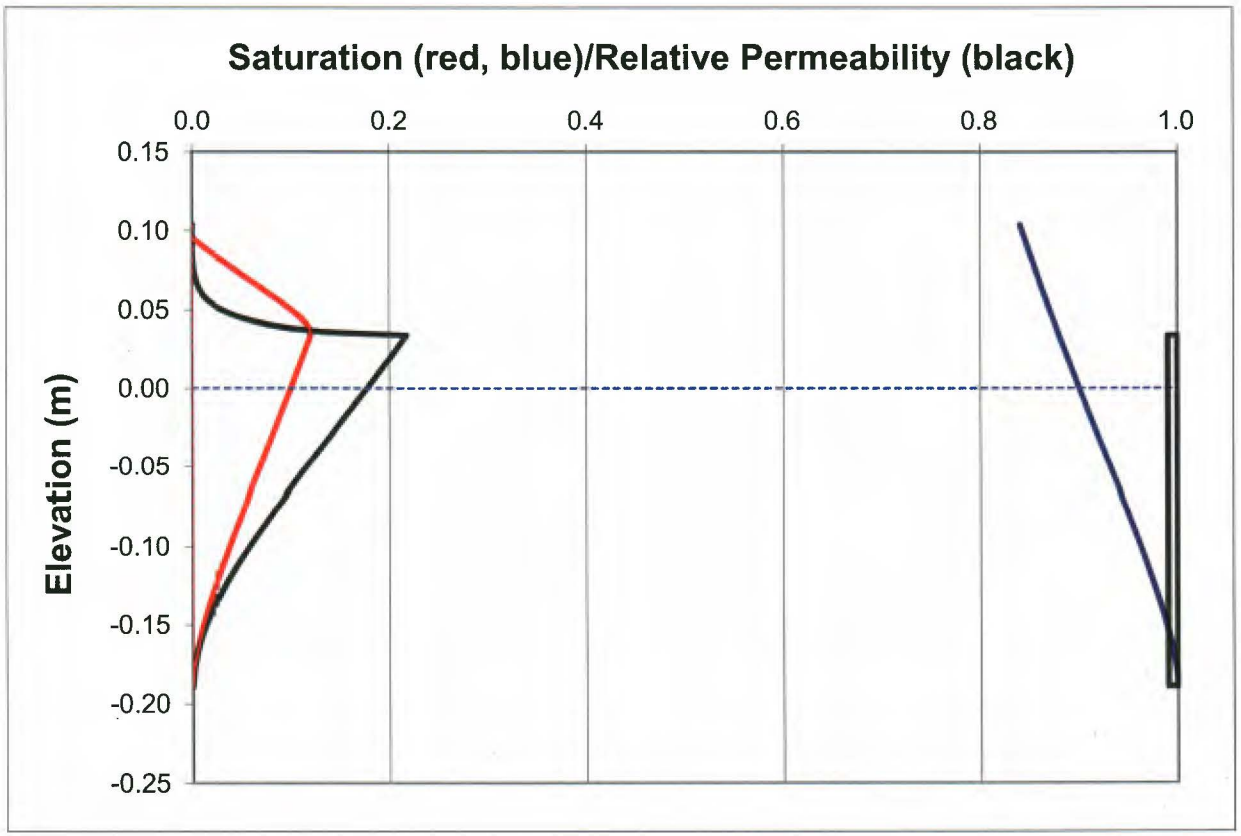


Figure H.17 C-167 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	1.649	Gauged January 2012 **AOI 7 / C-167** 5.410 feet

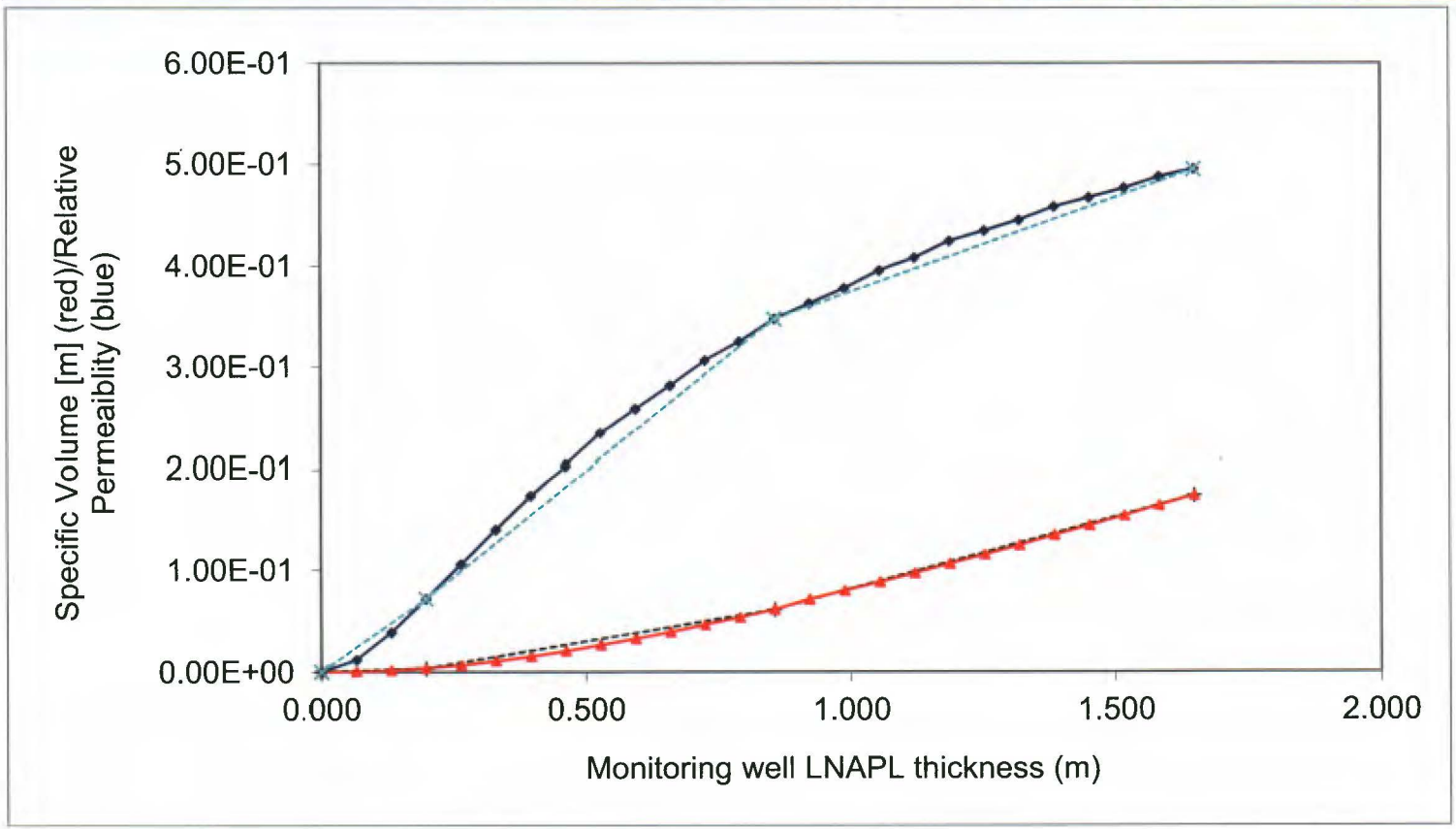
Soil Characteristic		**(SW)g**
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irreducible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		**Light Crude**
ρ_o =	0.8601	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.457	air/LNAPL "α"
α_{ow} =	3.251	LNAPL/water "α"
z_{ao} =	0.231	elevation of air-LNAPL interface
z_{ow} =	-1.418	elevation of LNAPL-water interface
z_{max} =	0.641	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	Gauged January 2012	
0.000	0.000	0.000					AOI 7 / C-167	
0.198	0.004	0.071	0.0000	0.018016	0.0000	0.361273		
0.857	0.061	0.347	0.1571	0.087389	0.0268	0.417880	0.1	Eps-Do
1.649	0.174	0.495	0.4284	0.142640	-0.9978	0.187097	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			1.649	Gauged January 2012
	D_o = 1.741E-01	k_{ro} =	4.952E-01	AOI 7 / C-167

Press Ctrl+Shift+S to calculate sheet

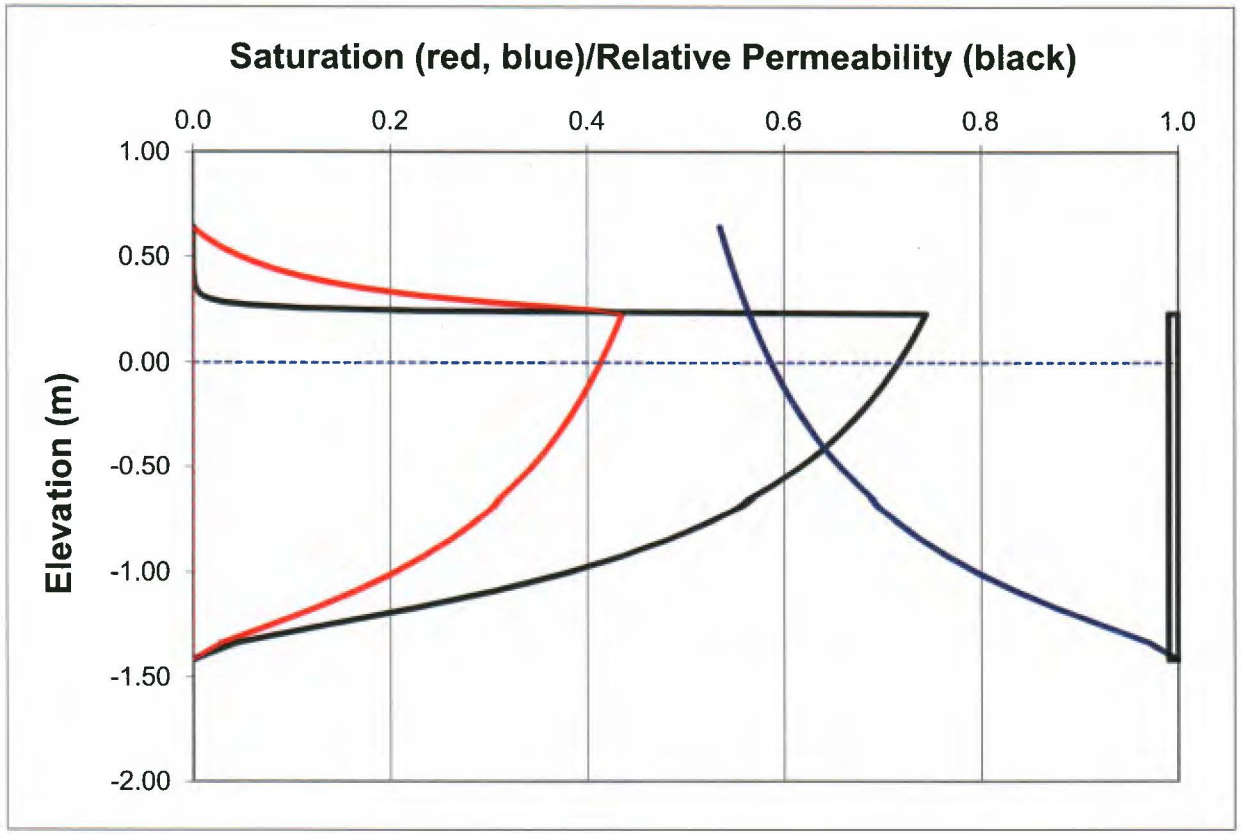


Figure H.18 WP-14 LNAPL (vG-M)

van Genuchten-Mualem Model of LNAPL Distribution and Relative Permeability

Enter Data in Yellow Region

Maximum Monitoring Well LNAPL Thickness (meters)		
b_o =	0.323	Gauged January 2012 **AOI 7 / WP-14** 1.060 feet

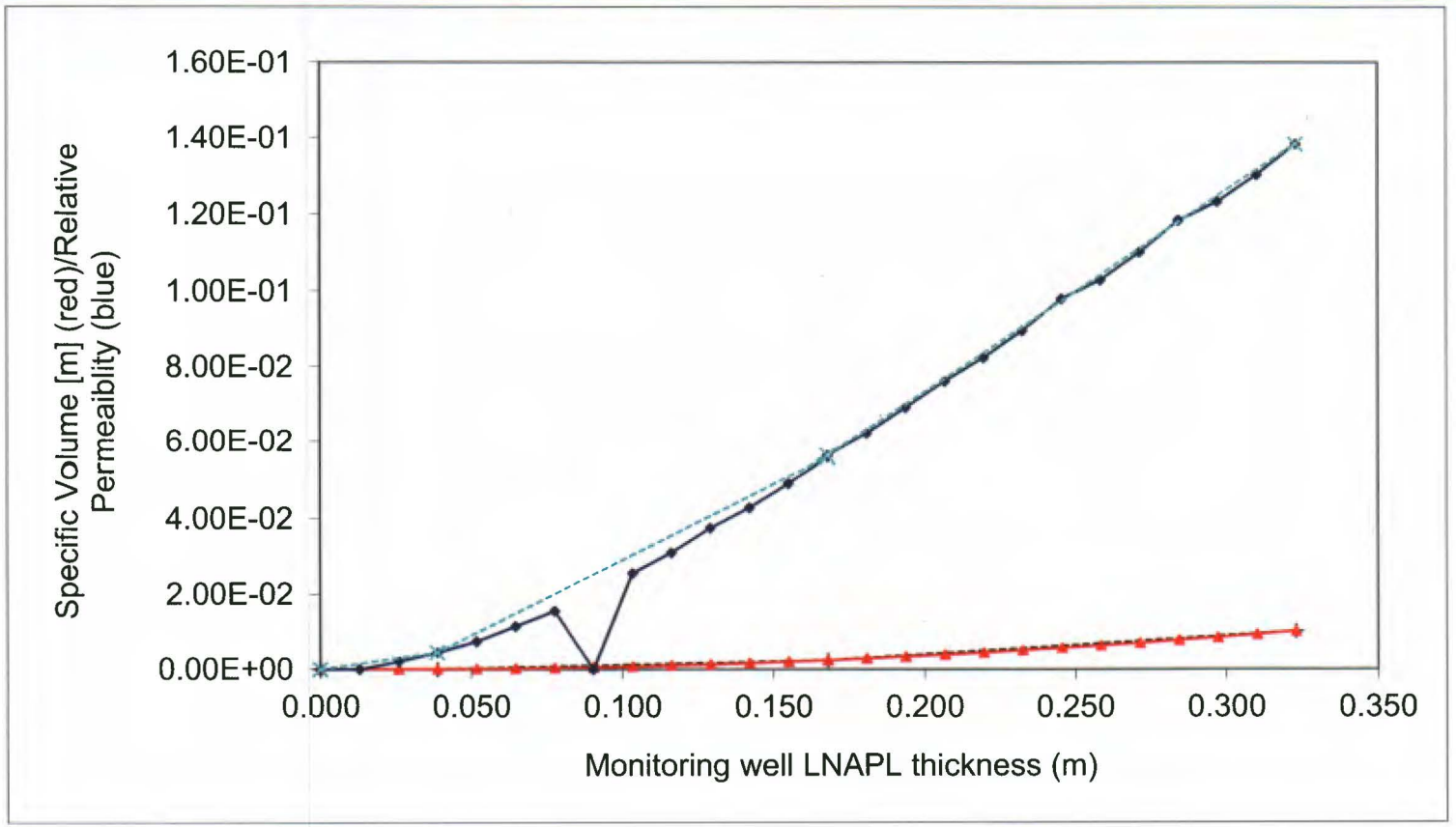
Soil Characteristic		(SW)g
n =	0.328	porosity
N =	1.550	van Genuchten "N"
α =	7.830	van Genuchten "α" [m^{-1}]
S_{wr} =	0.290	irrecucible water saturation
S_{orv} =	0.000	residual LNAPL saturation (saturated)
S_{ors} =	0.000	residual LNAPL saturation (vadose)

Fluid Characteristics:		Light Crude
ρ_o =	0.8601	LNAPL density (gm/cc)
σ_{aw} =	65.000	air/water (dynes/cm)
σ_{ao} =	26.600	air/oil (dynes/cm)
σ_{ow} =	21.900	oil/water (dynes/cm)

Calculated Parameters		
M =	0.355	van Genuchten "M"
α_{ao} =	16.457	air/LNAPL "α"
α_{ow} =	3.251	LNAPL/water "α"
z_{ao} =	0.045	elevation of air-LNAPL interface
z_{ow} =	-0.278	elevation of LNAPL-water interface
z_{max} =	0.125	maximum free-product elevation
λ =	0.472	pore-size distribution index
Ψ_b =	0.084	B-C displacement pressure head [m]

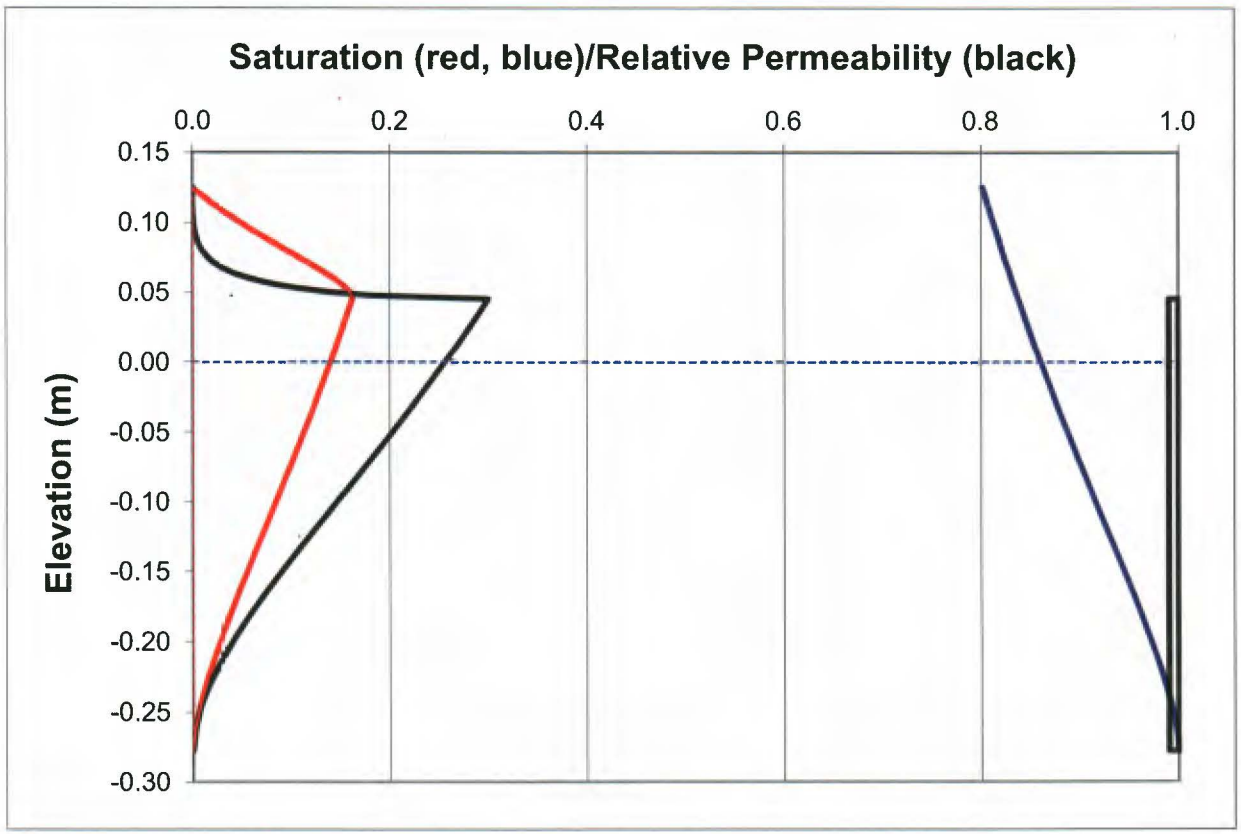
Press Ctrl+Shift+S to calculate sheet

Data for curve-fitting segments							Press Ctrl+Shift+S to calculate sheet	
b_o	D_o	k_{ro}	α	β	ξ	η	**Gauged January 2012**	
0.000	0.000	0.000					**AOI 7 / WP-14**	
0.039	0.000	0.004	0.0000	0.001795	0.0000	0.116036		
0.168	0.002	0.056	0.0349	0.018179	0.0275	0.400227	0.1	Eps-Do
0.323	0.010	0.138	0.1197	0.050112	0.0619	0.529753	0.1	Eps-kro



Monitoring Well LNAPL Thickness b_o (m) =			0.323	Gauged January 2012
	D_o = 1.019E-02	k_{ro} =	1.383E-01	AOI 7 / WP-14

Press Ctrl+Shift+S to calculate sheet



Appendix F
Remediation Systems Summary

Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC
Recovery System Operational Data
AOI 7: 3 Separator System

Second Half 2016

Date	Total Flow (gallons)	Period Total Flow (gallons)	Calculated System Flow Rate (gpm)	LNAPL Recovered in Period (gallons)	Total LNAPL Recovered (gallons)
5-Jul-16	16,041,185	46,600	64.72	96.2	109,916.4
11-Jul-16	16,076,085	34,900	48.47	67.2	109,983.5
19-Jul-16	16,126,385	50,300	69.86	100.4	110,084.0
26-Jul-16	16,172,885	46,500	64.58	98.3	110,182.3
3-Aug-16	16,234,885	62,000	86.11	91.2	110,273.5
8-Aug-16	16,273,485	38,600	53.61	105.6	110,379.1
15-Aug-16	16,322,585	49,100	68.19	87.0	110,466.1
22-Aug-16	16,366,285	43,700	60.69	118.8	110,584.9
31-Aug-16	16,421,885	55,600	77.22	110.3	110,695.2
7-Sep-16	16,466,085	44,200	61.39	59.9	110,755.1
12-Sep-16	16,498,285	32,200	44.72	86.6	110,841.8
20-Sep-16	16,556,485	58,200	80.83	147.1	110,988.9
26-Sep-16	16,601,585	45,100	62.64	69.5	111,058.4
4-Oct-16	16,661,585	60,000	83.33	78.9	111,137.3
10-Oct-16	16,706,685	45,100	62.64	37.5	111,174.7
18-Oct-16	16,769,685	63,000	87.50	32.8	111,207.6
24-Oct-16	16,811,485	41,800	58.06	50.3	111,257.8
31-Oct-16	16,859,085	47,600	66.11	54.1	111,311.9
7-Nov-16	16,909,485	50,400	70.00	54.7	111,366.6
14-Nov-16	16,951,685	42,200	58.61	52.1	111,418.7
18-Nov-16	16,974,885	23,200	32.22	40.5	111,459.2
21-Nov-16	16,992,485	17,600	24.44	14.4	111,473.6
28-Nov-16	17,030,485	38,000	52.78	60.1	111,533.7
9-Dec-16	17,099,085	68,600	95.28	36.7	111,570.3
13-Dec-16	17,128,585	29,500	40.97	38.8	111,609.1
19-Dec-16	17,173,885	45,300	62.92	19.9	111,629.0
26-Dec-16	17,226,885	53,000	73.61	18.8	111,647.7

Note:

gpm: gallons per minute

LNAPL: Light Non-Aqueous Phase Liquid

The 3 Separator System is a hydraulic control system constructed of ten recovery wells (RW-801 through RW-810) which was started on August 23, 2012. Groundwater and LNAPL are extracted using pneumatic submersible pumps, and total fluids pass through an oil/water separator (OWS). Water is discharged to an on-site process sewer, and LNAPL is recovered in a tank prior to being recycled by the complex. Groundwater and LNAPL recovery totals include system startup through the end of the first half of 2016.

The system was operational for the reporting period with the exception of the following:
On August 10, the pump in RW-808 was replaced.
On September 16, all the recovery pumps were removed, cleaned, and reinstalled.

Appendix G
Data Usability Assessment

Memorandum

August 16, 2016

To:	David Steele	Ref. No.:	11109614
From:	Paul McMahon/adh/1	Tel:	716-205-1970

Subject: **Data Usability Assessment**
SWMU Investigation AOI-7 Soil
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

1. Introduction

This document details a data usability assessment of analytical results for soil samples collected on July 11-12, 2016 in support of the Solid Waste Management Unit (SWMU) Investigation AOI-7 at the Philadelphia Refinery Site. Samples were submitted to Eurofins Lancaster Laboratories Environmental, located in Lancaster, Pennsylvania. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2. A copy of the executed chain of custody forms can be found in Attachment A.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, the chain of custody forms, blank data, recovery data from surrogate spikes/laboratory control samples (LCS), and field quality assurance/quality control (QA/QC) samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 2 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", United States Environmental Protection Agency (USEPA) 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in Table 2. The sample chain of custody documents and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

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All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

Inorganic Analyses

The method blank result was non-detect, indicating that laboratory contamination was not a factor for this investigation

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for organic determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral fraction is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All recoveries met the above criteria, demonstrating good analytical efficiency.

5. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS or LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The LCS contained the analyte of interest. The LCS recovery was assessed per the "Guidelines". The LCS recovery was within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed. If only the MS or MSD recovery was outside of control limits, the data were judged acceptable based on the acceptable companion spike and RPD.

The laboratory did not perform site-specific MS/MSD analyses internally for this sample delivery group (SDG).

7. ICP Serial Dilution

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. A minimum of 1 per 20 investigative samples or at least 1 per analytical batch must be analyzed at a five-fold dilution. For samples with sufficient analyte concentrations (>50 times the Method Detection Limit [MDL]), the serial dilution results must agree within 10 percent of the original results.

For this study, no site-specific serial dilution samples were prepared and analyzed by the laboratory.

8. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample.

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for volatile organic compound (VOC) analysis. All results were non-detect for the compounds of interest.

9. Analyte Reporting

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the reporting limit (RL) but greater than the MDL were qualified as estimated (J).

All soil results were reported on a dry weight basis.

10. Conclusion

Based on the assessment detailed in the foregoing, the data associated with this investigation are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
SWMU Investigation AOI-7 Soil
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

Sample Identification	Location	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters: VOCs	SVOCs	Lead	Comments
AOI7-BH-16-030-2-4-071116	AOI7	07/11/2016	11:15	x	x	x	
AOI7-BH-16-028-2-4-071116	AOI7	07/11/2016	11:50	x	x	x	
AOI7-BH-16-017-0-2-071116	AOI7	07/11/2016	13:40	x	x	x	
AOI7-BH-16-017-2-4-071116	AOI7	07/11/2016	13:40	x	x	x	
AOI7-BH-16-018-2-4-071116	AOI7	07/11/2016	14:15	x	x	x	
AOI7-BH-16-033-2-4-071116	AOI7	07/11/2016	13:35	x	x	x	
TB-AOI7-071116-08	-	07/11/2016	-	x			Trip Blank
AOI7-BH-16-002-0-2-071216	AOI7	07/12/2016	10:45	x	x	x	
AOI7-BH-16-003-0-2-071216	AOI7	07/12/2016	13:20	x	x	x	
AOI7-BH-16-044-0-2-071216	AOI7	07/12/2016	13:00	x	x	x	
AOI7-BH-16-028-0-2-071216	AOI7	07/12/2016	09:15	x	x	x	
AOI7-BH-16-032-0-2-071216	AOI7	07/12/2016	13:10	x	x	x	
AOI7-BH-16-031-2-4-071216	AOI7	07/12/2016	13:22	x	x	x	

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
- - Not applicable

Table 2

Analytical Methods and Preservation Requirements
SWMU Investigation AOI-7 Soil
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

Parameter	Method	Matrix	Preservation	Holding Time	
				Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Volatile Organic Compounds (VOCs)	SW-846 8260B	Soil	Iced, 0-6° C	-	14
Semi-volatile Organic Compounds (SVOCs)	SW-846 8270C	Soil	Iced, 0-6° C	14	40
Lead	SW-846 6010B	Soil	Iced, 0-6° C	-	180

Notes:

Method References:
SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions
- - Not applicable

Attachment A
Chain of Custody Document

Environmental Analysis Request/Chain of Custody

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For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10177 Group # 1682473 Sample # 8473656-68

1 of 2

COC # 504246

Client Information

Client: Evergreen	Acct. #:
Project Name/#: Evergreen	PWSID #:
Project Manager: David Steele	P.O. #:
Sampler: Alissa Cannon, Rob Drawicz	Quote #:
State where samples were collected:	For Compliance: Yes ☐ No ☐

For Lab Use Only

FSC:

SCR#:

Preservation Codes

H=HCl T=Thiosulfate

N=HNO_3 B=NaOH

S=H_2SO_4 O=Other

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil/Sediment/Tissue	Matrix: Water (Potable/Ground/Surface/NPDES)	Matrix: Other	Total # of Containers	Analysis Requested: Select VOCs	Select SVOCs	Moisture, Lead	Benzo(a) pyrene, Manganese
AOI7-DH-16-030-2-4-071116	07/11/16	1115	6		6			6	4	1	1	
AOI7-BH-16-028-2-4-071116		1150	6		6			6	4	1	1	
AOI7-BH-16-017-0-2-071116		1340	1		1			1				1
AOI7-BH-16-017-2-4-071116		1340	1		1			1				1
AOI7-BH-16-018-2-4-071116		1415	1		1			1				1
AOI7-BH-16-033-2-4-071116		1335	1		1			1			1	
TB-AOI7-071116-08			2					2	2			
AOI7-BH-16-002-0-2-071216		1045	6		6			6	4	1	1	
AOI7-BH-16-003-0-2-071216		1320	6		6			6	4	1	1	
AOI7-BH-16-044-0-2-071216		1300	6		6			6	4	1	1	

Turnaround Time (TAT) Requested (please circle)

(Standard) Rush

(Rush TAT is ~~subject to~~ laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
	7/13/16	1000		7.13.16	1300
	7.13.16	1418			
				7/13/16	1445

EDD Required? Yes No

If yes, format: _____

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS _____ FedEx _____ Other _____

Temperature upon receipt 3.3 °C

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10177 Group # 1682473 Sample # 8473656-68 2 of 2

COC # 504247

Client Information

Client: Evergreen

Acct. #:

Project Name/#: Evergreen PED

PWSID #:

Project Manager: David Steele

P.O. #:

Sampler: Alissa Cannia Drewicz

Quote #:

State where samples were collected: Pennsylvania

For Compliance: Yes ☐ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Other: ____

Analysis Requested

Preservation Codes

For Lab Use Only

FSC: ____

SCR#: ____

Preservation Codes

H=HCl T=Thiosulfate

N=HNO_3 B=NaOH

S=H_2SO_4 O=Other

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Total # of Containers	Select VOCs	Select SVOCs, Moisture	Moisture, Lead
AOI7-BH-16-028-0-2-071216	7/12/16	0915	6		6	6	4	1	1
AOI7-BH-16-032-0-2-07122016	↓	1310	6		6	6	4	1	1
AOI7-BH-16-031-24-071216	↓	1322	6		6	6	4	1	1

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: ____

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
	7/13/16	1000		7/13/16	1300
	7.13.16	1418			
				7/13/16	1418

EDD Required? Yes No

If yes, format: ____

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS ____ FedEx ____ Other ____

Temperature upon receipt 3.3 °C

Memorandum

August 24, 2016

To:	David Steele	Ref. No.:	11109614
From:	Paul McMahon/adh/2	Tel:	716-205-1970

Subject: **Data Usability Assessment**
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

1. Introduction

This document details a data usability assessment of analytical results for groundwater samples collected on July 20-21, 2016 in support of the Solid Waste Management Unit (SWMU) Investigation AOI-7 at the Philadelphia Refinery Site. Samples were submitted to Eurofins Lancaster Laboratories Environmental, located in Lancaster, Pennsylvania. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2. A copy of the executed chain of custody form can be found in Attachment A.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, the chain of custody forms, blank data, recovery data from surrogate spikes/laboratory control samples (LCS), and field quality assurance/quality control (QA/QC) samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 2 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", United States Environmental Protection Agency (USEPA) 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in Table 2. The sample chain of custody document and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

Inorganic Analyses

The method blank result was non-detect, indicating that laboratory contamination was not a factor for this investigation

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for organic determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral fraction is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All recoveries met the above criteria, demonstrating good analytical efficiency.

5. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS or LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The LCS contained the analyte of interest. The LCS recovery was assessed per the "Guidelines". The LCS recovery was within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed. If only the MS or MSD recovery was outside of control limits, the data were judged acceptable based on the acceptable companion spike and RPD.

Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The MS/MSD sample was spiked with the analyte of interest, and the results were evaluated using the "Guidelines". The percent recovery was within the control limits, demonstrating acceptable analytical accuracy and precision.

7. Duplicate Sample Analyses – Inorganic Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, duplicate samples were prepared and analyzed by the laboratory internally. The duplicate results were evaluated per the "Guidelines". All duplicate analyses performed were acceptable, demonstrating acceptable analytical precision.

8. Inductively Coupled Plasma (ICP) Serial Dilution

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. A minimum of 1 per 20 investigative samples or at least 1 per analytical batch must be analyzed at a

five-fold dilution. For samples with sufficient analyte concentrations (>50 times the Method Detection Limit [MDL]), the serial dilution results must agree within 10 percent of the original results.

A serial dilution was performed on the MS sample. All results met the criteria above.

9. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample.

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for volatile organic compound (VOC) analysis. All results were non-detect for the compounds of interest.

10. Analyte Reporting

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the reporting limit (RL) but greater than the MDL were qualified as estimated (J).

11. Conclusion

Based on the assessment detailed in the foregoing, the data associated with this investigation are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

Sample Identification	Location	Collection Date (mm/dd/yyyy)	Collection Time (hr:min)	Analysis/Parameters: VOCs	SVOCs	Lead	Comments
GW-11109614-C-144D-072016-AC-001	C-144D	07/20/2016	10:45	x	x	x	
GW-11109614-C-134D-072016-AC-002	C-134D	07/20/2016	13:10	x	x	x	
GW-11109614-C-50D-072016-AC-003	C-50D	07/20/2016	15:30	x	x	x	
GW-11109614-C-129D-072116-AC-004	C-129D	07/21/2016	10:40	x	x	x	
GW-11109614-C-49-072116-JM-005	C-49	07/21/2016	9:30	x	x	x	
GW-11109614-C-54-072116-AC-006	C-54	07/21/2016	12:30	x	x	x	
GW-11109614-C-113-072116-JM-007	C-113	07/21/2016	12:00	x	x	x	
GW-11109614-C-60-072116-AC-008	C-60	07/21/2016	14:00	x	x	x	
GW-11109614-C-96-072116-JM-009	C-96	07/21/2016	14:40	x	x	x	
TB-11109614-072116-001	-	07/21/2016	16:00	x			Trip Blank

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
- - Not applicable

Table 2

Analytical Methods and Preservation Requirements
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

Parameter	Method	Matrix	Preservation	Holding Time	
				Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Volatile Organic Compounds (VOCs)	SW-846 8260B	Groundwater	pH < 2 and Iced, 0-6° C	-	14
Semi-volatile Organic Compounds (SVOCs)	SW-846 8270C	Groundwater	Iced, 0-6° C	7	40
Ethylene Dibromide (EDB)	SW-846 8011	Groundwater	Iced, 0-6° C	-	14
Dissolved Lead	SW-846 6020	Groundwater	pH < 2 and Iced, 0-6° C	-	180

Notes:

Method References:
SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions
- - Not applicable

Attachment A
Chain of Custody Document

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10177 Group # 1686199 Sample # 8489349-58

1 of 1 **COC # 505686**

Client Information

Client: Evergreen	Acct. #:
Project Name/#: Evergreen PES 11109614.01	PWSID #:
Project Manager: David Steele	P.O. #:
Sampler: Alissa Cannon / Jason	Quote #:
State where samples were collected: Pennsylvania	For Compliance: Yes ☐ No ☐

Matrix: Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other: ____

Analysis Requested — Preservation Codes

For Lab Use Only: FSC: ____ SCR#: 191595

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

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Other	Total # of Containers	Lead	BTEX/MTBE/Cumene/EDC/TMBs	EDB in water	PAH in water by SIM	Metals QC						Remarks
GW-11109614-C-144D-072016-AC-001	07/20/16	1045	X			9	9	8	1	3	2	2	1		Batch Together				QC Metals
GW-11109614-C-134D-072016-AC-002	↓	1310	X			8		8	1	3	2	2							
GW-11109614-C-50D-072016-AC-003	↓	1530	X			8		8	1	3	2	2							
GW-11109614-C-129D-072116-AC-004	07/21/16	1040	X			8		8	1	3	2	2							
GW-11109614-C-54-072116-AC-006	↓	1230	X			9		9	1	3	2	2	1						
GW-11109614-C-60-072116-AC-008	↓	1400	X			8		8	1	3	2	2							
GW-11109614-C-49-072116-JM-005	↓	0930	X			8		8	1	3	2	2							
GW-11109614-C-113-072116-JM-007	↓	1200	X			8		8	1	3	2	2							
GW-11109614-C-96-072116-JM-009	↓	1440	X			8		8	1	3	2	2							
TB-11109614-072116-001	↓	1600	X			4		4		2	2								Trip Blanks

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: ____

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage					
[signature]	7/21/16	20:00	[signature]	7.22.16	1030
[signature]	7.22.16	1839			
			[signature]	7.22.16	1839

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

EDD Required? Yes No

If yes, format: ____

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other ____

Temperature upon receipt 2.3 - 3.8 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7044 0216

Memorandum

August 25, 2016

To:	David Steele	Ref. No.:	11109614
From:	Paul McMahon/cs/3	Tel:	716-205-1970

Subject: **Data Usability Assessment**
SWMU Investigation AOI-7 Air
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

1. Introduction

This document details a data usability assessment of analytical results for air samples collected on July 28, 2016 in support of the Solid Waste Management Unit (SWMU) Investigation AOI-7 at the Philadelphia Refinery Site. Samples were submitted to Eurofins Lancaster Laboratories Environmental, located in Lancaster, Pennsylvania. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2. A copy of the executed chain of custody form can be found in Attachment A.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, the chain of custody form, blank data, and recovery data from laboratory control samples (LCS).

The QA/QC criteria by which these data have been assessed are outlined in the analytical method referenced in Table 2 and applicable guidance from the "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540 R 08 01, June 2008.

2. Sample Holding Time and Preservation

The sample holding time criterion for the analyses is summarized in Table 2. The sample chain of custody document and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding time.

3. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per analytical batch.

GHD
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 F 716 297 2265 W www.ghd.com

REGISTERED COMPANY FOR ISO 9001 ENGINEERING DESIGN

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Laboratory Control Sample Analyses

LCS and laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study,LCS/LCSD were analyzed at a minimum frequency of 1 per analytical batch.

The LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

5. Analyte Reporting

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the reporting limit (RL) but greater than the MDL were qualified as estimated (J).

6. Conclusion

Based on the assessment detailed in the foregoing, the data associated with this investigation are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
SWMU Investigation AOI-7 Air
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

						Analysis/Parameters
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (Start) (hr:min)**	**Collection Time (Stop) (hr:min)**	**VOCs**
AOI7-AA-16-001	AA-16-001	Air	07/28/2016	08:03	15:33	X
AOI7-AA-16-002	AA-16-002	Air	07/28/2016	08:05	15:36	X
AOI7-AA-16-003	AA-16-003	Air	07/28/2016	08:34	15:27	X

Notes:

VOCs - Volatile Organic Compounds

Table 2

Analytical Method and Holding Time Criterion
SWMU Investigation AOI-7 Air
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
July 2016

Parameter	Method	Matrix	Holding Time Collection to Analysis (Days)
Volatile Organic Compounds (VOCs)	TO-15	Air	30

Notes:

EPA Method TO-15 - "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA-625/R-96/010b, January 1999
VOCs - Volatile Organic Compounds

Attachment A
Chain of Custody Document

Summa Canister Field Test Data/Chain of Custody

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For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10177 Group # 1688913 Sample # 8501129-31 Bottle Order (SCR) # _____

Client Information

Client: EVERGREEN
Account #:
Project Name/#: EVERGREEN PES PHILA
Project Manager: DAVID STEELE
P.O. #:
Sampler:
Quote #:
Name of state where samples were collected: PA

Turnaround Time Requested (TAT) (circle one)

Standard Rush (specify) _____

Data Package Required? Yes No

EDD Required? Yes No

	Temperature (F) Start	Temperature (F) Stop	Pressure ("Hg) Start	Pressure ("Hg) Stop
Ambient	89	73		
Maximum				
Minimum				

Analyses Requested

Sample Identification	Start Date/Time (24-hour clock)	Stop Date/Time (24-hour clock)	Canister Pressure in Field ("Hg) (Start)	Canister Pressure in Field ("Hg) (Stop)	Interior Temp. (F) (Start)	Interior Temp. (F) (Stop)	Flow Reg. ID	Can ID	Can Size (L)	Controller Flowrate (mL/min)	EPA TO - 15	EPA 18 ☐ BTEX ☐ MTBE	EPA 25 (select range below)	Helium as tracer	O2/CO2	Library Search
AOI7-AA-16-003	7.28.16 ~~0800~~ 0803	7.28.16 0834 1527	-30	-11	—	—	399392	1117	6	10.6	X					
AOI7-AA-16-002	7.28.16 ~~0800~~ 0805	7.28.16 1536	-30	-7+	—	—	710535	825	6	10.5	X					
AOI7-AA-16-001	7.28.16 0803	7.28.16 1533	-30	-11+	—	—	958072	1366	6	10.5	X					

Instructions/QC Requirements & Comments

EPA 25 (check one): ☐ C1 - C4 ☐ C2 - C10 ☐ C1 - C10 ☐ C4 - C10 (GRO) ☐ C2 - C4

Canisters Shipped by:	Date/Time:	Canisters Received by:	Date/Time:	Relinquished by:	Date/Time:	Received by:	Date/Time:
[signature]	16:25 7/26/16						
Relinquished by: [signature]	Date/Time: 7/28/16 1700	Received by: [signature]	Date/Time: 7.29.16 1626	Relinquished by: [signature]	Date/Time: 7/29/16 1735	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:	Relinquished by:	Date/Time:	Received by: [signature]	Date/Time: 7/29/16 17:35

Eurofins Lancaster Laboratories Environmental, LLC • 2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300

The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7056 1015

Memorandum

September 21, 2016

To:	David Steele	Ref. No.:	11109614
From:	Paul McMahon/adh/4	Tel:	716-205-1970

Subject: **Data Usability Assessment**
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
August 2016

1. Introduction

This document details a data usability assessment of analytical results for groundwater samples collected on August 19, 2016 in support of the Solid Waste Management Unit (SWMU) Investigation AOI-7 at the Philadelphia Refinery Site. Samples were submitted to Eurofins Lancaster Laboratories Environmental, located in Lancaster, Pennsylvania. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2. A copy of the executed chain of custody form can be found in Attachment A.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, the chain of custody form, blank data, recovery data from surrogate spikes/laboratory control samples (LCS), and field quality assurance/quality control (QA/QC) samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 2 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", United States Environmental Protection Agency (USEPA) 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in Table 2. The sample chain of custody document and analytical report were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

Inorganic Analyses

The method blank result was non-detect, indicating that laboratory contamination was not a factor for this investigation

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for organic determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral fraction is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All recoveries met the above criteria, demonstrating good analytical efficiency.

5. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses

The LCS contained the analyte of interest. The LCS recovery was assessed per the "Guidelines". The LCS recovery was within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed. If only the MS or MSD recovery was outside of control limits, the data were judged acceptable based on the acceptable companion spike and RPD.

Organic Analyses

The MS sample was spiked with the compound of interest. The percent recovery was within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The MS/MSD sample was spiked with the analyte of interest, and the results were evaluated using the "Guidelines". The percent recoveries and RPD were within the control limits, demonstrating acceptable analytical accuracy and precision.

7. Duplicate Sample Analyses – Inorganic Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, a duplicate sample was prepared and analyzed by the laboratory internally. The duplicate results were evaluated per the "Guidelines". All duplicate analyses performed were acceptable, demonstrating acceptable analytical precision.

8. Inductively Coupled Plasma (ICP) Serial Dilution

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. A minimum of 1 per 20 investigative samples or at least 1 per analytical batch must be analyzed at a

five-fold dilution. For samples with sufficient analyte concentrations (>50 times the Method Detection Limit [MDL]), the serial dilution results must agree within 10 percent of the original results.

A serial dilution was performed on the MS sample. All results met the criteria above.

9. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample.

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for volatile organic compound (VOC) analysis. All results were non-detect for the compounds of interest.

10. Analyte Reporting

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the reporting limit (RL) but greater than the MDL were qualified as estimated (J).

11. Conclusion

Based on the assessment detailed in the foregoing, the data associated with this investigation are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
August 2016

				Analysis/Parameters		
Sample Identification	**Location**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**VOCs**	**SVOCs**	**Lead**
GW-11109614-C-129D-082616-AC-001	C-129D	08/19/2016	10:10	x	x	x
GW-11109614-C-134D-082616-AC-002	C-134D	08/19/2016	11:20	x	x	x
GW-11109614-C-54-082616-AC-003	C-54	08/19/2016	10:40	x	x	x
GW-11109614-C-131-082616-AC-004	C-131	08/19/2016	11:45	x	x	x
GW-11109614-C-152-082616-AC-005	C-152	08/19/2016	09:30	x	x	x
TB-11109614-081916-AC-01	-	08/19/2016	-	x		

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
- - Not applicable

Table 2

Analytical Methods and Preservation Requirements
SWMU Investigation AOI-7 Groundwater
Evergreen Resources Group, LLC
Philadelphia, Pennsylvania
August 2016

Parameter	Method	Matrix	Preservation	Holding Time	
				Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Volatile Organic Compounds (VOCs)	SW-846 8260B	Groundwater	pH < 2 and Iced, 0-6° C	-	14
Semi-volatile Organic Compounds (SVOCs)	SW-846 8270C	Groundwater	Iced, 0-6° C	7	40
Ethylene Dibromide (EDB)	SW-846 8011	Groundwater	Iced, 0-6° C	-	14
Dissolved Lead	SW-846 6020	Groundwater	pH < 2 and Iced, 0-6° C	-	180

Notes:

Method References:
SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions
- - Not applicable

Attachment A
Chain of Custody Document

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10177 Group # 1698036 Sample # 8541531-36

1 of 1

COC # 506976

Client Information

Client: Evergreen GHD

Acct. #:

Project Name/#: Evergreen FES / 111096614

PWSID #:

Project Manager: David Steele

P.O. #:

Sampler: A. Cannon

Quote #:

State where samples were collected: Pennsylvania

For Compliance: Yes ☐ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐ Potable ☐ Ground ☒ Water ☐ NPDES ☐ Surface ☐ Other: ☐

Analysis Requested

Preservation Codes

For Lab Use Only

FSC:

SCR#: 192261

Preservation Codes

H=HCl T=Thiosulfate

N=HNO_3 B=NaOH

S=H_2SO_4 O=Other

Remarks

Philadelphia

Database

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	BTEX/MBE/Cumene/EDC/MTBE	EDB	Lead (Field Filtered)	PAH in wastewater by 537M
GW-111096614-C-129D-081916-AC-01	08/19/16	1010	8		8	3	2	1	2
GW-111096614-C-134D-081916-AC-02		1120	8		8	3	2	1	2
GW-111096614-C-54-081916-AC-03		1040	8		8	3	2	1	2
GW-111096614-C-131-081916-AC-04		1145	8		8	3	2	1	2
GW-111096614-C-152-081916-AC-05		0930	8		8	3	2	1	2
~~TB-111096614-081916-AC~~									
TB-111096614-081916-AC-01	↓	1200	4			2	2		

Trip Blanks

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: _____

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage					
	8/22/16	1300		8.22.16	1100
	8.22.16	1420			
				8-22-16	1420

EDD Required? Yes No

If yes, format: _____

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:

UPS _____ FedEx _____ Other _____

Temperature upon receipt 3.9 °C

Appendix H
Ecological Assessment Documentation

September 27, 2016 Reference No. 11109614

Mr. Christopher Urban
Chief, Natural Diversity Section
Pennsylvania Fish & Boat Commission
450 Robinson Lane
Bellefonte, PA 16823-9620

Dear Mr. Urban:

Re: PNDI# 613690
Project Review Request
Evergreen Philadelphia AOI-7
City of Philadelphia, Philadelphia County, Pennsylvania

GHD Services, Inc. (GHD) was retained by Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (Evergreen) to perform delineation of soil and groundwater under Act 2 Investigation of Area of Investigation (AOI) 7 (Study Area) at the Philadelphia Refinery Complex (PRC) located in the City of Philadelphia. The location of the Study Area is shown on a portion of the Philadelphia, PA USGS topographic quadrangle map provided as Figure 1. An aerial photograph showing the Study Area and adjoining land uses is provided as Figure 2.

A Pennsylvania Natural Diversity Inventory (PNDI) database search (Receipt No.613690) conducted for the Site identified a potential conflict with three (1) threatened species and two (2) endangered species under the jurisdiction of the Pennsylvania Fish and Boat Commission (PFBC). A copy of the PNDI search receipt is provided as Attachment A.

The Study Area consists of historically disturbed industrial lands associated with oil refining processes. The Schuylkill River borders the Study Area to the north and west with a bulkhead along the entire length of the AOI-7 Study Area.

No remediation activities are proposed at this time. There do not appear to be any wetlands or water bodies within the Study Area, with the exception of two man-made basins/separators that are part of the wastewater treatment operations within the facility. We are requesting your project review.

If you have any questions or require additional information, please contact me at (610) 646-7470 or Christine.miller@ghd.com.

GHD Services Inc.
410 Eagleview Boulevard Suite 110 Exton Pennsylvania 19341 USA
T 610 321 1800 **F** 610 321 2763 **W** www.ghd.com

REGISTERED COMPANY FOR
ISO 9001
ENGINEERING DESIGN

Sincerely,

GHD



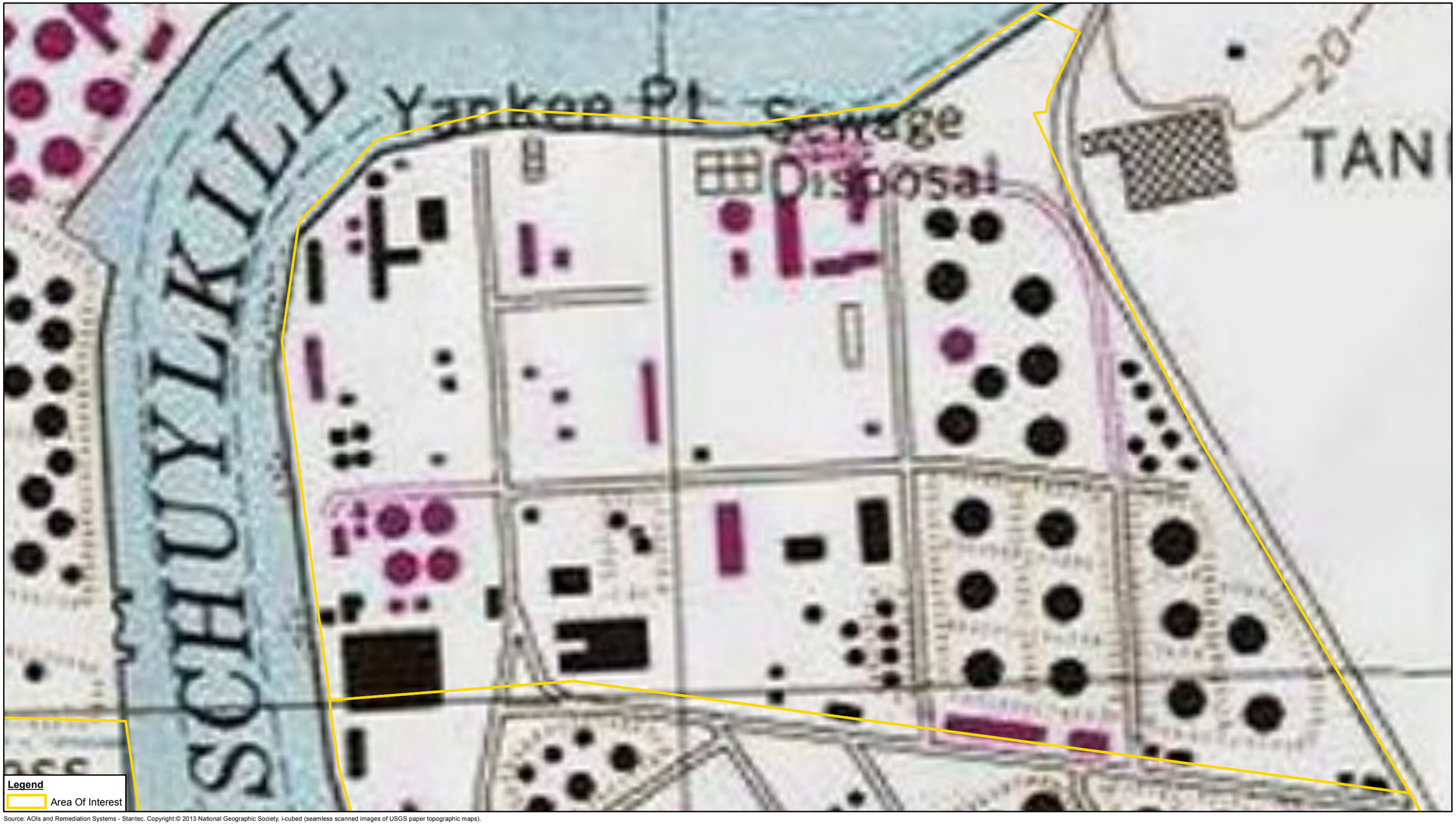
Christine J. Miller

CM/sk/1

Encl.

cc: Tiffani Doerr - Evergreen Resources Management Operations
David Steele - GHD Services, Inc.

Figures



Source: AOIs and Remediation Systems - Stantec. Copyright:© 2013 National Geographic Society, i-cubed (seamless scanned images of USGS paper topographic maps).
Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, June 2014

0 100 200 300
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania
South FIPS 3702 Feet

N

GHD

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA REFINERY OPERATIONS

11109626
Sep 26, 2016

FIGURE 1

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\NATU001\11109614-00(NATU001)GIS-WA002.mxd



Source: AOIs and Remediation Systems - Stantec
Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation, June 2014

0 100 200 300
Feet

Coordinate System:
NAD 1983 StatePlane Pennsylvania
South FIPS 3702 Feet

EVERGREEN RESOURCES MANAGEMENT
AOI-7 PHILADELPHIA REFINERY OPERATIONS

11109626
Sep 26, 2016

FIGURE 2

GIS File: Q:\GIS\PROJECTS\11109000s\11109614\Layouts\NATU001\11109614-00(NATU001)GIS-WA001.mxd

Attachment
PNDI Receipt

1. PROJECT INFORMATION

Project Name: **PES AOI 7**
Date of Review: **9/23/2016 03:50:55 PM**
Project Category: **Hazardous Waste Clean-up, Site Remediation, and Reclamation, Other**
Project Area: **132.63 acres**
County(s): **Philadelphia**
Township/Municipality(s): **PHILADELPHIA**
ZIP Code: **19145**
Quadrangle Name(s): **PHILADELPHIA**
Watersheds HUC 8: **Schuylkill**
Watersheds HUC 12: **City of Philadelphia-Schuylkill River**
Decimal Degrees: **39.907028, -75.208894**
Degrees Minutes Seconds: **39° 54' 25.2995" N, 75° 12' 32.172" W**

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) must comply with the bog turtle habitat screening requirements of the PASPGP.

PES AOI 7



Project Boundary

Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

PES AOI 7



Project Boundary

Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PFBC Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

Scientific Name	Common Name	Current Status
Sensitive Species**		Endangered
Sensitive Species**		Threatened
Sensitive Species**		Endangered

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

NOT FOR ACTUAL USE DRAFT

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).
***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov
Fax:(717) 772-0271

PA Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane, Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Alissa Cannon
Company/Business Name: GHD
Address: 410 Eagleview Blvd Suite 110
City, State, Zip: Exton, PA 19341
Phone:(610) 646-7461 Fax:(610) 321-2763
Email: alissa.cannon@ghd.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

Alissa Cannon
applicant/project proponent signature

09/26/2016
date

Pennsylvania Fish & Boat Commission
established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823
814-359-5237

November 3, 2016

IN REPLY REFER TO
SIR# 46838

GHD
Alissa Cannon
410 Eagleview Blvd.
Exton, Pennsylvania 19341

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 613690_1
PES AOI 7
PHILADELPHIA County: Philadelphia City

Dear Alissa Cannon:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Robert Morgan at 814-359-5129 and refer to the SIR # 46838. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,



Christopher A. Urban, Chief
Natural Diversity Section

CAU/RTM/dn

Appendix I
Copies of Referenced Consultant Reports (USB Flash Drive)

Appendix J
Historical Data

Table J1 - Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-49	C-50		C-50D		C-51		C-52	C-54		C-57	C-58	C-60	C-61	C-62	C-96				C-104	
Sample Date			21-Jul-16	27-Jul-16	2-Apr-13	2-Apr-13	20-Jul-16	27-Jul-16	27-Jul-16	27-Jul-16	21-Jul-16	19-Aug-16	26-Jul-16	25-Jul-16	21-Jul-16	25-Jul-16	27-Jul-16	21-Jul-16	8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14
Sample ID			GW-11109614-C-49-072116-JM-005	GW-11109614-C-50-072716-JM-022	C-50D_40213	C-50D_40213	GW-11109614-C-50D-072016-AC-003	GW-11109614-C-51-072716-JM-024	GW-11109614-C-51D-072716-JM-026	GW-11109614-C-52-072716-AC-027	GW-11109614-C-54-072116-AC-006	GW-11109614-C54 081916-AC-03	GW-11109614-C-57-072616-JM-018	GW-11109614-C-58-072516-JM-014	GW-11109614-C-60-072116-AC-008	GW-11109614-C-61-072516-AC-013	GW-11109614-C-62-072716-JM-028	GW-11109614-C-96-072116-JM-009	C-104	C-104_040813	C-104_040813	C-104	C-104
Sampling Company			GHD	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order			1686199	1688921	JB33050	JB33050	1686199	1688921	1688921	1688921	1686199	1698036	1687764	1687764	1686199	1687764	1688921	1686199	20140718EZ	JB33644	JB33644	JB68336	JB68336
Laboratory Sample ID	Units	MSC-PA	8489355	8501210	JB33050-3	JB33050-3F	8489351	8501212	8501214	8501215	8489353	8541533	8496061	8496057	8489354	8496056	8501216	8489357	UNKNOWN	JB33644-11	JB33644-11F	JB68336-16	JB68336-16F
Field Parameters																							
CONDUCTIVITY	mS/cm	n/v	1.815	0.89	-	-	1.22	0.667	0.667	0.614	1.21	-	1.798	7.055	1.18	1.14	2.999	1.655	-	-	-	-	-
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	8.54	3.31	-	-	0	2.84	2.84	7.18	3.47	-	2.87	0.34	6.06	4.13	2.18	7.8	-	-	-	-	-
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-157.6	-174.8	-	-	-123	-120.6	-120.6	-86	-48	-	-163.3	-165.3	-63	-77	-167.2	-142	-	-	-	-	-
pH, FIELD MEASURED	S.U.	n/v	6.84	7.2	-	-	6.89	6.8	6.8	6.62	7.56	-	6.88	6.8	6.67	7.11	7.38	6.99	-	-	-	-	-
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	17.45	22.86	-	-	18.36	25.2	25.2	26.05	30.9	-	17.73	30.06	29.17	32.3	22.04	19.63	-	-	-	-	-
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	52.8	288.4	-	-	43.1	39.8	39.8	0.1	156	-	177	147.3	27.3	26.2	277	192.2	-	-	-	-	-
Volatile Organic Compounds																							
BENZENE	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	*ND (10)* (0.5)	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	*ND (10)* (0.5)	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-
ETHYLBENZENE	µg/L	700	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (2) (0.5)	0.6 J (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	3 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	2 J (0.5)	ND (10) (0.5)	ND (20) (0.5)	-	ND (2) (0.45)	-	ND (1.0) (0.26)	-
METHYL TERTIARY BUTYL ETHER	µg/L	20	1 (0.5)	ND (1) (0.5)	ND (1.0) (0.16)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	1 (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)	-	ND (1) (0.16)	-	ND (1.0) (0.26)	-
TOLUENE	µg/L	1000	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (10) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-
TOTAL BTEX	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.62 ()	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	0.6 J (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	8 (0.5)	ND (10) (0.5)	ND (20) (0.5)	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	2 (0.5)	ND (10) (0.5)	ND (20) (0.5)	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	1 (0.5)	ND (5) (0.5)	ND (10) (0.5)	-	0.62 J (0.24)	-	ND (1.0) (0.20)	-
Volatile Organic Compounds (SW8011)																							
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-
Semi-Volatile Organic Compounds																							
ANTHRACENE	µg/L	66	0.19 (0.010)	0.028 J (0.010)	ND (0.10) (0.020)	-	0.17 (0.010)	0.15 (0.010)	0.32 (0.010)	0.14 (0.010)	0.032 J (0.010)	0.045 J (0.010)	0.98 (0.010)	0.15 (0.010)	0.069 (0.010)	0.19 (0.010)	0.33 (0.010)	0.49 (0.010)	-	0.364 (0.02)	-	ND (0.10) (0.021)	-
BENZO(A)ANTHRACENE	µg/L	4.9	0.017 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	0.16 (0.010)	0.060 (0.010)	0.12 (0.010)	0.033 J (0.010)	0.026 J (0.010)	0.034 J (0.010)	1.2 (0.010)	0.050 J (0.010)	0.025 J (0.010)	0.12 (0.010)	0.26 (0.010)	0.27 (0.010)	-	ND (0.1) (0.012)	-	0.260 (0.012)	-
BENZO(A)PYRENE	µg/L	0.2	ND (0.052) (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	***0.24 (0.010)***	0.019 J (0.010)	0.053 (0.010)	0.025 J (0.010)	0.027 J (0.010)	0.034 J (0.010)	***1.1 (0.010)***	0.013 J (0.010)	0.012 J (0.010)	0.054 (0.010)	***0.30 (0.010)***	0.19 (0.010)	-	ND (0.1) (0.012)	-	***0.201 (0.013)***	-
BENZO(B)FLUORANTHENE	µg/L	1.2	0.013 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.010)	-	0.23 (0.010)	0.031 J (0.010)	0.071 (0.010)	0.042 J (0.010)	0.035 J (0.010)	0.032 J (0.010)	1.2 (0.010)	0.015 J (0.010)	0.020 J (0.010)	0.042 J (0.010)	0.34 (0.010)	0.20 (0.010)	-	ND (0.1) (0.01)	-	0.240 (0.010)	-
BENZO(G,H,I)PERYLENE	µg/L	0.26	0.012 J (0.010)	ND (0.051) (0.010)	ND (0.10) (0.016)	-	0.15 (0.010)	0.015 J (0.010)	0.041 J (0.010)	0.020 J (0.010)	0.020 J (0.010)	0.026 J (0.010)	***0.58 (0.010)***	ND (0.052) (0.010)	0.012 J (0.010)	0.018 J (0.010)	0.22 (0.010)	0.10 (0.010)	-	ND (0.1) (0.016)	-	0.122 (0.016)	-
CHRYSENE	µg/L	1.9	ND (0.052) (0.010)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	0.15 (0.010)	0.059 (0.010)	0.13 (0.010)	0.043 J (0.010)	0.029 J (0.010)	0.035 J (0.010)	1.3 (0.010)	0.053 (0.010)	0.017 J (0.010)	0.11 (0.010)	0.28 (0.010)	0.30 (0.010)	-	ND (0.1) (0.012)	-	0.202 (0.012)	-
FLUORENE	µg/L	1900	0.011 J (0.010)	0.051 (0.010)	ND (0.10) (0.017)	-	0.71 (0.010)	0.99 (0.010)	1.8 (0.010)	0.010 J (0.010)	0.013 J (0.010)	0.025 J (0.010)	1.9 (0.010)	0.57 (0.010)	0.012 J (0.010)	1.1 (0.010)	0.64 (0.010)	0.96 (0.010)	-	2.35 (0.017)	-	ND (0.10) (0.017)	-
NAPHTHALENE	µg/L	100	ND (0.062) (0.030)	ND (0.061) (0.030)	ND (0.10) (0.036)	-	ND (0.060) (0.030)	0.041 J (0.030)	0.070 (0.030)	ND (0.060) (0.030)	0.045 J (0.030)	0.10 (0.030)	1.7 (0.030)	0.12 (0.030)	ND (0.062) (0.030)	1.4 (0.030)	ND (0.061) (0.030)	0.22 (0.030)	-	ND (0.1) (0.036)	-	ND (0.10) (0.036)	-
PHENANTHRENE	µg/L	1100	ND (0.062) (0.030)	ND (0.061) (0.030)	ND (0.10) (0.021)	-	0.20 (0.030)	0.096 (0.030)	0.22 (0.030)	0.11 (0.030)	ND (0.062) (0.030)	0.091 (0.030)	3.8 (0.030)	1.6 (0.030)	ND (0.062) (0.030)	0.16 (0.030)	1.2 (0.030)	2.0 (0.030)	-	0.633 (0.021)	-	0.161 (0.021)	-
PYRENE	µg/L	130	0.040 J (0.010)	0.065 (0.010)	ND (0.10) (0.015)	-	0.43 (0.010)	0.87 (0.010)	1.7 (0.010)	0.15 (0.010)	0.042 J (0.010)	0.055 (0.010)	2.2 (0.010)	0.61 (0.010)	0.091 (0.010)	0.85 (0.010)	0.46 (0.010)	1.1 (0.010)	-	0.641 (0.015)	-	0.429 (0.015)	-
Metals																							
ARSENIC	µg/L	10	-	-	***56.2 (0.97)***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	58600 (24)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	ND (3.0) (1.7)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	***3560 (0.40)***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																							
ARSENIC	µg/L	10	-	-	-	***17.2 (0.97)***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	36300 (24)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	ND (1.0) (0.090)	ND (1.0) (0.090)	-	ND (3.0) (1.7)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.11 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.19 J (0.090)	0.10 J (0.090)	-	-	ND (3) (1.7)	-	2.3 J (1.3)
MANGANESE	µg/L	300	-	-	-	***3310 (0.40)***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																							
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	396000 (5000)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	396000 (3500)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	272000 (48)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	270 (5.1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	10800 (400)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	43 B (5.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	43 B (4.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	ND (10) (1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	390 B (380)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	980 (28)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	242000 (2400)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	836000 (1800)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J1 - Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location						C-105	C-106	C-108	C-112	C-113	C-127								C-129				
Sample Date			21-May-15	24-May-16	26-Jul-16	25-Jul-16	1-Aug-16	28-Jul-16	29-Jul-16	21-Jul-16	8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14	21-May-15	24-May-16	26-Jul-16	8-Apr-13	8-Apr-13	8-Apr-13	3-Jun-14	3-Jun-14
Sample ID			C-104_20150521	C-104-20160524	GW-11109614-C-104-072616-AC-015	GW-11109614-C-105-072516-AC-011	GW-11109614-C-106-080116-AC-042	GW-11109614-C-108-072816-JM-034	GW-11109614-C-112-072916-JM-040	GW-11109614-C-113-072116-JM-007	C-127	C-127_040813	C-127_040813	C-127	C-127	C-127_20150521	C-127-20160524	GW-11109614-C-127-072616-AC-020	C-129	C-129_040813	C-129_040813	C-129	C-129
Sampling Company			STANTEC	STANTEC	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	GHD	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			LL	LL	LL	LL	LL	LL	LL	LL	UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	UNKNOWN	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order			1563553	1666456	1687764	1687764	1689795	1688921	1689254	1686199	20140718EZ	JB33644	JB33644	JB68336	JB68336	1563553	1666456	1687764	20140718EZ	JB33644	JB33644	JB68336	JB68336
Laboratory Sample ID	Units	MSC-PA	7900310	8402595	8496058	8496054	8504222	8501220	8502288	8489356	UNKNOWN	JB33644-12	JB33644-12F	JB68336-17	JB68336-17F	7900309	8402596	8496064	UNKNOWN	JB33644-13	JB33644-13F	JB68336-18	JB68336-18F
Field Parameters																							
CONDUCTIVITY	mS/cm	n/v	-	-	1.14	0.74	NM	1.04	1.23	0.545	-	-	-	-	-	-	-	1.64	-	-	-	-	-
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	1.78	4.1	4.11	3.81	NM	1.11	6.34	5.74	-	-	-	-	-	0.81	3.01	2.71	-	-	-	-	-
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-110	-139	-129	-81	NM	-99.9	-88	-108.2	-	-	-	-	-	-109	-131	-115	-	-	-	-	-
pH, FIELD MEASURED	S.U.	n/v	7.88	7.47	6.96	6.61	NM	6.43	6.44	7.25	-	-	-	-	-	7.8	7.42	6.76	-	-	-	-	-
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	1.18	0.958	-	-	-	-	-	-	-	-	-	-	-	2.39	1.54	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	13.6	14.75	24.77	22.75	NM	21.75	22.38	24.02	-	-	-	-	-	14.88	16.33	27.22	-	-	-	-	-
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	0.754	0.612	-	-	-	-	-	-	-	-	-	-	-	1.55	0.982	-	-	-	-	-	-
TURBIDITY	NTU	n/v	195	39.6	39.2	117	NM	73.6	269	32.2	-	-	-	-	-	30.8	17.3	11.4	-	-	-	-	-
Volatile Organic Compounds																							
BENZENE	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (0.50) (0.21)	-
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.26)	-	ND (1.0) (0.30)	-
ETHYLBENZENE	µg/L	700	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.40)	-
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	2.2 (0.45)	-	3.6 (0.26)	-	2 (0.5)	4 (0.5)	6 (0.5)	-	ND (2) (0.45)	-	ND (1.0) (0.26)	-
METHYL TERTIARY BUTYL ETHER	µg/L	20	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	7.5 (0.16)	-	4.4 (0.26)	-	6 (0.5)	5 (0.5)	5 (0.5)	-	ND (1) (0.16)	-	ND (1.0) (0.26)	-
TOLUENE	µg/L	1000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.23)	-	ND (1.0) (0.22)	-
TOTAL BTEX	µg/L	n/v	ND	ND	-	-	-	-	-	-	0.57 ()	-	-	-	-	ND	ND	-	ND	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	-	ND (2) (0.19)	-	ND (2.0) (0.19)	-
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	-	ND (2) (0.36)	-	ND (2.0) (0.17)	-
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	-	0.57 J (0.24)	-	0.22 J (0.20)	-	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	-	ND (1) (0.24)	-	ND (1.0) (0.20)	-
Volatile Organic Compounds (SW8011)																							
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.0096) (0.010)	ND (0.0096) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-	ND (0.0097) (0.010)	ND (0.0097) (0.010)	ND (0.028) (0.010)	-	ND (0.02) (0.011)	-	ND (0.020) (0.011)	-
Semi-Volatile Organic Compounds																							
ANTHRACENE	µg/L	66	1 (0.1)	0.5 J (0.1)	0.47 (0.010)	0.089 (0.010)	0.40 (0.010)	0.073 (0.010)	0.13 (0.010)	0.061 (0.010)	-	0.285 (0.02)	-	0.281 (0.021)	-	0.5 J (0.1)	0.4 J (0.1)	0.59 (0.010)	-	ND (0.1) (0.02)	-	ND (0.10) (0.020)	-
BENZO(A)ANTHRACENE	µg/L	4.9	0.8 (0.1)	0.1 J (0.1)	0.15 (0.010)	0.080 (0.010)	0.26 (0.010)	0.018 J (0.010)	0.098 (0.010)	0.034 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-	0.1 J (0.1)	0.1 J (0.1)	0.11 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-
BENZO(A)PYRENE	µg/L	0.2	***0.6 (0.1)***	ND (0.1) (0.1)	0.036 J (0.010)	0.040 J (0.010)	0.19 (0.010)	ND (0.050) (0.010)	0.069 (0.010)	0.017 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.013)	-	ND (0.1) (0.1)	0.1 J (0.1)	0.079 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-
BENZO(B)FLUORANTHENE	µg/L	1.2	0.5 J (0.1)	ND (0.1) (0.1)	0.044 J (0.010)	0.041 J (0.010)	0.27 (0.010)	0.012 J (0.010)	0.078 (0.010)	0.018 J (0.010)	-	ND (0.1) (0.01)	-	ND (0.10) (0.010)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	0.058 (0.010)	-	ND (0.1) (0.01)	-	ND (0.10) (0.010)	-
BENZO(G,H,I)PERYLENE	µg/L	0.26	***0.3 J (0.1)***	ND (0.1) (0.1)	0.014 J (0.010)	0.018 J (0.010)	0.049 J (0.010)	ND (0.050) (0.010)	0.022 J (0.010)	0.011 J (0.010)	-	ND (0.1) (0.016)	-	ND (0.10) (0.016)	-	ND (0.1) (0.1)	***0.6 (0.1)***	***0.36 (0.010)***	-	ND (0.1) (0.016)	-	ND (0.10) (0.016)	-
CHRYSENE	µg/L	1.9	1 (0.1)	0.1 J (0.1)	0.17 (0.010)	0.088 (0.010)	0.33 (0.010)	0.017 J (0.010)	0.10 (0.010)	0.034 J (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-	0.2 J (0.1)	ND (0.1) (0.1)	0.13 (0.010)	-	ND (0.1) (0.012)	-	ND (0.10) (0.012)	-
FLUORENE	µg/L	1900	7 (0.1)	6 (0.1)	3.2 (0.010)	0.23 (0.010)	0.76 (0.010)	0.076 (0.010)	0.68 (0.010)	0.057 (0.010)	-	1.64 (0.017)	-	2.15 (0.018)	-	4 (0.1)	3 (0.1)	1.1 (0.010)	-	ND (0.1) (0.017)	-	ND (0.10) (0.017)	-
NAPHTHALENE	µg/L	100	0.2 J (0.1)	ND (0.1) (0.1)	ND (0.061) (0.030)	0.063 (0.030)	0.15 (0.030)	0.054 J (0.030)	0.079 (0.030)	ND (0.061) (0.030)	-	ND (0.1) (0.036)	-	ND (0.10) (0.037)	-	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.063) (0.030)	-	ND (0.1) (0.036)	-	ND (0.10) (0.036)	-
PHENANTHRENE	µg/L	1100	3 (0.1)	0.3 J (0.1)	0.25 (0.030)	0.038 J (0.030)	1.5 (0.030)	ND (0.060) (0.030)	0.25 (0.030)	0.17 (0.030)	-	ND (0.1) (0.021)	-	0.225 (0.022)	-	0.1 J (0.1)	0.3 J (0.1)	0.30 (0.030)	-	ND (0.1) (0.021)	-	ND (0.10) (0.021)	-
PYRENE	µg/L	130	3 (0.1)	2 (0.1)	1.9 (0.010)	0.31 (0.010)	0.93 (0.010)	0.039 J (0.010)	0.38 (0.010)	0.15 (0.010)	-	0.59 (0.015)	-	0.440 (0.015)	-	1 (0.1)	0.7 (0.1)	0.92 (0.010)	-	ND (0.1) (0.015)	-	ND (0.10) (0.015)	-
Metals																							
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																							
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	ND (0.082) (0.082)	ND (0.13) (0.13)	ND (1.0) (0.090)	0.13 J (0.090)	0.10 J (0.090)	0.17 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	-	-	ND (3) (1.7)	-	ND (3.0) (1.3)	ND (0.082) (0.082)	ND (0.13) (0.13)	ND (1.0) (0.090)	-	-	ND (3) (1.7)	-	2.2 J (1.3)
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																							
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J1 - Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-129D							C-130	C-131			C-132	C-134D				C-136	C-140	C-142	C-144D		
Sample Date			21-May-15	24-May-16	1-Aug-16	2-Apr-13	2-Apr-13	21-Jul-16	19-Aug-16	25-Jul-16	26-Jul-16	19-Aug-16	25-Jul-16	1-Apr-13	1-Apr-13	20-Jul-16	19-Aug-16	29-Jul-16	26-Jul-16	28-Jul-16	2-Apr-13	2-Apr-13	20-Jul-16
Sample ID			C-129_20150521	C-129-20160524	GW-11109614-C-129-080116-AC-041	C-129D_40213	C-129D_40213	GW-11109614-C-129D-072116-AC-004	GW-11109614-C129D-081916-AC-01	GW-11109614-C-130-072516-JM-012	GW-11109614-C-131-072616-JM-016	GW-11109614-C131-081916-AC-04	GW-11109614-C-132-072516-JM-010	C-134D_40113	C-134D_40113	GW-11109614-C-134D-072016-AC-002	GW-11109614-C134D-081916-AC-02	GW-11109614-C-136-072916-JM-036	GW-11109614-C-140-072616-AC-017	GW-11109614-C-142-072816-JM-030	C-144D_40213	C-144D_40213	GW-11109614-C-144D-072016-AC-001
Sampling Company			STANTEC	STANTEC	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD	GHD	GHD	LANGAN	LANGAN	GHD	GHD	GHD	GHD	GHD	LANGAN	LANGAN	GHD
Laboratory			LL	LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	LL
Laboratory Work Order			1563553	1666456	1689795	JB33050	JB33050	1686199	1698036	1687764	1687764	1698036	1687764	JB32976	JB32976	1686199	1698036	1689254	1687764	1688921	JB33050	JB33050	1686199
Laboratory Sample ID	Units	MSC-PA	7900308	8402597	8504218	JB33050-4	JB33050-4F	8489352	8541531	8496055	8496059	8541534	8496053	JB32976-6	JB32976-6F	8489350	8541532	8502286	8496060	8501217	JB33050-5	JB33050-5F	8489349
Field Parameters																							
CONDUCTIVITY	mS/cm	n/v	-	-	0.715	-	-	0.73	-	0.518	4.212	-	0.574	-	-	0.725	-	1.6612	1.41	1.91	-	-	0.415
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	1.65	2.92	5.01	-	-	2.34	-	4.9	4.25	-	1.38	-	-	2.83	-	4.63	14.63	6.59	-	-	5.08
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	1	3	-17	-	-	-202	-	-101	-138.2	-	-173	-	-	-48	-	-35	-54	-122	-	-	64
pH, FIELD MEASURED	S.U.	n/v	8.5	8.04	7.4	-	-	7.53	-	7.78	7	-	7.47	-	-	6.58	-	6.5	7.51	6.93	-	-	9.26
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	0.748	0.584	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	14.52	16.16	23.21	-	-	20.17	-	19.28	20.01	-	22.6	-	-	22.45	-	21.05	25	30.43	-	-	21.88
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	0.479	0.372	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	39.6	31.4	76.6	-	-	0	-	63.4	230.3	-	50	-	-	76.4	-	11.6	93.2	0	-	-	0
Volatile Organic Compounds																							
BENZENE	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	0.6 J (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.26)	-	ND (1) (0.5)
ETHYLBENZENE	µg/L	700	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	0.7 J (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)	ND (2) (0.5)	0.5 J (0.5)	ND (2) (0.5)	130 (0.5)	ND (2.0) (0.45)	-	ND (2) (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	0.82 J (0.16)	-	1 (0.5)	0.6 J (0.5)	ND (1) (0.5)	13 (0.5)	11 (0.5)	ND (1) (0.5)	0.92 J (0.16)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	2.4 (0.16)	-	ND (1) (0.5)
TOLUENE	µg/L	1000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	0.6 J (0.5)	ND (1.0) (0.23)	-	ND (1) (0.5)
TOTAL BTEX	µg/L	n/v	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.19)	-	ND (2) (0.5)
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2.0) (0.36)	-	ND (2) (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (0.5) (0.5)	ND (0.5) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1.0) (0.24)	-	ND (1) (0.5)
Volatile Organic Compounds (SW8011)																							
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.0096) (0.010)	ND (0.0097) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.020) (0.011)	-	ND (0.029) (0.010)
Semi-Volatile Organic Compounds																							
ANTHRACENE	µg/L	66	ND (0.1) (0.1)	ND (0.1) (0.1)	0.031 J (0.010)	ND (0.10) (0.020)	-	0.016 J (0.010)	0.041 J (0.010)	ND (0.050) (0.010)	1.4 (0.010)	0.32 (0.010)	0.082 (0.010)	ND (0.10) (0.020)	-	0.011 J (0.010)	ND (0.050) (0.010)	0.080 (0.010)	0.15 (0.010)	0.61 (0.010)	ND (0.10) (0.020)	-	ND (0.050) (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	ND (0.1) (0.1)	ND (0.1) (0.1)	0.014 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)	0.61 (0.010)	0.034 J (0.010)	0.061 (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.058 (0.010)	0.037 J (0.010)	0.17 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)
BENZO(A)PYRENE	µg/L	0.2	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.051) (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)	***0.43 (0.010)***	ND (0.050) (0.010)	0.031 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.026 J (0.010)	0.026 J (0.010)	0.14 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)
BENZO(B)FLUORANTHENE	µg/L	1.2	ND (0.1) (0.1)	ND (0.1) (0.1)	0.013 J (0.010)	ND (0.10) (0.010)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.014 J (0.010)	0.42 (0.010)	0.012 J (0.010)	0.044 J (0.010)	ND (0.10) (0.010)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.029 J (0.010)	0.031 J (0.010)	0.092 (0.010)	ND (0.10) (0.010)	-	ND (0.050) (0.010)
BENZO(G,H,I)PERYLENE	µg/L	0.26	ND (0.1) (0.1)	ND (0.1) (0.1)	0.011 J (0.010)	ND (0.10) (0.016)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.050) (0.010)	0.23 (0.010)	ND (0.050) (0.010)	0.024 J (0.010)	ND (0.10) (0.016)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	ND (0.051) (0.010)	0.020 J (0.010)	0.064 (0.010)	ND (0.10) (0.016)	-	ND (0.050) (0.010)
CHRYSENE	µg/L	1.9	ND (0.1) (0.1)	ND (0.1) (0.1)	0.015 J (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.012 J (0.010)	0.67 (0.010)	0.044 J (0.010)	0.077 (0.010)	ND (0.10) (0.012)	-	ND (0.051) (0.010)	ND (0.050) (0.010)	0.063 (0.010)	0.035 J (0.010)	0.33 (0.010)	ND (0.10) (0.012)	-	ND (0.050) (0.010)
FLUORENE	µg/L	1900	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.051) (0.010)	0.207 (0.017)	-	0.035 J (0.010)	0.11 (0.010)	ND (0.050) (0.010)	3.9 (0.010)	0.67 (0.010)	0.074 (0.010)	ND (0.10) (0.017)	-	0.075 (0.010)	ND (0.050) (0.010)	0.25 (0.010)	1.3 (0.010)	1.2 (0.010)	ND (0.10) (0.017)	-	ND (0.050) (0.010)
NAPHTHALENE	µg/L	100	ND (0.1) (0.1)	ND (0.1) (0.1)	0.18 (0.030)	ND (0.10) (0.036)	-	ND (0.061) (0.030)	0.095 (0.030)	ND (0.060) (0.030)	0.65 (0.030)	0.072 (0.030)	0.038 J (0.030)	ND (0.10) (0.036)	-	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.061) (0.030)	0.34 (0.030)	0.27 (0.030)	ND (0.10) (0.036)	-	ND (0.060) (0.030)
PHENANTHRENE	µg/L	1100	ND (0.1) (0.1)	ND (0.1) (0.1)	ND (0.061) (0.030)	ND (0.10) (0.021)	-	ND (0.061) (0.030)	0.13 (0.030)	ND (0.060) (0.030)	0.63 (0.030)	0.15 (0.030)	0.041 J (0.030)	ND (0.10) (0.021)	-	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.061) (0.030)	0.30 (0.030)	0.38 (0.030)	0.203 (0.021)	-	ND (0.060) (0.030)
PYRENE	µg/L	130	ND (0.1) (0.1)	ND (0.1) (0.1)	0.040 J (0.010)	ND (0.10) (0.015)	-	0.14 (0.010)	0.071 (0.010)	0.011 J (0.010)	2.1 (0.010)	0.31 (0.010)	0.59 (0.010)	ND (0.10) (0.015)	-	0.033 J (0.010)	ND (0.050) (0.010)	0.33 (0.010)	0.35 (0.010)	0.38 (0.010)	0.173 (0.015)	-	ND (0.050) (0.010)
Metals																							
ARSENIC	µg/L	10	-	-	-	2.6 J (0.97)	-	-	-	-	-	-	-	4.9 (0.97)	-	-	-	-	-	-	***10.6 (0.97)***	-	-
COBALT	µg/L	35	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	1.7 J (0.59)	-	-
IRON	µg/L	n/v	-	-	-	76100 (24)	-	-	-	-	-	-	-	17100 (24)	-	-	-	-	-	-	23100 (24)	-	-
LEAD	µg/L	5	-	-	-	2.2 J (1.7)	-	-	-	-	-	-	-	***5.7 (1.7)***	-	-	-	-	-	-	ND (3.0) (1.7)	-	-
MANGANESE	µg/L	300	-	-	-	***1540 (0.40)***	-	-	-	-	-	-	-	***785 (0.40)***	-	-	-	-	-	-	95.9 (0.40)	-	-
MERCURY	µg/L	2	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	ND (0.20) (0.089)	-	-
Metals, Dissolved																							
ARSENIC	µg/L	10	-	-	-	-	ND (3.0) (0.97)	-	-	-	-	-	-	-	2.1 J (0.97)	-	-	-	-	-	-	1.9 J (0.97)	-
COBALT	µg/L	35	-	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	-	*ND (50)* (0.59)	-	-	-	-	-	-	1.6 J (0.59)	-
IRON	µg/L	n/v	-	-	-	-	54300 (24)	-	-	-	-	-	-	-	1150 (24)	-	-	-	-	-	-	4470 (24)	-
LEAD	µg/L	5	0.13 J (0.082)	ND (0.13) (0.13)	0.42 J (0.090)	-	2.5 J (1.7)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	-	***6.0 (1.7)***	ND (1.0) (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.53 J (0.090)	0.17 J (0.090)	-	ND (3.0) (1.7)	ND (1.0) (0.090)
MANGANESE	µg/L	300	-	-	-	-	***1500 (0.40)***	-	-	-	-	-	-	-	***711 (0.40)***	-	-	-	-	-	-	84.9 (0.40)	-
MERCURY	µg/L	2	-	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	-	ND (0.20) (0.089)	-	-	-	-	-	-	ND (0.20) (0.089)	-
General Chemistry																							
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	447000 (5000)	-	-	-	-	-	-	-	382000 (5000)	-	-	-	-	-	-	448000 (5000)	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	447000 (3500)	-	-	-	-	-	-	-	383000 (3500)	-	-	-	-	-	-	448000 (3500)	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	33200 (48)	-	-	-	-	-	-	-	136000 (48)	-	-	-	-	-	-	45200 (48)	-	-
FLUORIDE	µg/L	4000	-	-	-	83 B (5.1)	-	-	-	-	-	-	-	740 (5.1)	-	-	-	-	-	-	330 (5.1)	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	***32400 (1600)***	-	-	-	-	-	-	-	16200 (1200)	-	-	-	-	-	-	***35000 (1800)***	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	36 B (5.6)	-	-	-	-	-	-	-	30 B (5.6)	-	-	-	-	-	-	22 B (5.6)	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	36 B (4.6)	-	-	-	-	-	-	-	30 B (4.6)	-	-	-	-	-	-	22 B (4.6)	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	ND (10) (1)	-	-	-	-	-	-	-	ND (10) (1)	-	-	-	-	-	-	ND (10) (1)	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	600 B (380)	-	-	-	-	-	-	-	11200 (380)	-	-	-	-	-	-	2400 B (380)	-	-
SULFIDE	µg/L	n/v	-	-	-	1200 B (280)	-	-	-	-	-	-	-	410 B (280)	-	-	-	-	-	-	ND (2000) (280)	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	249000 (2400)	-	-	-	-	-	-	-	2900 (240)	-	-	-	-	-	-	267000 (4800)	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	485000 (1800)	-	-	-	-	-	-	-	544000 (1800)	-	-	-	-	-	-	312000 (1800)	-	-

Table J1 - Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location			C-145	C-146	C-150	C-152		C-157	C-161	C-163		C-168	C-169	C-170			C-171		C-172	
Sample Date			27-Jul-16	1-Aug-16	1-Aug-16	29-Jul-16	19-Aug-16	28-Jul-16	1-Aug-16	27-Jul-16	27-Jul-16	26-Jul-16	2-Aug-16	29-Jul-16	26-Aug-16	26-Aug-16	29-Jul-16	26-Aug-16	29-Jul-16	26-Aug-16
Sample ID			GW-11109614-C-145-072716-AC-025	GW-11109614-C-146-080116-JM-037	GW-11109614-C-150-080116-JM-039	GW-11109614-C-152-072916-AC-033	GW-11109614-C152-081916-AC-05	GW-11109614-C-157-072816-JM-032	GW-11109614-C-161-080116-JM-035	GW-11109614-C-163-072716-AC-021	GW-11109614-C-163D-072716-AC-023	GW-11109614-C-168-072616-AC-019	GW-11109614-C-169-080216-JM-043	GW-11109614-C-170-072916-AC-029	GW-11109614-C-170-082616-AC-001	GW-11109614-C-170D-082616-AC-002	GW-11109614-C-171-072916-AC-031	GW-11109614-C-171-082616-AC-003	GW-11109614-C-172-072916-JM-038	GW-11109614-C-172-082616-AC-004
Sampling Company			GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory			LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order			1688921	1689795	1689795	1689254	1698036	1688921	1689795	1688921	1688921	1687764	1689795	1689254	1700683	1700683	1689254	1700683	1689254	1700683
Laboratory Sample ID	Units	MSC-PA	8501213	8504220	8504221	8502285	8541535	8501219	8504219	8501209	8501211	8496062	8504223	8502282	8553542	8553543	8502283	8553545	8502287	8553546
Field Parameters																				
CONDUCTIVITY	mS/cm	n/v	1.26	NM	NM	NM	-	1.155	NM	1.66	1.66	NM	NM	4.03	4.96	-	2.44	2.45	0.995	1.63
DISSOLVED OXYGEN, FIELD MEASURED	mg/L	n/v	1.54	NM	NM	NM	-	4	NM	NM	NM	NM	NM	7.15	23.13	-	1.63	2.08	3.64	0.68
OXIDATION REDUCTION POTENTIAL, FIELD MEASURED	mV	n/v	-116	NM	NM	NM	-	-86.4	NM	-114	-114	NM	NM	-126	-162	-	-121	-158	-48	-112
pH, FIELD MEASURED	S.U.	n/v	6.88	NM	NM	NM	-	6.89	NM	6.82	6.82	NM	NM	6.76	6.98	-	6.53	6.71	6.4	6.41
SPECIFIC CONDUCTANCE FIELD	mS/cm	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPERATURE, FIELD MEASURED	deg c	n/v	28.1	NM	NM	NM	-	26.68	NM	23.99	23.99	NM	NM	25.11	21.44	-	23.28	21.67	22.49	25.55
TOTAL DISSOLVED SOLIDS, FIELD MEASURED	g/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TURBIDITY	NTU	n/v	504	NM	NM	NM	-	10	NM	0	0	NM	NM	310	711	-	0	1000.00 >	178.7	1000.00 >
Volatile Organic Compounds																				
BENZENE	µg/L	5	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	***51 (0.5)***	2 (0.5)	ND (1) (0.5)	1 (0.5)	ND (1) (0.5)	ND (1) (0.5)	***600 (0.5)***	***370 (0.5)***	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
1,2-DICHLOROETHANE (EDC)	µg/L	5	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ETHYLBENZENE	µg/L	700	ND (1) (0.5)	ND (5) (0.5)	16 (0.5)	3 (0.5)	ND (1) (0.5)	ND (1) (0.5)	7 (0.5)	ND (1) (0.5)	ND (1) (0.5)	79 (0.5)	150 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
ISOPROPYLBENZENE (CUMENE)	µg/L	3500	ND (2) (0.5)	130 (0.5)	59 (0.5)	15 (0.5)	3 (0.5)	ND (2) (0.5)	31 (0.5)	1 J (0.5)	1 J (0.5)	22 (0.5)	34 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	0.7 J (0.5)	0.7 J (0.5)
METHYL TERTIARY BUTYL ETHER	µg/L	20	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (5) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
TOLUENE	µg/L	1000	ND (1) (0.5)	ND (5) (0.5)	3 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	14 (0.5)	210 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
TOTAL BTEX	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	µg/L	62	ND (2) (0.5)	46 (0.5)	***130 (0.5)***	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	14 (0.5)	ND (2) (0.5)	ND (2) (0.5)	***170 (0.5)***	***250 (0.5)***	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
1,3,5-TRIMETHYLBENZENE	µg/L	1200	ND (2) (0.5)	14 (0.5)	48 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	3 (0.5)	ND (2) (0.5)	ND (2) (0.5)	65 (0.5)	72 (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)	ND (2) (0.5)
XYLENES, TOTAL (DIMETHYLBENZENE)	µg/L	10000	ND (1) (0.5)	8 (0.5)	190 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	0.7 J (0.5)	0.6 J (0.5)	470 (0.5)	600 (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)	ND (1) (0.5)
Volatile Organic Compounds (SW8011)																				
1,2-DIBROMOETHANE (EDB)	µg/L	0.05	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	0.027 J (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)	ND (0.028) (0.010)	ND (0.029) (0.010)
Semi-Volatile Organic Compounds																				
ANTHRACENE	µg/L	66	0.45 (0.010)	***220 (0.010)***	20 (0.010)	0.18 (0.010)	0.079 (0.010)	0.039 J (0.010)	1.4 (0.010)	0.50 (0.010)	0.36 (0.010)	0.96 (0.010)	14 (0.010)	0.17 (0.010)	0.19 (0.010)	0.24 (0.010)	0.25 (0.010)	0.32 (0.010)	0.23 (0.010)	0.58 (0.010)
BENZO(A)ANTHRACENE	µg/L	4.9	0.53 (0.010)	***190 (0.010)***	***10 (0.010)***	0.078 (0.010)	0.037 J (0.010)	0.012 J (0.010)	0.87 (0.010)	0.065 (0.010)	0.055 (0.010)	1.6 (0.010)	4.9 (0.010)	0.017 J (0.010)	0.040 J (0.010)	0.037 J (0.010)	0.028 J (0.010)	0.042 J (0.010)	0.15 (0.010)	0.17 (0.010)
BENZO(A)PYRENE	µg/L	0.2	***0.40 (0.010)***	***130 (0.010)***	***5.6 (0.010)***	0.048 J (0.010)	0.030 J (0.010)	0.011 J (0.010)	***0.60 (0.010)***	0.032 J (0.010)	0.024 J (0.010)	***1.1 (0.010)***	***2.9 (0.010)***	0.011 J (0.010)	0.047 J (0.010)	0.041 J (0.010)	0.011 J (0.010)	0.027 J (0.010)	0.11 (0.010)	0.097 (0.010)
BENZO(B)FLUORANTHENE	µg/L	1.2	0.45 (0.010)	***170 (0.010)***	***6.8 (0.010)***	0.060 (0.010)	0.031 J (0.010)	0.017 J (0.010)	0.87 (0.010)	0.046 J (0.010)	0.034 J (0.010)	***1.4 (0.010)***	***3.1 (0.010)***	0.015 J (0.010)	0.048 J (0.010)	0.046 J (0.010)	0.014 J (0.010)	0.033 J (0.010)	0.13 (0.010)	0.12 (0.010)
BENZO(G,H,I)PERYLENE	µg/L	0.26	0.18 (0.010)	***38 (0.010)***	***1.3 (0.010)***	0.021 J (0.010)	0.018 J (0.010)	0.011 J (0.010)	0.22 (0.010)	0.020 J (0.010)	0.014 J (0.010)	***0.53 (0.010)***	***0.71 (0.010)***	ND (0.050) (0.010)	0.031 J (0.010)	0.031 J (0.010)	ND (0.051) (0.010)	0.027 J (0.010)	0.043 J (0.010)	0.047 J (0.010)
CHRYSENE	µg/L	1.9	0.68 (0.010)	***210 (0.010)***	***17 (0.010)***	0.12 (0.010)	0.061 (0.010)	0.011 J (0.010)	0.85 (0.010)	0.085 (0.010)	0.074 (0.010)	1.6 (0.010)	***19 (0.010)***	0.024 J (0.010)	0.033 J (0.010)	0.044 J (0.010)	0.021 J (0.010)	0.039 J (0.010)	0.16 (0.010)	0.18 (0.010)
FLUORENE	µg/L	1900	0.22 (0.010)	320 (0.010)	45 (0.010)	0.51 (0.010)	0.25 (0.010)	ND (0.050) (0.010)	5.8 (0.010)	2.2 (0.010)	1.7 (0.010)	3.9 (0.010)	50 (0.010)	0.022 J (0.010)	0.054 (0.010)	0.062 (0.010)	0.064 (0.010)	0.036 J (0.010)	2.8 (0.010)	6.2 (0.010)
NAPHTHALENE	µg/L	100	0.53 (0.030)	***830 (0.030)***	***110 (0.030)***	2.9 (0.030)	0.39 (0.030)	ND (0.060) (0.030)	3.5 (0.030)	ND (0.061) (0.030)	ND (0.060) (0.030)	ND (0.32) (0.030)	***360 (0.030)***	0.068 (0.030)	0.11 (0.030)	0.11 (0.030)	0.037 J (0.030)	0.071 (0.030)	0.16 (0.030)	0.25 (0.030)
PHENANTHRENE	µg/L	1100	0.46 (0.030)	1000 (0.030)	120 (0.030)	0.87 (0.030)	0.35 (0.030)	ND (0.060) (0.030)	5.6 (0.030)	0.89 (0.030)	0.58 (0.030)	3.0 (0.030)	170 (0.030)	ND (0.060) (0.030)	0.056 J (0.030)	0.059 J (0.030)	0.11 (0.030)	0.13 (0.030)	1.3 (0.030)	7.7 (0.030)
PYRENE	µg/L	130	1.5 (0.010)	***370 (0.010)***	28 (0.010)	0.30 (0.010)	0.17 (0.010)	0.042 J (0.010)	2.8 (0.010)	0.49 (0.010)	0.42 (0.010)	3.5 (0.010)	17 (0.010)	0.21 (0.010)	0.12 (0.010)	0.11 (0.010)	0.070 (0.010)	0.089 (0.010)	0.65 (0.010)	1.4 (0.010)
Metals																				
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Dissolved																				
ARSENIC	µg/L	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	µg/L	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	µg/L	5	0.19 J (0.090)	0.97 J (0.090)	ND (1.0) (0.090)	0.11 J (0.090)	0.12 J (0.090)	0.19 J (0.090)	0.19 J (0.090)	ND (1.0) (0.090)	ND (1.0) (0.090)	0.62 J (0.090)	ND (1.0) (0.090)	1.1 (0.090)	1.2 (0.090)	1.2 (0.090)	0.12 J (0.090)	0.64 J (0.090)	0.24 J (0.090)	0.77 J (0.090)
MANGANESE	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																				
ALKALINITY, BICARBONATE (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALKALINITY, TOTAL (AS CACO3)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLORIDE (AS CL)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORIDE	µg/L	4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, AMMONIA (AS N)	µg/L	30000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE (AS N)	µg/L	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRATE-NITRITE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROGEN, NITRITE	µg/L	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFATE (AS SO4)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CARBON	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	µg/L	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J1 - Historical Groundwater Analytical Results Summary - AOI 7 2013 to present
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Notes:

MSC-PA	Pennsylvania Department of Environmental Protection - 2016 Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Groundwater - Used Aquifer, Non Residential, TDS ≤ 2500
6.5	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.50)	Laboratory reporting limit was greater than the applicable standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value in database - 2016 values have been populated for Evergreen Comprehensive List only. Criteria for other analytes may be available but may not be represented here.
-	Parameter not analyzed / not available.
NM	Not measured.
>	Report value is greater than associated value
B	Indicates the analyte is detected in the associated blank as well as in the sample.
J	Indicates an estimated value.
µg/L	Micrograms per liter.
mg/L	Milligrams per liter.
mV	Millivolts.
S.U.	Standard Units.
mS/cm	Microsiemens per centimeter.
deg c	Degrees Celcius.
g/L	Grams per liter.
NTU	Nephelometric Turbidity Units.
LL	Eurofins Lancaster Laboratories Environmental
	Method detection limit is shown in second set of parentheses.

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-55	AOI7 BH-12-56	AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-74	AOI7 BH-12-75		AOI7 BH-12-76	AOI7 BH-12-78		AOI7 BH-12-79	AOI7 BH-12-82	AOI7 BH-12-83	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-91	AOI7 BH-12-92
Sample Date				29-Nov-12	29-Nov-12	30-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-46_0.5'	BH-12-47_1.5'	BH-12-55_1.5'	BH-12-56_2'	BH-12-67_2'	BH-12-68_1.5'	BH-12-69_2'	BH-12-70_2'	BH-12-74_1'	BH-12-75_1'	BH-12-75_2'	BH-12-76_1'	BH-12-78_1.0'	BH-12-78_2.0'	BH-12-79_1.0'	BH-12-82_1.0'	BH-12-83_1.0'	BH-12-85_1.5'	BH-12-87_1.0'	BH-12-91_0.5'	BH-12-92_0.5'
Sample Depth				0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22561	JB22561	JB22549	1352569	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-8	JB22561-9	JB22549-3	6876917	JB22561-4	JB22561-6	JB22561-1	6876924	6876913	6876926	6876914	6876910	JB22267-15	JB22267-16	JB22267-13	JB22267-14	JB22267-9	JB22267-7	JB22267-4	JB22267-1	JB22267-2
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	ND (0.00082) (0.00082	ND (0.092) (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.0005)	ND (0.0014) (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.0005)	0.027 (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	ND (0.00082) (0.00082	*ND (0.092)* (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	*ND (0.006)* (0.001)	*ND (0.006)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	ND (0.00082) (0.00082	ND (0.092) (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	ND (0.00082) (0.00082	ND (0.092) (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	ND (0.00082) (0.00082	ND (0.092) (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.0005)	0.0023 (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	-	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	-	-	-	-	-	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	ND (0.00082) (0.00082	0.288 (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.001)	ND (0.0014) (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.0041) (0.0041)	ND (0.46) (0.46)	ND (0.0042) (0.0042)	ND (0.005) (0.001)	ND (0.0070) (0.0070)	ND (0.0050) (0.0050)	ND (0.0040) (0.0040)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.0044) (0.0044)	ND (0.0052) (0.0052)	ND (0.0055) (0.0055)	ND (0.0049) (0.0049)	ND (0.0056) (0.0056)	ND (0.0078) (0.0078)	ND (0.0062) (0.0062)	ND (0.0044) (0.0044)	ND (0.0041) (0.0041)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	ND (0.00082) (0.00082	0.111 (0.092)	ND (0.00085) (0.00085	ND (0.005) (0.001)	0.0025 (0.0014)	ND (0.00099) (0.0009	ND (0.00079) (0.0007	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.00088) (0.0008	ND (0.0010) (0.0010)	ND (0.0011) (0.0011)	ND (0.00097) (0.0009	ND (0.0011) (0.0011)	ND (0.0016) (0.0016)	ND (0.0012) (0.0012)	ND (0.00088) (0.0008	ND (0.00083) (0.0008
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	ND (0.032) (0.032)	ND (0.39) (0.39)	0.0370 (0.037)	0.35 (0.003)	0.497 (0.071)	0.0890 (0.033)	5.04 (0.61)	ND (0.018) (0.003)	0.081 (0.003)	0.079 (0.003)	0.88 (0.003)	0.035 (0.003)	0.119 (0.033)	0.0605 (0.039)	0.0638 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.0562 (0.043)	0.223 (0.041)	0.0677 (0.038)	ND (0.034) (0.034)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	0.139 (0.032)	3.38 (0.39)	0.118 (0.037)	0.85 (0.003)	0.908 (0.071)	0.214 (0.033)	6.21 (0.61)	0.032 (0.003)	0.27 (0.003)	0.29 (0.003)	2.6 (0.003)	0.11 (0.003)	0.200 (0.033)	0.180 (0.039)	0.265 (0.037)	0.0384 (0.036)	ND (0.031) (0.031)	0.128 (0.043)	0.670 (0.041)	0.401 (0.038)	ND (0.034) (0.034)
BENZO(A)PYRENE	mg/kg	12^	12[B]	0.129 (0.032)	0.731 (0.39)	0.120 (0.037)	1.0 (0.003)	1.06 (0.071)	0.203 (0.033)	4.06 (0.61)	0.039 (0.003)	0.36 (0.003)	0.32 (0.003)	2.8 (0.003)	0.099 (0.003)	0.150 (0.033)	0.207 (0.039)	0.244 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.183 (0.043)	0.775 (0.041)	0.403 (0.038)	ND (0.034) (0.034)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	0.177 (0.032)	ND (0.39) (0.39)	0.125 (0.037)	1.3 (0.003)	0.943 (0.071)	0.185 (0.033)	3.28 (0.61)	0.057 (0.003)	0.47 (0.003)	0.44 (0.003)	3.5 (0.003)	0.13 (0.003)	0.176 (0.033)	0.235 (0.039)	0.282 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.259 (0.043)	0.815 (0.041)	0.760 (0.038)	ND (0.034) (0.034)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	0.166 (0.032)	ND (0.39) (0.39)	0.116 (0.037)	0.88 (0.003)	0.641 (0.071)	0.279 (0.033)	1.69 (0.61)	0.039 (0.003)	0.41 (0.003)	0.29 (0.003)	1.9 (0.003)	0.059 (0.003)	0.0889 (0.033)	0.222 (0.039)	0.179 (0.037)	0.106 (0.036)	ND (0.031) (0.031)	0.197 (0.043)	0.617 (0.041)	0.463 (0.038)	ND (0.034) (0.034)
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	0.199 (0.032)	1.82 (0.39)	0.124 (0.037)	0.89 (0.003)	1.61 (0.071)	0.201 (0.033)	5.53 (0.61)	0.032 (0.003)	0.45 (0.003)	0.39 (0.003)	2.9 (0.003)	0.14 (0.003)	0.205 (0.033)	0.202 (0.039)	0.253 (0.037)	0.0408 (0.036)	ND (0.031) (0.031)	0.159 (0.043)	0.718 (0.041)	0.622 (0.038)	ND (0.034) (0.034)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-46	AOI7 BH-12-47	AOI7 BH-12-55	AOI7 BH-12-56	AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-74	AOI7 BH-12-75		AOI7 BH-12-76	AOI7 BH-12-78		AOI7 BH-12-79	AOI7 BH-12-82	AOI7 BH-12-83	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-91	AOI7 BH-12-92
Sample Date				29-Nov-12	29-Nov-12	30-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12
Sample ID				BH-12-46_0.5'	BH-12-47_1.5'	BH-12-55_1.5'	BH-12-56_2'	BH-12-67_2'	BH-12-68_1.5'	BH-12-69_2'	BH-12-70_2'	BH-12-74_1'	BH-12-75_1'	BH-12-75_2'	BH-12-76_1'	BH-12-78_1.0'	BH-12-78_2.0'	BH-12-79_1.0'	BH-12-82_1.0'	BH-12-83_1.0'	BH-12-85_1.5'	BH-12-87_1.0'	BH-12-91_0.5'	BH-12-92_0.5'
Sample Depth				0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	1 - 1.5 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Laboratory Work Order		A	B	JB22561	JB22561	JB22549	1352569	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22561-8	JB22561-9	JB22549-3	6876917	JB22561-4	JB22561-6	JB22561-1	6876924	6876913	6876926	6876914	6876910	JB22267-15	JB22267-16	JB22267-13	JB22267-14	JB22267-9	JB22267-7	JB22267-4	JB22267-1	JB22267-2
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	ND (0.032) (0.032)	0.418 (0.39)	ND (0.037) (0.037)	0.076 (0.003)	0.510 (0.071)	ND (0.033) (0.033)	1.74 (0.030)	ND (0.018) (0.003)	ND (0.020) (0.003)	ND (0.019) (0.003)	0.33 (0.003)	ND (0.019) (0.003)	0.0695 (0.033)	ND (0.039) (0.039)	ND (0.037) (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	ND (0.043) (0.043)	0.0663 (0.041)	ND (0.038) (0.038)	ND (0.034) (0.034)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{SD}^	58_{SD}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	1.0 (0.003)	-	-	-	0.025 (0.003)	0.13 (0.003)	0.19 (0.003)	0.43 (0.003)	0.027 (0.003)	-	-	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	0.183 (0.032)	2.95 (0.39)	0.0855 (0.037)	0.64 (0.003)	1.02 (0.071)	0.197 (0.033)	17.9 (0.61)	0.026 (0.003)	0.41 (0.003)	0.32 (0.003)	2.7 (0.003)	0.16 (0.003)	0.584 (0.033)	0.115 (0.039)	0.243 (0.037)	ND (0.036) (0.036)	ND (0.031) (0.031)	0.0803 (0.043)	0.737 (0.041)	0.122 (0.038)	ND (0.034) (0.034)
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	0.237 (0.032)	ND (0.39) (0.39)	0.185 (0.037)	0.93 (0.003)	1.99 (0.071)	0.339 (0.033)	14.4 (0.61)	0.039 (0.003)	0.46 (0.003)	0.43 (0.003)	4.3 (0.003)	0.18 (0.003)	0.350 (0.033)	0.212 (0.039)	0.390 (0.037)	0.0396 (0.036)	ND (0.031) (0.031)	0.111 (0.043)	0.884 (0.041)	0.910 (0.038)	ND (0.034) (0.034)
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{TI}^	190_{TI}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	121 (7.0)	**2060**[B] (2.8)	112 (2.2)	**743**[B] (0.0044)	**583**[B] (2.4)	240 (2.2)	14.7 (2.2)	13.8 (0.0044)	254 (0.0044)	335 (0.0044)	**551**[B] (0.0044)	143 (0.0044)	237 (2.2)	128 (2.4)	**498**[B] (2.3)	116 (13)	16.2 (2.2)	145 (2.8)	**870**[B] (2.8)	291 (24)	30.2 (2.1)
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	16.0 (0.50)	-	-	-	6.5 (0.50)	14.7 (0.50)	12.5 (0.50)	13.8 (0.50)	9.5 (0.50)	-	-	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	86.9 (J)	72.6 (J)	85.7 (J)	-	79.6 (J)	86.8 (J)	94.0 (J)	-	-	-	-	-	88.9 (J)	79.5 (J)	83.5 (J)	75.8 (J)	92.2 (J)	68.3 (J)	75.1 (J)	81.6 (J)	86.3 (J)
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-94	AOI7 BH-12-98	AOI7 BH-12-99	AOI7-BH-13-45	AOI7-BH-13-46	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-13-50	AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007	AOI7-BH-16-008	AOI7-BH-16-009	AOI7-BH-16-010	AOI7-BH-16-011	AOI7-BH-16-012	AOI7-BH-16-013	AOI7-BH-16-014
Sample Date				27-Nov-12	28-Nov-12	28-Nov-12	13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13	19-Mar-13	1-Jul-16	12-Jul-16	12-Jul-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	29-Jun-16	29-Jun-16
Sample ID				BH-12-94_1.0'	BH-12-98_1'	BH-12-99_0.5'	AOI7-BH-13-45_1.5-2 031313	AOI7-BH-13-46_1.5-2 031313	AOI7-BH-13-47_1.5-2 031313	AOI7-BH-13-48_1.5-2 031313	AOI7-BH-13-50_0-0.5 031913	AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816	AOI7-BH-16-008-0-2-062816	AOI7-BH-16-009-062816-0-2	AOI7-BH-16-010-062816-0-2	AOI7-BH-16-011-062816-0-2	AOI7-BH-16-012-062816-0-2	AOI7-BH-16-013-0-2-062916	AOI7-BH-16-014-0-2-062916
Sample Depth				0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB22267	1352569	1352569	JB31265	JB31265	JB31265	JB31265	JB31794	1679350	1682473	1682473	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-3	6876922	6876923	JB31265-3	JB31265-7	JB31265-5	JB31265-1	JB31794-2	8460987	8473663	8473664	8455730	8455727	8455729	8455728	8455725	8455721	8455723	8455722	8455736	8455739
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	ND (0.0012) (0.0012)	**0.53[B]** (0.0005)	ND (0.006) (0.0005)	ND (0.14) (0.14)	ND (0.00086) (0.00086	ND (0.12) (0.12)	**2.66[B]** (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.240) (0.0005)	ND (0.005) (0.0005)	0.0008 J (0.0005)	0.002 J (0.0005)	ND (0.007) (0.0005)	ND (0.006) (0.0005)	0.079 J (0.0005)	*ND (0.660)* (0.0005)	ND (0.007) (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	ND (0.0012) (0.0012)	*ND (0.076)* (0.001)	*ND (0.006)* (0.001)	*ND (0.14)* (0.14)	ND (0.00086) (0.00086	*ND (0.12)* (0.12)	*ND (0.088)* (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (0.006)* (0.001)	*ND (0.240)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	*ND (0.007)* (0.001)	*ND (0.006)* (0.001)	*ND (0.640)* (0.001)	*ND (0.660)* (0.001)	*ND (0.007)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	ND (0.0012) (0.0012)	ND (0.076) (0.001)	ND (0.006) (0.001)	ND (0.14) (0.14)	ND (0.00086) (0.00086	ND (0.12) (0.12)	ND (0.088) (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	*ND (0.640)* (0.001)	*ND (0.660)* (0.001)	ND (0.007) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	ND (0.0012) (0.0012)	0.18 J (0.001)	ND (0.006) (0.001)	ND (0.14) (0.14)	ND (0.00086) (0.00086	ND (0.12) (0.12)	0.643 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	2500[B]	ND (0.0058) (0.0058)	7.6 (0.001)	ND (0.006) (0.001)	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	ND (0.44) (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	ND (0.0012) (0.0012)	ND (0.038) (0.0005)	ND (0.006) (0.0005)	ND (0.14) (0.14)	ND (0.00086) (0.00086	ND (0.12) (0.12)	ND (0.088) (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.240) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.007) (0.0005)	ND (0.006) (0.0005)	ND (0.640) (0.0005)	ND (0.660) (0.0005)	ND (0.007) (0.0005)
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	ND (0.0058) (0.0058)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	ND (0.0012) (0.0012)	2.0 (0.001)	ND (0.006) (0.001)	0.140 (0.14)	ND (0.00086) (0.00086	0.252 (0.12)	3.45 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.240) (0.001)	ND (0.005) (0.001)	0.002 J (0.001)	0.002 J (0.001)	0.001 J (0.001)	ND (0.006) (0.001)	0.810 (0.001)	0.280 J (0.001)	ND (0.007) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	ND (0.0058) (0.0058)	7.3 (0.001)	ND (0.006) (0.001)	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	0.499 (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.620 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.0058) (0.0058)	ND (0.076) (0.001)	ND (0.006) (0.001)	ND (0.69) (0.69)	ND (0.0043) (0.0043)	ND (0.58) (0.58)	ND (0.44) (0.44)	ND (0.019) (0.019)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.130 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	ND (0.640) (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	ND (0.0012) (0.0012)	0.57 (0.001)	ND (0.006) (0.001)	0.474 (0.14)	ND (0.00086) (0.00086	0.255 (0.12)	4.53 (0.088)	ND (0.0039) (0.0039)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	0.200 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.007) (0.001)	ND (0.006) (0.001)	0.220 J (0.001)	ND (0.660) (0.001)	ND (0.007) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	0.162 (0.036)	0.17 J (0.003)	ND (15) (0.003)	ND (0.21) (0.21)	0.0831 (0.037)	0.459 (0.042)	0.332 (0.034)	0.110 (0.038)	0.005 J (0.003)	0.020 (0.003)	ND (0.018) (0.003)	0.590 (0.003)	0.600 (0.003)	0.067 (0.003)	0.100 (0.003)	0.110 (0.003)	1.100 (0.003)	0.910 (0.003)	2.400 (0.003)	2.500 (0.003)	1.600 (0.003)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	0.816 (0.036)	0.34 (0.003)	ND (15) (0.003)	0.482 (0.21)	0.335 (0.037)	1.23 (0.042)	0.797 (0.034)	0.188 (0.038)	0.017 J (0.003)	0.088 (0.003)	ND (0.018) (0.003)	0.770 (0.003)	0.830 (0.003)	0.078 (0.003)	0.130 (0.003)	0.240 (0.003)	2.700 (0.003)	0.960 (0.003)	2.000 (0.003)	2.200 (0.003)	1.300 (0.003)
BENZO(A)PYRENE	mg/kg	12^	12[B]	0.782 (0.036)	0.32 (0.003)	*ND (15)* (0.003)	0.395 (0.21)	0.347 (0.037)	1.25 (0.042)	0.934 (0.034)	0.197 (0.038)	0.017 J (0.003)	0.062 (0.003)	ND (0.018) (0.003)	0.660 (0.003)	1.000 (0.003)	0.053 (0.003)	0.200 (0.003)	0.260 (0.003)	2.100 (0.003)	0.810 (0.003)	1.500 (0.003)	1.300 (0.003)	1.200 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	0.952 (0.036)	0.59 (0.003)	ND (15) (0.003)	0.425 (0.21)	0.535 (0.037)	1.14 (0.042)	1.10 (0.034)	0.184 (0.038)	0.026 (0.003)	0.085 (0.003)	ND (0.018) (0.003)	0.790 (0.003)	1.300 (0.003)	0.094 (0.003)	0.170 (0.003)	0.520 (0.003)	2.700 (0.003)	1.200 (0.003)	1.800 (0.003)	1.800 (0.003)	1.900 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	0.538 (0.036)	0.32 (0.003)	ND (15) (0.003)	0.485 (0.21)	0.309 (0.037)	0.818 (0.042)	0.590 (0.034)	0.516 (0.038)	0.019 (0.003)	0.051 (0.003)	0.008 J (0.003)	0.600 (0.003)	0.420 (0.003)	0.110 (0.003)	0.140 (0.003)	0.510 (0.003)	1.400 (0.003)	0.720 (0.003)	1.100 (0.003)	0.750 (0.003)	1.200 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	0.904 (0.036)	0.42 (0.003)	16 (0.003)	1.26 (0.21)	0.546 (0.037)	1.40 (0.042)	1.00 (0.034)	0.219 (0.038)	0.018 J (0.003)	0.200 (0.003)	ND (0.018) (0.003)	0.890 (0.003)	4.700 (0.003)	0.086 (0.003)	0.450 (0.003)	0.400 (0.003)	2.900 (0.003)	1.200 (0.003)	2.400 (0.003)	2.800 (0.003)	1.700 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-94	AOI7 BH-12-98	AOI7 BH-12-99	AOI7-BH-13-45	AOI7-BH-13-46	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-13-50	AOI7-BH-16-001	AOI7-BH-16-002	AOI7-BH-16-003	AOI7-BH-16-005	AOI7-BH-16-006	AOI7-BH-16-007	AOI7-BH-16-008	AOI7-BH-16-009	AOI7-BH-16-010	AOI7-BH-16-011	AOI7-BH-16-012	AOI7-BH-16-013	AOI7-BH-16-014
Sample Date				27-Nov-12	28-Nov-12	28-Nov-12	13-Mar-13	13-Mar-13	13-Mar-13	13-Mar-13	19-Mar-13	1-Jul-16	12-Jul-16	12-Jul-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	28-Jun-16	29-Jun-16	29-Jun-16
Sample ID				BH-12-94_1.0'	BH-12-98_1'	BH-12-99_0.5'	AOI7-BH-13-45_1.5-2 031313	AOI7-BH-13-46_1.5-2 031313	AOI7-BH-13-47_1.5-2 031313	AOI7-BH-13-48_1.5-2 031313	AOI7-BH-13-50_0-0.5 031913	AOI7-BH-16-001-0-2-070116	AOI7-BH-16-002-0-2-071216	AOI7-BH-16-003-0-2-071216	AOI7-BH-16-005-0-2-062816	AOI7-BH-16-006-0-2-062816	AOI7-BH-16-007-0-2-062816	AOI7-BH-16-008-0-2-062816	AOI7-BH-16-009-062816-0-2	AOI7-BH-16-010-062816-0-2	AOI7-BH-16-011-062816-0-2	AOI7-BH-16-012-062816-0-2	AOI7-BH-16-013-0-2-062916	AOI7-BH-16-014-0-2-062916
Sample Depth				0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB22267	1352569	1352569	JB31265	JB31265	JB31265	JB31265	JB31794	1679350	1682473	1682473	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-3	6876922	6876923	JB31265-3	JB31265-7	JB31265-5	JB31265-1	JB31794-2	8460987	8473663	8473664	8455730	8455727	8455729	8455728	8455725	8455721	8455723	8455722	8455736	8455739
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	ND (0.036) (0.036)	0.077 J (0.003)	400 (0.003)	ND (0.21) (0.21)	ND (0.037) (0.037)	0.211 (0.042)	0.428 (0.034)	0.0427 (0.038)	ND (0.018) (0.003)	0.015 J (0.003)	ND (0.018) (0.003)	0.220 (0.003)	3.100 (0.003)	0.023 (0.003)	0.043 (0.003)	0.035 (0.003)	0.540 (0.003)	0.430 (0.003)	2.000 (0.003)	2.200 (0.003)	0.880 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{SO}^	58_{SO}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	0.79 (0.003)	ND (15) (0.003)	ND (0.21) (0.21)	ND (0.037) (0.037)	0.190 (0.042)	0.120 (0.034)	0.0880 (0.038)	0.009 J (0.003)	0.019 J (0.003)	ND (0.018) (0.003)	5.200 (0.003)	0.300 (0.003)	0.280 (0.003)	0.340 (0.003)	0.480 (0.003)	10.000 (0.003)	9.500 (0.003)	11.000 (0.003)	8.000 (0.003)	22.000 (0.003)
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	1.03 (0.036)	0.70 (0.003)	180 (0.003)	0.246 (0.21)	0.266 (0.037)	1.07 (0.042)	0.214 (0.034)	0.269 (0.038)	0.015 J (0.003)	0.150 (0.003)	0.005 J (0.003)	1.700 (0.003)	8.700 (0.003)	0.150 (0.003)	0.250 (0.003)	0.270 (0.003)	3.900 (0.003)	3.000 (0.003)	4.300 (0.003)	5.900 (0.003)	5.000 (0.003)
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	1.54 (0.036)	0.53 (0.003)	ND (15) (0.003)	1.39 (0.21)	0.585 (0.037)	1.46 (0.042)	1.51 (0.034)	0.243 (0.038)	0.025 (0.003)	0.110 (0.003)	0.006 J (0.003)	0.870 (0.003)	2.800 (0.003)	0.098 (0.003)	0.230 (0.003)	0.400 (0.003)	3.600 (0.003)	1.200 (0.003)	4.200 (0.003)	6.300 (0.003)	1.900 (0.003)
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{TI}^	190_{TI}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	***1340*[B]** (2.6)	***955*[B]** (0.0044)	341 (0.0044)	***498*[B]** (2.0)	237 (2.2)	***866*[B]** (2.0)	275 (2.2)	281 (2.0)	10.2 (0.550)	98.3 (0.550)	ND (13.4) (0.550)	130 (0.550)	63.6 (0.550)	241 (0.550)	85.4 (0.550)	***526*[B]** (0.550)	399 (0.550)	321 (0.550)	295 (0.550)	418 (0.550)	***566*[B]** (0.550)
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	22.2 (0.50)	30.9 (0.50)	-	-	-	-	-	7.2 (0.50)	10.4 (0.50)	6.6 (0.50)	26.6 (0.50)	12.4 (0.50)	19.0 (0.50)	15.8 (0.50)	20.6 (0.50)	30.9 (0.50)	29.5 (0.50)	44.3 (0.50)	44.1 (0.50)	35.5 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	78.7 ()	-	-	78.4 ()	85.8 ()	79.4 ()	91.1 ()	80.4 ()	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-015	AOI7-BH-16-016	AOI7-BH-16-017	AOI7-BH-16-019	AOI7-BH-16-020		AOI7-BH-16-021	AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025	AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039
Sample Date				29-Jun-16	28-Jun-16	11-Jul-16	6-Jul-16	28-Jun-16	1-Jul-16	30-Jun-16	5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	7-Jul-16	12-Jul-16	12-Jul-16	8-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	29-Jun-16
Sample ID				AOI7-BH-16-015-0-2-062916	AOI7-BH-16-016-062816-0-2	AOI7-BH-16-017-0-2-071116	AOI7-BH-16-019-0-2-070616	AOI7-BH-16-020-0-2-062816	AOI7-BH-16-020-0-2-070116	AOI7-BH-16-021-0-2-063016	AOI7-BH-16-022-0-2-070516	AOI7-BH-16-023-0-2-070116	AOI7-BH-16-024-0-2-070716	AOI7-BH-16-025-0-2-070116	AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816	AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1682473	1680744	1678008	1679350	1679350	1680744	1679350	1680744	1679350	1679350	1680744	1682473	1682473	1681418	1681418	1679350	1678008	1679350	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455734	8455726	8473658	8466410	8455731	8460999	8460978	8466399	8460992	8466411	8460993	8460990	8466408	8473666	8473667	8469170	8469168	8460984	8455741	8460981	8455740
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	ND (0.008) (0.0005)	ND (0.004) (0.0005)	-	0.0006 J (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	***0.820 J*** [B] (0.0005)	0.001 J (0.0005)	ND (0.004) (0.0005)	0.010 (0.0005)	ND (0.004) (0.0005)	0.390 J (0.0005)	0.002 J (0.0005)	0.089 J (0.0005)	*ND (2.300)* (0.0005)	ND (0.005) (0.0005)	0.004 J (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	*ND (0.008)* (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	*ND (0.009)* (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (4.100)* (0.001)	*ND (0.006)* (0.001)	ND (0.004) (0.001)	*ND (0.006)* (0.001)	ND (0.004) (0.001)	*ND (0.410)* (0.001)	ND (0.004) (0.001)	*ND (0.490)* (0.001)	*ND (2.300)* (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (4.100)* (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.410) (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	*ND (2.300)* (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	ND (0.004) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	1.600 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.150 J (0.001)	ND (0.004) (0.001)	0.110 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	3.400 J (0.001)	0.004 J (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.250 J (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	ND (0.008) (0.0005)	ND (0.004) (0.0005)	-	ND (0.004) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	*ND (4.100)* (0.0005)	ND (0.006) (0.0005)	ND (0.004) (0.0005)	ND (0.006) (0.0005)	ND (0.004) (0.0005)	ND (0.410) (0.0005)	ND (0.004) (0.0005)	ND (0.490) (0.0005)	*ND (2.300)* (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.0009 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.002 J (0.001)	ND (0.004) (0.001)	1.100 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	0.015 (0.001)	ND (0.004) (0.001)	0.670 (0.001)	0.002 J (0.001)	1.400 (0.001)	0.610 J (0.001)	0.001 J (0.001)	0.002 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	1.000 J (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	1.000 (0.001)	ND (0.004) (0.001)	0.140 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	0.001 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (4.100) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.006) (0.001)	ND (0.004) (0.001)	ND (0.410) (0.001)	ND (0.004) (0.001)	ND (0.490) (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	ND (0.008) (0.001)	ND (0.004) (0.001)	-	0.002 J (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	2.000 J (0.001)	0.002 J (0.001)	ND (0.004) (0.001)	0.004 J (0.001)	ND (0.004) (0.001)	1.500 (0.001)	ND (0.004) (0.001)	0.260 J (0.001)	ND (2.300) (0.001)	ND (0.005) (0.001)	0.002 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	1.200 (0.003)	0.012 J (0.003)	-	0.180 (0.003)	0.024 (0.003)	0.300 (0.003)	0.190 (0.003)	1.300 (0.003)	0.200 J (0.003)	0.004 J (0.003)	2.000 (0.003)	0.053 J (0.003)	0.014 J (0.003)	1.000 (0.003)	0.010 J (0.003)	1.000 (0.003)	0.340 (0.003)	1.600 (0.003)	1.200 (0.003)	0.160 J (0.003)	0.009 J (0.003)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	1.400 (0.003)	0.025 (0.003)	-	0.270 (0.003)	0.110 (0.003)	0.530 (0.003)	0.530 (0.003)	2.200 (0.003)	0.460 (0.003)	0.009 J (0.003)	1.800 (0.003)	0.260 (0.003)	0.025 (0.003)	2.000 (0.003)	0.030 (0.003)	1.800 (0.003)	0.720 (0.003)	1.400 (0.003)	0.890 (0.003)	0.540 (0.003)	0.032 (0.003)
BENZO(A)PYRENE	mg/kg	12^	12[B]	1.300 (0.003)	0.021 (0.003)	3.200 (0.003)	0.220 (0.003)	0.085 (0.003)	0.480 (0.003)	0.480 (0.003)	2.100 (0.003)	0.380 (0.003)	0.014 J (0.003)	1.900 (0.003)	0.370 (0.003)	0.034 (0.003)	1.700 (0.003)	0.038 (0.003)	1.800 (0.003)	0.550 (0.003)	1.500 (0.003)	0.910 (0.003)	0.690 (0.003)	0.027 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	1.800 (0.003)	0.035 (0.003)	-	0.260 (0.003)	0.130 (0.003)	0.630 (0.003)	0.610 (0.003)	3.100 (0.003)	0.800 (0.003)	0.017 J (0.003)	2.300 (0.003)	0.570 (0.003)	0.053 (0.003)	2.200 (0.003)	0.069 (0.003)	2.500 (0.003)	0.690 (0.003)	2.300 (0.003)	1.400 (0.003)	0.800 (0.003)	0.037 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.300 (0.003)	0.023 (0.003)	-	0.290 (0.003)	0.076 (0.003)	0.590 (0.003)	0.330 (0.003)	1.600 (0.003)	0.430 (0.003)	0.016 J (0.003)	1.600 (0.003)	0.390 (0.003)	0.046 (0.003)	1.600 (0.003)	0.046 (0.003)	1.600 (0.003)	0.560 (0.003)	1.400 (0.003)	0.990 (0.003)	0.720 (0.003)	0.043 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	1.800 (0.003)	0.032 (0.003)	-	0.570 (0.003)	0.140 (0.003)	0.600 (0.003)	0.480 (0.003)	2.300 (0.003)	0.540 (0.003)	0.012 J (0.003)	2.100 (0.003)	0.400 (0.003)	0.034 (0.003)	2.200 (0.003)	0.049 (0.003)	2.800 (0.003)	0.730 (0.003)	1.600 (0.003)	1.200 (0.003)	0.650 (0.003)	0.063 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-015	AOI7-BH-16-016	AOI7-BH-16-017	AOI7-BH-16-019	AOI7-BH-16-020		AOI7-BH-16-021	AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025	AOI7-BH-16-026	AOI7-BH-16-027	AOI7-BH-16-028	AOI7-BH-16-032	AOI7-BH-16-034	AOI7-BH-16-035	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038	AOI7-BH-16-039
Sample Date				29-Jun-16	28-Jun-16	11-Jul-16	6-Jul-16	28-Jun-16	1-Jul-16	30-Jun-16	5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	7-Jul-16	12-Jul-16	12-Jul-16	8-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	29-Jun-16
Sample ID				AOI7-BH-16-015-0-2-062916	AOI7-BH-16-016-062816-0-2	AOI7-BH-16-017-0-2-071116	AOI7-BH-16-019-0-2-070616	AOI7-BH-16-020-0-2-062816	AOI7-BH-16-020-0-2-070116	AOI7-BH-16-021-0-2-063016	AOI7-BH-16-022-0-2-070516	AOI7-BH-16-023-0-2-070116	AOI7-BH-16-024-0-2-070716	AOI7-BH-16-025-0-2-070116	AOI7-BH-16-026-0-2-070116	AOI7-BH-16-027-0-2-070716	AOI7-BH-16-028-0-2-071216	AOI7-BH-16-032-0-2-071216	AOI7-BH-16-034-0-2-070816	AOI7-BH-16-035-0-2-070816	AOI7-BH-16-036-0-2-063016	AOI7-BH-16-037-0-2-062916	AOI7-BH-16-038-0-2-063016	AOI7-BH-16-039-0-2-062916
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1678008	1678008	1682473	1680744	1678008	1679350	1679350	1680744	1679350	1680744	1679350	1679350	1680744	1682473	1682473	1681418	1681418	1679350	1678008	1679350	1678008
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455734	8455726	8473658	8466410	8455731	8460999	8460978	8466399	8460992	8466411	8460993	8460990	8466408	8473666	8473667	8469170	8469168	8460984	8455741	8460981	8455740
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	0.470 (0.003)	0.006 J (0.003)	-	0.250 (0.003)	0.008 J (0.003)	0.150 (0.003)	0.074 (0.003)	0.800 (0.003)	0.063 J (0.003)	ND (0.018) (0.003)	1.800 (0.003)	ND (0.190) (0.003)	0.004 J (0.003)	0.220 (0.003)	ND (0.018) (0.003)	0.830 (0.003)	0.110 (0.003)	1.100 (0.003)	0.770 (0.003)	0.059 J (0.003)	0.005 J (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{SO}[A]	58_{SO}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	12.000 (0.003)	0.017 J (0.003)	-	0.680 (0.003)	0.025 (0.003)	1.000 (0.003)	0.150 (0.003)	5.500 (0.003)	1.100 (0.003)	0.009 J (0.003)	***64.000*** [B] (0.003)	0.120 J (0.003)	0.040 (0.003)	3.300 (0.003)	0.009 J (0.003)	10.000 (0.003)	0.200 (0.003)	21.000 (0.003)	10.000 (0.003)	1.400 (0.003)	0.020 (0.003)
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	3.400 (0.003)	0.028 (0.003)	-	0.830 (0.003)	0.078 (0.003)	0.900 (0.003)	0.740 (0.003)	3.500 (0.003)	0.720 (0.003)	0.008 J (0.003)	5.100 (0.003)	0.230 (0.003)	0.029 (0.003)	2.600 (0.003)	0.031 (0.003)	3.100 (0.003)	1.400 (0.003)	4.700 (0.003)	3.900 (0.003)	0.650 (0.003)	0.050 (0.003)
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	1.600 (0.003)	0.039 (0.003)	-	0.450 (0.003)	0.180 (0.003)	0.840 (0.003)	0.950 (0.003)	3.500 (0.003)	0.670 (0.003)	0.016 J (0.003)	3.400 (0.003)	0.610 (0.003)	0.035 (0.003)	2.800 (0.003)	0.062 (0.003)	2.300 (0.003)	1.300 (0.003)	2.200 (0.003)	1.500 (0.003)	0.640 (0.003)	0.040 (0.003)
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	$220_{(1)}$[A]	$190_{(3)}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	386 (0.550)	21.4 (0.550)	-	117 (0.550)	13.9 (0.550)	351 (0.550)	77.5 (0.550)	119 (0.550)	268 (0.550)	6.35 (0.550)	***533*** [B] (0.550)	50.3 (0.550)	5.12 (0.550)	***499*** [B] (0.550)	8.24 (0.550)	424 (0.550)	59.9 (0.550)	368 (0.550)	313 (0.550)	40.6 (0.550)	42.3 (0.550)
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	36.3 (0.50)	8.1 (0.50)	32.5 (0.50)	16.0 (0.50)	20.9 (0.50)	16.7 (0.50)	18.7 (0.50)	20.3 (0.50)	23.3 (0.50)	6.3 (0.50)	27.7 (0.50)	12.8 (0.50)	4.0 (0.50)	24.5 (0.50)	7.1 (0.50)	27.9 (0.50)	12.3 (0.50)	36.9 (0.50)	37.1 (0.50)	22.6 (0.50)	7.0 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-040	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047	AST 283-CV-1	AST 283-SB-1	AST 283-SB-2	AST 283-SB-3	AST 283-SB-4	AST 283-SB-5	B90-1	B90-2	B90-4	B90-7	B90-8	B90-9	B90-13
Sample Date				29-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16	12-Jul-16	1-Jul-16	5-Jul-16	8-Jul-16	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	24-Aug-92	25-Aug-92
Sample ID				AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616	AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816	CV-1	SB-1	SB-2	SB-3	SB-4	SB-5	B090A4	B090A1	B090A6	B090B7	B090A9	B090A8	B09082
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Work Order		A	B	1678008	1680744	1680744	1678008	1682473	1679350	1680744	1681418	950598	950598	950598	950598	950598	950598	P209605	P209602	P209610	P209930	P209880	P209612	P209882
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455738	8466406	8466404	8455732	8473665	8460994	8466398	8469172	4559623	4559618	4559619	4559620	4559621	4559622							
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (7.4) R ()	ND (7.3) R ()	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*ND (15)* ()	*ND (15)* ()	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.5) ()	ND (15) ()	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	0.001 J (0.0005)	0.002 J (0.0005)	0.110 J (0.0005)	0.002 J (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	0.370 (0.0005)	0.120 J (0.0005)	ND (0.027) (0.0005)	ND (0.030) (0.0005)	ND (0.5) (0.5)	0.059 J (0.0005)	0.033 J (0.0005)	ND (0.027) (0.0005)	-	-	-	*ND (0.74)* ()	*ND (0.73)* ()	-	-
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	*ND (0.390)* (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	*ND (0.340)* (0.001)	*ND (0.380)* (0.001)	*ND (0.054)* (0.001)	*ND (0.059)* (0.001)	-	*ND (0.051)* (0.001)	*ND (0.059)* (0.001)	*ND (0.055)* (0.001)	-	-	-	*ND (1.5)* ()	*ND (1.5)* ()	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.340) (0.001)	ND (0.380) (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	*ND (1)* (1)	ND (0.051) (0.001)	ND (0.059) (0.001)	ND (0.055) (0.001)	-	-	-	*ND (0.74)* ()	*ND (0.73)* ()	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (22) R ()	ND (22) R ()	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	0.120 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.180 J (0.001)	0.100 J (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (0.8) (0.8)	ND (0.051) (0.001)	0.064 J (0.001)	ND (0.055) (0.001)	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.610 (0.001)	ND (0.380) (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (1) (1)	ND (0.051) (0.001)	ND (0.059) (0.001)	ND (0.055) (0.001)	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.390) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.004) (0.0005)	ND (0.340) (0.0005)	ND (0.380) (0.0005)	ND (0.027) (0.0005)	ND (0.030) (0.0005)	ND (0.5) (0.5)	ND (0.026) (0.0005)	ND (0.029) (0.0005)	ND (0.027) (0.0005)	-	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	-	-	-	-	-	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (1) (1)	ND (0.051) (0.001)	0.260 J (0.001)	ND (0.055) (0.001)	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.5) ()	ND (1.5) ()	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
TOLUENE	mg/kg	10000^	100[B]	0.001 J (0.001)	ND (0.005) (0.001)	0.700 (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.500 (0.001)	0.890 (0.001)	ND (0.054) (0.001)	0.073 J (0.001)	ND (0.7) (0.7)	0.074 J (0.001)	0.200 J (0.001)	ND (0.055) (0.001)	-	-	-	1.1 ()	4.8 ()	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.74) ()	ND (0.73) ()	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	0.082 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.160 J (0.001)	0.130 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.390) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	ND (0.340) (0.001)	ND (0.380) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	0.0008 J (0.001)	ND (0.005) (0.001)	0.300 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.004) (0.001)	0.880 (0.001)	0.210 J (0.001)	ND (0.054) (0.001)	ND (0.059) (0.001)	ND (0.8) (0.8)	ND (0.051) (0.001)	0.170 J (0.001)	ND (0.055) (0.001)	-	-	-	30 ()	14 ()	-	-
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (7.4) R ()	ND (7.3) R ()	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.10) L ()	ND (0.94) L ()	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.500) ()	0.500 J ()	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	*ND (0.0096)* (0.010)	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	0.210 (0.003)	0.014 J (0.003)	2.000 (0.003)	1.400 (0.003)	0.006 J (0.003)	ND (0.019) (0.003)	3.500 (0.003)	1.900 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.00072 (0.040)	ND (0.190) (0.033)	0.460 J (0.033)	ND (0.990) (0.033)	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*ND (1.9)* ()	*ND (1.8)* ()	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	0.330 (0.003)	0.032 (0.003)	2.700 (0.003)	3.400 (0.003)	0.024 (0.003)	0.016 J (0.003)	5.000 (0.003)	2.100 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0030 (0.020)	0.260 J (0.033)	0.920 J (0.033)	ND (0.990) (0.033)	-	-	-	0.2 J ()	0.13 J ()	-	-
BENZO(A)PYRENE	mg/kg	12^	12[B]	0.250 (0.003)	0.041 (0.003)	3.300 (0.003)	2.400 (0.003)	0.022 (0.003)	0.020 (0.003)	5.100 (0.003)	2.400 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0046 (0.020)	0.260 J (0.033)	0.900 J (0.033)	ND (0.990) (0.033)	-	-	-	0.22 J ()	0.16 J ()	-	-
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	0.230 (0.003)	0.057 (0.003)	4.100 (0.003)	3.100 (0.003)	0.039 (0.003)	0.030 (0.003)	6.400 (0.003)	2.700 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0024 (0.040)	0.320 J (0.033)	0.850 J (0.033)	ND (0.990) (0.033)	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	0.280 (0.003)	0.035 (0.003)	2.700 (0.003)	1.700 (0.003)	0.024 (0.003)	0.024 (0.003)	3.400 (0.003)	2.100 (0.003)	0.260 J (0.033)	ND (0.960) (0.033)	0.0037 (0.10)	ND (0.190) (0.033)	0.620 J (0.033)	ND (0.990) (0.033)	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	0.009 J (0.003)	2.200 (0.003)	1.200 (0.003)	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3 B ()	0.34 J ()	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
CHRYSENE	mg/kg	760^	230[B]	0.720 (0.003)	0.043 (0.003)	2.600 (0.003)	3.300 (0.003)	0.030 (0.003)	0.020 (0.003)	5.900 (0.003)	2.700 (0.003)	ND (0.190) (0.033)	1.6 J (0.033)	0.0044 (0.080)	0.220 J (0.033)	1.1 (0.033)	ND (0.990) (0.033)	-	-	-	0.260 ()	0.200 J ()	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	0.006 J (0.003)	0.970 J (0.003)	0.570 (0.003)	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.350) ()	ND (0.340) ()	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-040	AOI7-BH-16-041	AOI7-BH-16-042	AOI7-BH-16-043	AOI7-BH-16-044	AOI7-BH-16-045	AOI7-BH-16-046	AOI7-BH-16-047	AST 283-CV-1	AST 283-SB-1	AST 283-SB-2	AST 283-SB-3	AST 283-SB-4	AST 283-SB-5	B90-1	B90-2	B90-4	B90-7	B90-8	B90-9	B90-13
Sample Date				29-Jun-16	6-Jul-16	6-Jul-16	29-Jun-16	12-Jul-16	1-Jul-16	5-Jul-16	8-Jul-16	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	28-Jun-05	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	24-Aug-92	25-Aug-92
Sample ID				AOI7-BH-16-040-0-2-062916	AOI7-BH-16-041-0-2-070616	AOI7-BH-16-042-0-2-070616	AOI7-BH-16-043-0-2-062916	AOI7-BH-16-044-0-2-071216	AOI7-BH-16-045-0-2-070116	AOI7-BH-16-046-0-2-070516	AOI7-BH-16-047-0-2-070816	CV-1	SB-1	SB-2	SB-3	SB-4	SB-5	B090A4	B090A1	B090A6	B090B7	B090A9	B090A8	B09082
Sample Depth				0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 0.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	1 - 1.5 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Work Order		A	B	1678008	1680744	1680744	1678008	1682473	1679350	1680744	1681418	950598	950598	950598	950598	950598	950598	P209605	P209602	P209610	P209930	P209880	P209612	P209882
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455738	8466406	8466404	8455732	8473665	8460994	8466398	8469172	4559623	4559618	4559619	4559620	4559621	4559622							
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.900) ()	ND (1.800) ()	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26 J ()	0.2 J ()	-	-
FLUORENE	mg/kg	130000^	3800[B]	0.270 (0.003)	0.005 J (0.003)	1.200 (0.003)	0.480 (0.003)	ND (0.018) (0.003)	ND (0.019) (0.003)	5.400 (0.003)	1.000 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0013 (0.50)	ND (0.190) (0.033)	0.210 J (0.033)	ND (0.990) (0.033)	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.790) ()	ND (0.760) ()	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0027 (0.080)	ND (0.190) (0.033)	0.510 J (0.033)	ND (0.990) (0.033)	-	-	-	0.26 J ()	0.24 J ()	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.780 J ()	1.300 ()	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{20}$^	58$_{42}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.2) ()	ND (1.1) ()	-	-
NAPHTHALENE	mg/kg	760^	25[B]	0.087 (0.003)	0.039 (0.003)	8.700 (0.003)	2.500 (0.003)	0.004 J (0.003)	0.007 J (0.003)	11.000 (0.003)	10.000 (0.003)	-	-	-	-	-	-	0.33 J ()	0.31 J ()	3.2 ()	1.4 ()	2.6 ()	0.32 J ()	13 J ()
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.9) ()	ND (1.8) ()	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	1.100 (0.003)	0.032 (0.003)	4.200 (0.003)	3.500 (0.003)	0.018 J (0.003)	0.012 J (0.003)	5.700 (0.003)	3.700 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.0035 (0.080)	0.370 J (0.033)	0.790 J (0.033)	ND (0.990) (0.033)	-	-	-	0.2 J ()	0.14 J ()	-	-
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
PYRENE	mg/kg	96000^	2200[B]	0.780 (0.003)	0.057 (0.003)	3.600 (0.003)	4.500 (0.003)	0.038 (0.003)	0.024 (0.003)	9.000 (0.003)	3.900 (0.003)	ND (0.190) (0.033)	ND (0.960) (0.033)	0.010 (0.18)	0.480 J (0.033)	1.0 (0.033)	ND (0.990) (0.033)	-	-	-	0.23 J ()	0.19 J ()	-	-
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.79) ()	ND (0.76) ()	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*ND (0.79)* ()	*ND (0.76)* ()	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.240) ()	ND (0.230) ()	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.390) ()	ND (0.370) ()	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.42 J ()	0.26 J ()	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.39) ()	ND (0.37) ()	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.780) ()	ND (0.750) ()	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0) ()	ND (0) ()	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (2) ()	ND (1.9) ()	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (1.20) L ()	ND (1.10) L ()	-	-
ARSENIC	mg/kg	61^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.8 H ()	2.0 H ()	1.3 H ()	3.3 H ()	2.9 H ()	11.5 H ()	6.8 H ()
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.6 ()	59.5 ()	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82 ()	ND (0.57) ()	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.59) ()	ND (0.57) ()	-	-
CHROMIUM	mg/kg	220$_{13}$^	190$_{13}$[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62.9 L ()	16.3 L ()	27.5 L ()	22.4 ()	16.3 ()	43.1 L ()	8.5 L ()
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	ND (1.7) (0.50)	ND (7.4) (0.50)	ND (1.9) (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.4 ()	5.1 ()	-	-
LEAD	mg/kg	2240^	450[B]	309 (0.550)	26.1 (0.550)	256 (0.550)	432 (0.550)	ND (29.0) (0.550)	4.14 (0.550)	***509***[B] (0.550)	238 (0.550)	121 (0.780)	317 (0.780)	-	97.9 (0.780)	113 (0.780)	81.1 (0.780)	93.8 H ()	16.0 L ()	78.5 H ()	148 ()	233 ()	236 H ()	80.3 H ()
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	ND (0.105) (0.0100)	***11.0***[B] (0.0100)	1.15 (0.0100)	-	-	-	-	-	-	-	-	-	-	0.22 J ()	0.62 J ()	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.3 ()	12.6 ()	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.47) ()	ND (0.45) ()	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.2 ()	15.7 ()	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.3 ()	6.4 ()	7.2 ()	13.2 ()	15.9 ()	15.4 ()	14.0 ()
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.08) ()	ND (0.08) ()	ND (0.08) ()	ND (0.12) ()	ND (0.11) ()	ND (0.11) ()	ND (0.11) ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92.9 J ()	ND (21.50) J ()	179 J ()	664 J ()	3720 J ()	1040 J ()	1630 J ()
MOISTURE, PERCENT	%	n/v	n/v	7.4 (0.50)	7.0 (0.50)	23.3 (0.50)	15.7 (0.50)	7.6 (0.50)	10.7 (0.50)	18.5 (0.50)	20.8 (0.50)	12.1 (0.50)	13.3 (0.50)	-	12.5 (0.50)	13.7 (0.50)	15.6 (0.50)	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.51) ()	ND (0.54) ()	ND (0.48) ()	ND (0.48) ()	ND (0.54) ()	ND (0.62) ()	1.4 ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (4.40) ()	13.2 H ()	ND (4.40) ()	23.7 J ()	ND (4.50) J ()	ND (6.10) ()	29.7 H ()
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.28) ()	ND (0.28) ()	ND (0.28) ()	0.54 ()	1.6 ()	2.7 ()	0.97 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4090 J ()	1260 J ()	3560 J ()	7570 L ()	9170 L ()	33500 J ()	24100 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (21.40) ()	ND (20.40) ()	ND (18.20) ()	ND (20.30) ()	38.5 ()	ND (27.70) ()	ND (24.10) ()

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-13DL	B90-16	B91-3	B91-7	B91-8	B91-9	B91-19	BH-10-05	BH-10-06	BH-10-07	BH-10-08	BH-10-09		BH-10-10	BH-10-11	BH-10-12	BH-10-13	BH-10-14	BH-10-15	BH-10-16	BH-10-17
Sample Date				25-Aug-92	26-Aug-92	27-Aug-92	26-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	9-Jun-10	9-Jun-10	10-Jun-10	10-Jun-10	6-Apr-09	10-Jun-10	10-Jun-10	10-Jun-10	10-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10
Sample ID				B09082DL	B090C1	B091A5	B091A3	B091A1	B091B2	B091B5	BH-10-05_1.5-2.0	BH-10-06_1.2-1.7	BH-10-07_1.0-1.5	BH-10-08_1.5-2.0	BH-10-09	BH-10-09_1.2-1.7	BH-10-10_1.5-2.0	BH-10-11_1.5-2.0	BH-10-12_1.5-2.0	BH-10-13_1.5-2.0	BH-10-14_1.5-2.0	BH-10-15_1.4-1.9	BH-10-16_1.5-2.0	BH-10-17_1.5-2.0
Sample Depth				0 - 2 ft	0 - 2 ft	1 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft	1.2 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 2 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.4 - 1.9 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	P209882DL	P209933	P210009	P209937	P209935	P210085	P210088	1198982	1198982	1198982	1198982	UNKNOWN	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	MSC-PA	SHS-PA								6007722	6007721	6007732	6007730	5640517	6007731	6007729	6007728	6007727	6007723	6007724	6007725	6007726	6007720
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	ND (0.056) ()	-	ND (0.057) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	ND (0.11) ()	-	ND (0.11) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	ND (0.11) ()	-	ND (0.11) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	-	-	0.008 ()	-	ND (0.006) ()	-	-	0.003 J (0.0005)	0.0007 J (0.0005)	ND (0.005) (0.0005)	0.370 J (0.0005)	-	0.002 J (0.0005)	0.160 J (0.0005)	0.056 J (0.0005)	0.004 J (0.0005)	0.002 J (0.0005)	0.260 J (0.0005)	0.004 J (0.0005)	**0.850 J[B]** (0.0005)	0.460 (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	*ND (0.011)* ()	-	*ND (0.011)* ()	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	*ND (0.092)* (0.001)	-	ND (0.001) (0.001)	*ND (0.093)* (0.001)	*ND (0.053)* (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	*ND (0.081)* (0.001)	ND (0.001) (0.001)	*ND (0.180)* (0.001)	*ND (0.057)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.092) (0.001)	-	ND (0.001) (0.001)	ND (0.093) (0.001)	ND (0.053) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.081) (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	ND (0.057) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	ND (0.17) R ()	-	ND (0.17) R ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	-	-	-	-	-	-	-	0.002 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	0.150 J (0.001)	-	ND (0.001) (0.001)	0.180 J (0.001)	0.090 J (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.220 J (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	0.800 (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	-	-	0.072 ()	-	ND (0.011) ()	-	-	0.004 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	27 (0.001)	-	ND (0.001) (0.001)	0.180 J (0.001)	ND (0.053) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.081) (0.001)	ND (0.001) (0.001)	9.1 (0.001)	0.300 (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	0.005 B ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	-	-	-	-	-	-	-	ND (0.0008) (0.0005)	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	ND (0.046) (0.0005)	-	ND (0.0007) (0.0005)	ND (0.047) (0.0005)	ND (0.026) (0.0005)	ND (0.0007) (0.0005)	ND (0.0006) (0.0005)	ND (0.040) (0.0005)	ND (0.0006) (0.0005)	ND (0.088) (0.0005)	ND (0.029) (0.0005)
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	ND (0.011) ()	-	ND (0.011) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	-	-	0.007 ()	-	ND (0.006) ()	-	-	0.005 J (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	0.120 J (0.001)	-	0.003 J (0.001)	0.700 (0.001)	0.190 J (0.001)	0.007 J (0.001)	0.003 J (0.001)	0.950 (0.001)	0.002 J (0.001)	0.340 J (0.001)	2.3 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	ND (0.006) ()	-	ND (0.006) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	-	-	-	-	-	-	-	0.007 J (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	0.210 J (0.001)	-	ND (0.001) (0.001)	0.890 (0.001)	0.430 (0.001)	0.006 J (0.001)	ND (0.001) (0.001)	0.290 J (0.001)	ND (0.001) (0.001)	0.240 J (0.001)	4.4 (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	-	-	-	-	-	-	-	0.006 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.092) (0.001)	-	ND (0.001) (0.001)	0.099 J (0.001)	0.085 J (0.001)	0.003 J (0.001)	ND (0.001) (0.001)	0.120 J (0.001)	ND (0.001) (0.001)	ND (0.180) (0.001)	2.4 (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	-	-	0.11 ()	-	0.011 ()	-	-	0.017 (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	0.690 (0.001)	-	0.002 J (0.001)	0.570 (0.001)	0.300 (0.001)	0.007 (0.001)	ND (0.001) (0.001)	1.1 (0.001)	ND (0.001) (0.001)	0.690 J (0.001)	7.5 (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	ND (0.056) R ()	-	ND (0.057) R ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	ND (0.91) L ()	-	ND (1.10) L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	0.036 ()	-	ND (0.011) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	0.540 (0.033)	0.870 (0.033)	ND (1.9) (0.033)	2.5 (0.033)	-	1.5 (0.033)	1.2 (0.033)	1.3 (0.033)	1.7 (0.033)	1.6 (0.033)	1.0 (0.033)	0.570 (0.033)	1.9 J (0.033)	0.570 (0.033)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	*ND (1.8)* ()	-	*ND (1.8)* ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	1.1 (0.033)	1.9 (0.033)	ND (1.9) (0.033)	2.6 (0.033)	-	2.6 (0.033)	1.4 (0.033)	3.3 (0.033)	2.4 (0.033)	5.0 (0.033)	1.3 (0.033)	1.7 (0.033)	3.5 (0.033)	0.580 (0.033)
BENZO(A)PYRENE	mg/kg	12^	12[B]	-	-	0.12 J ()	-	ND (0.38) ()	-	-	1.0 (0.033)	1.9 (0.033)	ND (1.9) (0.033)	2.2 J (0.033)	-	2.7 (0.033)	1.4 (0.033)	2.7 (0.033)	2.1 (0.033)	4.2 (0.033)	1.2 (0.033)	1.4 (0.033)	2.8 (0.033)	0.510 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	1.3 (0.033)	2.5 (0.033)	ND (1.9) (0.033)	2.1 J (0.033)	-	3.4 (0.033)	1.7 (0.033)	3.6 (0.033)	2.7 (0.033)	5.7 (0.033)	1.6 (0.033)	2.0 (0.033)	3.5 (0.033)	0.540 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	-	-	-	-	-	-	-	0.960 (0.033)	1.6 (0.033)	ND (1.9) (0.033)	1.6 J (0.033)	-	1.9 (0.033)	1.0 (0.033)	1.4 (0.033)	1.5 (0.033)	2.9 (0.033)	1.1 (0.033)	0.970 (0.033)	2.2 J (0.033)	0.320 (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	0.82 B ()	-	0.57 B ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	-	-	0.130 J ()	-	0.290 ()	-	-	1.1 (0.033)	2.0 (0.033)	ND (1.9) (0.033)	8.3 (0.033)	-	2.6 (0.033)	1.8 (0.033)	3.4 (0.033)	2.5 (0.033)	4.6 (0.033)	1.4 (0.033)	1.6 (0.033)	4.7 (0.033)	0.930 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	ND (0.340) ()	-	ND (0.340) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B90-13DL	B90-16	B91-3	B91-7	B91-8	B91-9	B91-19	BH-10-05	BH-10-06	BH-10-07	BH-10-08	BH-10-09		BH-10-10	BH-10-11	BH-10-12	BH-10-13	BH-10-14	BH-10-15	BH-10-16	BH-10-17
Sample Date				25-Aug-92	26-Aug-92	27-Aug-92	26-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	9-Jun-10	9-Jun-10	10-Jun-10	10-Jun-10	6-Apr-09	10-Jun-10	10-Jun-10	10-Jun-10	10-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10	9-Jun-10
Sample ID				B09082DL	B090C1	B091A5	B091A3	B091A1	B091B2	B091B5	BH-10-05_1.5-2.0	BH-10-06_1.2-1.7	BH-10-07_1.0-1.5	BH-10-08_1.5-2.0	BH-10-09	BH-10-09_1.2-1.7	BH-10-10_1.5-2.0	BH-10-11_1.5-2.0	BH-10-12_1.5-2.0	BH-10-13_1.5-2.0	BH-10-14_1.5-2.0	BH-10-15_1.4-1.9	BH-10-16_1.5-2.0	BH-10-17_1.5-2.0
Sample Depth				0 - 2 ft	0 - 2 ft	1 - 4 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft	1.2 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 2 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.4 - 1.9 ft	1.5 - 2 ft	1.5 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1198982	1198982	1198982	1198982	UNKNOWN	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209882DL	P209933	P210009	P209937	P209935	P210085	P210088	6007722	6007721	6007732	6007730	5640517	6007731	6007729	6007728	6007727	6007723	6007724	6007725	6007726	6007720
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	ND (1.800) ()	-	ND (1.800) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	0.16 J ()	-	0.15 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	-	-	-	-	-	-	-	0.340 (0.033)	0.360 (0.033)	ND (1.9) (0.033)	35 (0.033)	-	0.570 (0.033)	0.930 (0.033)	0.640 (0.033)	1.3 (0.033)	0.530 (0.033)	0.410 (0.033)	0.230 (0.033)	ND (0.440) (0.033)	0.900 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	ND (0.750) ()	-	ND (0.770) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	ND (0.750) ()	-	ND (0.770) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{sol}$^	58$_{sol}$[B]	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	ND (1.1) ()	-	ND (1.1) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	12 ()	2.9 ()	0.2 J ()	1.4 ()	ND (0.38) ()	ND (0.36) ()	2.3 ()	1.0 (0.033)	3.3 (0.033)	ND (1.9) (0.033)	ND (0.460) (0.033)	-	4.6 (0.033)	3.3 (0.033)	1.5 (0.033)	3.8 (0.033)	1.0 (0.033)	4.9 (0.033)	0.310 (0.033)	ND (0.440) (0.033)	1.4 (0.033)
4-NITROANILINE	mg/kg	4600^	n/v	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	ND (1.8) ()	-	ND (1.8) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	-	-	0.17 J ()	-	ND (0.38) ()	-	-	1.2 (0.033)	2.3 (0.033)	ND (1.9) (0.033)	20 (0.033)	-	3.4 (0.033)	2.0 (0.033)	2.9 (0.033)	3.8 (0.033)	4.5 (0.033)	2.6 (0.033)	2.4 (0.033)	11 (0.033)	2.3 (0.033)
PHENOL	mg/kg	16000^	200[B]	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	-	-	0.15 J ()	-	ND (0.38) ()	-	-	1.7 (0.033)	2.8 (0.033)	ND (1.9) (0.033)	8.9 (0.033)	-	3.2 (0.033)	3.0 (0.033)	6.6 (0.033)	4.5 (0.033)	7.3 (0.033)	1.8 (0.033)	2.7 (0.033)	8.0 (0.033)	1.4 (0.033)
PYRIDINE	mg/kg	3200^	12[B]	-	-	ND (0.75) ()	-	ND (0.77) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	*ND (0.75)* ()	-	*ND (0.77)* ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	ND (0.220) ()	-	ND (0.230) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	ND (0.370) ()	-	ND (0.380) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	0.23 J ()	-	0.32 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	ND (0.37) ()	-	ND (0.38) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	ND (0.740) ()	-	ND (0.760) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	ND (1.9) ()	-	ND (2) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	1.3 L ()	-	2.5 L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	-	6.9 H ()	1.4 H ()	1.7 H ()	3.2 H ()	1.9 H ()	6.5 H ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	33.9 ()	-	160 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	ND (0.56) ()	-	0.69 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	ND (0.56) ()	-	ND (0.57) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220$_{(t)}$^	190$_{(t)}$[B]	-	49.4 L ()	15.4 ()	20.7 L ()	***1730*** [AB] ()	23.6 J ()	30.6 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	13.3 ()	-	4.8 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	-	310 H ()	19.8 ()	8.1 H ()	306 ()	117 ()	***1110*** [B] ()	411 (0.0050)	266 (0.0050)	305 (0.0050)	444 (0.0050)	441 (0.015)	***1230*** [B] (0.0050)	***725*** [B] (0.0050)	184 (0.0050)	414 (0.0050)	320 (0.0050)	***531*** [B] (0.0050)	280 (0.0050)	***616*** [B] (0.0050)	47.8 (0.0050)
MERCURY	mg/kg	510^	10[B]	-	-	0.13 J ()	-	0.11 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	15.0 ()	-	17.9 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	ND (0.45) ()	-	ND (0.46) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	15.2 ()	-	195 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	12.1 ()	9.7 ()	0.56 ()	14.1 ()	11.7 J ()	7.7 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	ND (0.09) ()	ND (0.11) ()	ND (0.08) ()	ND (0.11) ()	ND (0.11) L ()	ND (0.14) L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	983 J ()	ND (32.10) J ()	1580 J ()	1030 J ()	ND (22.10) L ()	945 L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	14.6 (0.50)	20.4 (0.50)	13.0 (0.50)	27.3 (0.50)	14.7 (0.5)	20.9 (0.50)	15.7 (0.50)	12.6 (0.50)	15.9 (0.50)	11.8 (0.50)	14.3 (0.50)	11.3 (0.50)	23.9 (0.50)	8.3 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	1.0 ()	ND (0.48) ()	ND (0.51) ()	ND (0.51) ()	ND (0.55) L ()	0.95 L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	53.1 ()	8.9 J ()	52.9 ()	18.6 J ()	48.1 ()	ND (5.80) L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	0.80 ()	ND (0.28) ()	ND (0.27) ()	0.39 ()	ND (0.27) ()	0.92 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	43000 J ()	3620 L ()	2440 J ()	5720 L ()	5270 ()	29500 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	ND (24.2) ()	ND (20.70) ()	ND (20.70) ()	ND (20.10) ()	ND (21.30) ()	ND (26.40) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-18	BH-10-19	BH-10-20	BH-10-21	BH-10-22	BH-10-23	BH-10-24	BH-10-25	BH-10-26	BH-10-27	BH-10-28	BH-10-29	BH-10-30	BH-10-31	BH-10-32	BH-10-33	BH-10-34	BH-10-35	BNA-3	BNA-11	BNA-12
Sample Date				9-Jun-10	9-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	21-Aug-92	17-Aug-92	14-Aug-92
Sample ID				BH-10-18_1.5-2.0	BH-10-19_0.5-1.0	BH-10-20_1.3-1.8	BH-10-21_1.0-1.5	BH-10-22_1.5-2.0	BH-10-23_1.0-1.5	BH-10-24_1.0-1.5	BH-10-25_1.2-1.7	BH-10-26_1.5-2.0	BH-10-27_1.5-2.0	BH-10-28_1.5-2.0	BH-10-29_0.7-1.2	BH-10-30_1.5-2.0	BH-10-31_1.5-2.0	BH-10-32_0.5-1.0	BH-10-33_1.5-2.0	BH-10-34_1.0-1.5	BH-10-35_1.3-1.7	B087A9	B088A5	B089A2
Sample Depth				1.5 - 2 ft	0.5 - 1 ft	1.3 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0.7 - 1.2 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	1.5 - 2 ft	1 - 1.5 ft	1.3 - 1.7 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical
Laboratory Work Order		A	B	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	P209531	P208791	P208744
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6007719	6007718	6007717	6007716	6007715	6007703	6007702	6007704	6007705	6007709	6007708	6007706	6007707	6007714	6007713	6007710	6007712	6007711			
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	0.0008 J (0.0005)	ND (0.005) (0.0005)	0.003 J (0.0005)	ND (0.0007) (0.0005)	0.005 J (0.0005)	0.019 (0.0005)	0.094 J (0.0005)	**31[B]** (0.0005)	0.003 J (0.0005)	ND (0.460) (0.0005)	**1.6[B]** (0.0005)	0.010 (0.0005)	0.380 J (0.0005)	0.470 J (0.0005)	0.004 J (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	*ND (0.073)* (0.001)	*ND (0.097)* (0.001)	ND (0.001) (0.001)	*ND (0.920)* (0.001)	*ND (0.075)* (0.001)	ND (0.005) (0.001)	*ND (0.088)* (0.001)	*ND (0.098)* (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.073) (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	*ND (0.920)* (0.001)	ND (0.075) (0.001)	ND (0.005) (0.001)	ND (0.088) (0.001)	ND (0.098) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.780 (0.001)	0.510 (0.001)	ND (0.001) (0.001)	2.4 J (0.001)	27 (0.001)	ND (0.005) (0.001)	0.290 J (0.001)	0.630 (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.280 J (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	6.5 (0.001)	2.1 (0.001)	ND (0.005) (0.001)	ND (0.088) (0.001)	0.170 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	ND (0.0007) (0.0005)	ND (0.005) (0.0005)	ND (0.0006) (0.0005)	ND (0.0007) (0.0005)	ND (0.0007) (0.0005)	ND (0.0008) (0.0005)	ND (0.036) (0.0005)	ND (0.049) (0.0005)	ND (0.0006) (0.0005)	ND (0.460) (0.0005)	ND (0.037) (0.0005)	ND (0.005) (0.0005)	ND (0.044) (0.0005)	ND (0.049) (0.0005)	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	0.002 J (0.001)	ND (0.005) (0.001)	0.001 J (0.001)	ND (0.001) (0.001)	0.014 (0.001)	0.010 (0.001)	0.180 J (0.001)	2.8 (0.001)	0.002 J (0.001)	1.7 J (0.001)	6.5 (0.001)	0.028 (0.001)	1.7 (0.001)	1.7 (0.001)	0.007 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.830 (0.001)	0.200 J (0.001)	ND (0.001) (0.001)	16 (0.001)	**280[B]** (0.001)	ND (0.005) (0.001)	0.240 J (0.001)	1.1 (0.001)	0.002 J (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.340 J (0.001)	ND (0.097) (0.001)	ND (0.001) (0.001)	8.0 (0.001)	130 (0.001)	ND (0.005) (0.001)	ND (0.088) (0.001)	0.450 J (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	0.001 J (0.001)	0.002 J (0.001)	0.003 J (0.001)	0.890 (0.001)	1.3 (0.001)	ND (0.001) (0.001)	9.0 (0.001)	250 (0.001)	0.006 (0.001)	0.810 (0.001)	3.8 (0.001)	0.009 (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	1.0 (0.033)	0.670 (0.033)	0.880 (0.033)	2.9 (0.033)	0.790 (0.033)	0.052 J (0.033)	0.083 J (0.033)	0.450 (0.033)	3.6 (0.033)	2.6 (0.033)	ND (0.410) (0.033)	ND (0.180) (0.033)	1.0 (0.033)	0.820 (0.033)	0.130 J (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.290 (0.033)	-	-	-
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	1.4 (0.033)	2.1 (0.033)	1.8 (0.033)	4.4 (0.033)	1.1 (0.033)	0.200 (0.033)	0.270 (0.033)	0.360 (0.033)	5.8 (0.033)	3.4 (0.033)	0.610 J (0.033)	0.210 (0.033)	1.3 (0.033)	0.610 (0.033)	0.180 J (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.790 (0.033)	-	-	-
BENZO(A)PYRENE	mg/kg	12^	12[B]	1.5 (0.033)	2.3 (0.033)	1.7 (0.033)	3.8 (0.033)	1.1 (0.033)	0.240 (0.033)	0.310 (0.033)	0.380 (0.033)	4.3 (0.033)	3.8 (0.033)	0.600 J (0.033)	0.230 (0.033)	1.5 (0.033)	0.610 (0.033)	0.210 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.820 (0.033)	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	1.7 (0.033)	3.1 (0.033)	2.3 (0.033)	4.5 (0.033)	1.6 (0.033)	0.320 (0.033)	0.430 (0.033)	0.770 (0.033)	6.1 (0.033)	5.5 (0.033)	1.3 J (0.033)	0.360 (0.033)	2.3 (0.033)	0.910 (0.033)	0.270 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.840 (0.033)	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.2 (0.033)	2.5 (0.033)	1.4 (0.033)	2.9 (0.033)	1.2 (0.033)	0.140 J (0.033)	0.180 (0.033)	0.270 (0.033)	1.2 (0.033)	3.4 (0.033)	0.640 J (0.033)	ND (0.180) (0.033)	0.740 (0.033)	0.660 (0.033)	0.250 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.610 (0.033)	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	1.6 (0.033)	2.2 (0.033)	1.7 (0.033)	4.7 (0.033)	1.3 (0.033)	0.210 (0.033)	0.280 (0.033)	0.440 (0.033)	5.4 (0.033)	4.4 (0.033)	0.680 J (0.033)	0.240 (0.033)	1.6 (0.033)	0.800 (0.033)	0.270 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.850 (0.033)	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BH-10-18	BH-10-19	BH-10-20	BH-10-21	BH-10-22	BH-10-23	BH-10-24	BH-10-25	BH-10-26	BH-10-27	BH-10-28	BH-10-29	BH-10-30	BH-10-31	BH-10-32	BH-10-33	BH-10-34	BH-10-35	BNA-3	BNA-11	BNA-12
Sample Date				9-Jun-10	9-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	7-Jun-10	7-Jun-10	7-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	8-Jun-10	21-Aug-92	17-Aug-92	14-Aug-92
Sample ID				BH-10-18_1.5-2.0	BH-10-19_0.5-1.0	BH-10-20_1.3-1.8	BH-10-21_1.0-1.5	BH-10-22_1.5-2.0	BH-10-23_1.0-1.5	BH-10-24_1.0-1.5	BH-10-25_1.2-1.7	BH-10-26_1.5-2.0	BH-10-27_1.5-2.0	BH-10-28_1.5-2.0	BH-10-29_0.7-1.2	BH-10-30_1.5-2.0	BH-10-31_1.5-2.0	BH-10-32_0.5-1.0	BH-10-33_1.5-2.0	BH-10-34_1.0-1.5	BH-10-35_1.3-1.7	B087A9	B088A5	B089A2
Sample Depth				1.5 - 2 ft	0.5 - 1 ft	1.3 - 1.7 ft	1 - 1.5 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft	1.2 - 1.7 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0.7 - 1.2 ft	1.5 - 2 ft	1.5 - 2 ft	0.5 - 1 ft	1.5 - 2 ft	1 - 1.5 ft	1.3 - 1.7 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	CCR Historical	CCR Historical	CCR Historical
Laboratory Work Order		A	B	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	1198982	P209531	P208791	P208744
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6007719	6007718	6007717	6007716	6007715	6007703	6007702	6007704	6007705	6007709	6007708	6007706	6007707	6007714	6007713	6007710	6007712	6007711			
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	0.530 (0.033)	0.190 (0.033)	0.320 (0.033)	0.970 (0.033)	0.250 (0.033)	ND (0.037) (0.033)	0.080 J (0.033)	0.170 J (0.033)	1.1 (0.033)	1.7 J (0.033)	0.590 J (0.033)	ND (0.180) (0.033)	0.500 (0.033)	0.320 (0.033)	ND (0.040) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{sol}^	58_{sol}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	3.1 (0.033)	ND (0.180) (0.033)	1.2 (0.033)	9.2 (0.033)	3.7 (0.033)	0.110 J (0.033)	1.4 (0.033)	5.5 (0.033)	3.3 (0.033)	21 (0.033)	**30[B]** (0.033)	0.200 (0.033)	11 (0.033)	7.3 (0.033)	0.640 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.17 J ()	ND (0.35) ()	ND (0.37) ()
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	2.4 (0.033)	2.5 (0.033)	2.6 (0.033)	4.2 (0.033)	2.0 (0.033)	0.170 J (0.033)	0.480 (0.033)	1.6 (0.033)	2.8 (0.033)	8.9 (0.033)	1.8 J (0.033)	0.210 (0.033)	2.9 (0.033)	2.5 (0.033)	0.300 (0.033)	ND (0.180) (0.033)	ND (0.180) (0.033)	0.840 (0.033)	-	-	-
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	2.4 (0.033)	3.5 (0.033)	2.8 (0.033)	7.7 (0.033)	1.5 (0.033)	0.310 (0.033)	0.440 (0.033)	0.540 (0.033)	8.2 (0.033)	6.5 (0.033)	1.3 J (0.033)	0.290 (0.033)	1.7 (0.033)	0.770 (0.033)	0.290 (0.033)	ND (0.180) (0.033)	0.190 (0.033)	1.7 (0.033)	-	-	-
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.4 ()	4.9 ()	5.5 ()
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{tri}^	190_{tri}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150 H ()	30.2 H ()	**264 H[AB]** ()
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	**478[B]** (0.0050)	365 (0.0050)	179 (0.0050)	**869[B]** (0.0050)	304 (0.0050)	**623[B]** (0.0050)	411 (0.0050)	79.4 (0.0050)	**2040[B]** (0.0050)	393 (0.0050)	155 (0.0050)	395 (0.0050)	250 (0.0050)	**610[B]** (0.0050)	298 (0.0050)	43.1 (0.0050)	84.2 (0.0050)	92.5 (0.0050)	**650[B]** ()	32.3 ()	88.7 ()
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.2 J ()	4.9 J ()	10.6 J ()
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.11) L ()	0.21 L ()	ND (0.08) L ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	651 ()	ND (10.60) ()	ND (11.00) ()
MOISTURE, PERCENT	%	n/v	n/v	23.4 (0.50)	9.3 (0.50)	10.7 (0.50)	24.7 (0.50)	12.2 (0.50)	8.8 (0.50)	8.0 (0.50)	32.1 (0.50)	19.3 (0.50)	21.6 (0.50)	19.4 (0.50)	9.2 (0.50)	21.2 (0.50)	30.6 (0.50)	17.6 (0.50)	9.1 (0.50)	9.4 (0.50)	9.7 (0.50)	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2 ()	ND (0.52) ()	ND (0.52) ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (5.80) ()	17.6 ()	27.9 ()
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.44 ()	ND (0.27) ()	0.35 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17700 J ()	2440 J ()	2720 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND (28.60) ()	ND (16.80) ()	ND (23.40) ()

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-14	C-129	C-130	C-131	C-136	C-137	C-138	C-139	C-140	C-142	C-143	C-165	C-168	C-169	C-170	C-171	C-172	GP-270-S-6	GP-270-S-11	GP-270-S-13	GP-270-S-14
Sample Date				14-Aug-92	2-Jun-10	2-Jun-10	3-Jun-10	28-May-10	27-May-10	27-May-10	2-Jun-10	26-May-10	3-Jun-10	3-Jun-10	5-Dec-12	5-Dec-12	5-Dec-12	7-Jul-16	5-Jul-16	6-Jul-16	29-Sep-09	6-Oct-09	6-Oct-09	6-Oct-09
Sample ID				B089A1	C-129_1-2	C-130_1-2	C-131_1-2	C-136_1-2	C-137_1-2	C-138_1-2	C-139_1-2	C-140_1-2	C-142_1-2	C-143_1-2	C-165_1.5-2'	C-168_1.5-2'	C-169_1.5-2'	AOI7-C-170-0-2-070716	AOI7-C-171-0-2-070516	AOI7-C-172-0-2-070616	S-6 (1.5-2.0)	S-11 (1.5-2.0)	S-13 (1.0-1.5)	S-14 (1.0-1.5)
Sample Depth				0 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft
Sampling Company					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				UNKNOWN	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	CCR Historical	1197775	1197775	1197775	1196722	1196722	1196722	1197775	1196722	1197775	1197775	JB23100	JB23100	JB23100	1680744	1680744	1680744	1163948	1165331	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208743	6000420	6000419	6000424	5994015	5994014	5994013	6000421	5994012	6000423	6000422	JB23100-13	JB23100-14	JB23100-15	8466413	8466396	8466402	5790786	5799593	5799595	5799596
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	-	0.003 J (0.0005)	ND (0.005) (0.0005)	ND (0.0006) (0.0005)	0.007 (0.0005)	ND (0.005) (0.0005)	0.012 J (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	0.100 J (0.0005)	**2.0[B]** (0.0005)	ND (0.25) (0.030)	ND (0.0013) (0.00015)	ND (0.0016) (0.00019	0.090 J (0.0005)	0.150 J (0.0005)	ND (0.006) (0.0005)	ND (0.053) (0.0005)	0.120 J (0.0005)	ND (0.058) (0.0005)	ND (0.057) (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.002) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	*ND (0.061)* (0.001)	*ND (0.067)* (0.001)	*ND (0.25)* (0.032)	ND (0.0013) (0.00016)	ND (0.0016) (0.00020	*ND (0.380)* (0.001)	*ND (0.330)* (0.001)	*ND (0.006)* (0.001)	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	ND (0.002) (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	ND (0.061) (0.001)	ND (0.067) (0.001)	ND (0.25) (0.034)	ND (0.0013) (0.00017)	ND (0.0016) (0.00022	ND (0.380) (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	0.014 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.072 J (0.001)	0.150 J (0.001)	ND (0.25) (0.066)	ND (0.0013) (0.00034)	ND (0.0016) (0.00042	0.160 J (0.001)	0.090 J (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	0.009 (0.001)	0.003 J (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.078 J (0.001)	5.6 (0.001)	0.918 J (0.019)	ND (0.0064) (0.00009	ND (0.0080) (0.00012	0.910 (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	-	ND (0.0006) (0.0005)	ND (0.005) (0.0005)	0.017 (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	ND (0.001) (0.0005)	ND (0.004) (0.0005)	ND (0.005) (0.0005)	ND (0.031) (0.0005)	ND (0.033) (0.0005)	ND (0.25) (0.059)	ND (0.0013) (0.00030)	ND (0.0016) (0.00038	ND (0.380) (0.0005)	ND (0.330) (0.0005)	ND (0.006) (0.0005)	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.410 J (0.001)	0.290 J (0.001)	0.670 (0.001)	0.800 (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	-	0.012 (0.001)	ND (0.005) (0.001)	0.003 J (0.001)	0.008 (0.001)	ND (0.005) (0.001)	0.054 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.630 (0.001)	0.220 J (0.001)	0.347 (0.026)	ND (0.0013) (0.00013	0.00052 J (0.00017)	0.410 (0.001)	0.390 (0.001)	ND (0.006) (0.001)	0.360 J (0.001)	0.400 (0.001)	0.400 J (0.001)	0.280 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	0.014 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.180 J (0.001)	0.250 J (0.001)	0.147 J (0.052)	ND (0.0064) (0.00027)	ND (0.0080) (0.00033	1.500 (0.001)	0.110 J (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)	ND (0.064) (0.001)	ND (0.120) (0.001)	0.130 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	0.007 J (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.090 J (0.001)	0.240 J (0.001)	ND (1.2) (0.040)	ND (0.0064) (0.00020)	ND (0.0080) (0.00026	0.270 J (0.001)	ND (0.330) (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)	ND (0.064) (0.001)	ND (0.120) (0.001)	ND (0.110) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	-	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.001) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	0.072 (0.001)	ND (0.004) (0.001)	ND (0.005) (0.001)	0.220 J (0.001)	0.570 (0.001)	0.445 (0.035)	ND (0.0013) (0.00018)	ND (0.0016) (0.00022	0.830 (0.001)	0.490 (0.001)	ND (0.006) (0.001)	ND (0.110) (0.001)	0.083 J (0.001)	0.140 J (0.001)	0.190 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	-	0.830 (0.033)	2.7 (0.033)	0.940 J (0.033)	ND (0.180) (0.033)	1.9 (0.033)	0.094 J (0.033)	ND (0.180) (0.033)	0.380 (0.033)	2.0 (0.033)	0.170 J (0.033)	2.64 (0.090)	0.206 (0.013)	0.0691 (0.016)	2.200 (0.003)	2.900 (0.003)	0.910 (0.003)	7.5 (0.033)	0.890 J (0.033)	1.1 J (0.033)	1.1 J (0.033)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	-	1.9 (0.033)	9.6 (0.033)	1.3 (0.033)	0.370 (0.033)	2.3 (0.033)	0.240 J (0.033)	ND (0.180) (0.033)	1.2 (0.033)	3.1 (0.033)	0.420 (0.033)	0.790 (0.084)	0.240 (0.013)	0.0673 (0.015)	2.100 J (0.003)	4.800 (0.003)	2.000 (0.003)	8.8 (0.033)	1.6 J (0.033)	1.8 J (0.033)	1.9 J (0.033)
BENZO(A)PYRENE	mg/kg	12^	12[B]	-	2.3 (0.033)	8.4 (0.033)	1.5 (0.033)	0.380 (0.033)	1.9 (0.033)	0.200 J (0.033)	ND (0.180) (0.033)	1.2 (0.033)	3.4 (0.033)	0.520 (0.033)	0.576 (0.078)	0.223 (0.012)	0.0624 (0.014)	2.100 J (0.003)	3.900 (0.003)	2.000 (0.003)	7.1 (0.033)	1.6 J (0.033)	2.4 J (0.033)	2.5 J (0.033)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	-	3.1 (0.033)	11 (0.033)	2.2 (0.033)	0.550 (0.033)	2.2 (0.033)	0.320 (0.033)	ND (0.180) (0.033)	1.4 (0.033)	4.8 (0.033)	0.620 (0.033)	0.445 (0.086)	0.206 (0.013)	0.0670 (0.015)	2.700 (0.003)	7.000 (0.003)	2.600 (0.003)	8.6 (0.033)	2.0 (0.033)	2.8 (0.033)	3.0 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	-	0.870 (0.033)	4.9 (0.033)	0.640 J (0.033)	0.390 (0.033)	1.3 (0.033)	0.150 J (0.033)	ND (0.180) (0.033)	1.0 (0.033)	1.3 (0.033)	0.430 (0.033)	0.912 (0.096)	0.612 (0.014)	0.0751 (0.017)	2.400 (0.003)	2.700 (0.003)	1.500 (0.003)	3.7 (0.033)	1.1 J (0.033)	1.9 J (0.033)	2.3 J (0.033)
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	-	1.8 (0.033)	8.7 (0.033)	1.6 (0.033)	0.410 (0.033)	2.3 (0.033)	0.300 (0.033)	ND (0.180) (0.033)	1.3 (0.033)	2.9 (0.033)	0.600 (0.033)	1.05 (0.087)	0.276 (0.013)	0.0565 (0.015)	3.600 (0.003)	5.100 (0.003)	1.900 (0.003)	11 (0.033)	1.9 J (0.033)	1.9 J (0.033)	1.9 J (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-14	C-129	C-130	C-131	C-136	C-137	C-138	C-139	C-140	C-142	C-143	C-165	C-168	C-169	C-170	C-171	C-172	GP-270-S-6	GP-270-S-11	GP-270-S-13	GP-270-S-14
Sample Date				14-Aug-92	2-Jun-10	2-Jun-10	3-Jun-10	28-May-10	27-May-10	27-May-10	2-Jun-10	26-May-10	3-Jun-10	3-Jun-10	5-Dec-12	5-Dec-12	5-Dec-12	7-Jul-16	5-Jul-16	6-Jul-16	29-Sep-09	6-Oct-09	6-Oct-09	6-Oct-09
Sample ID				B089A1	C-129_1-2	C-130_1-2	C-131_1-2	C-136_1-2	C-137_1-2	C-138_1-2	C-139_1-2	C-140_1-2	C-142_1-2	C-143_1-2	C-165_1.5-2'	C-168_1.5-2'	C-169_1.5-2'	AOI7-C-170-0-2-070716	AOI7-C-171-0-2-070516	AOI7-C-172-0-2-070616	S-6 (1.5-2.0)	S-11 (1.5-2.0)	S-13 (1.0-1.5)	S-14 (1.0-1.5)
Sample Depth				0 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1 - 1.5 ft	1 - 1.5 ft
Sampling Company					UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				UNKNOWN	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	CCR Historical	1197775	1197775	1197775	1196722	1196722	1196722	1197775	1196722	1197775	1197775	JB23100	JB23100	JB23100	1680744	1680744	1680744	1163948	1165331	1165331	1165331
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208743	6000420	6000419	6000424	5994015	5994014	5994013	6000421	5994012	6000423	6000422	JB23100-13	JB23100-14	JB23100-15	8466413	8466396	8466402	5790786	5799593	5799595	5799596
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	-	0.280 (0.033)	ND (1.9) (0.033)	0.350 J (0.033)	ND (0.180) (0.033)	1.8 (0.033)	ND (0.051) (0.033)	ND (0.180) (0.033)	ND (0.190) (0.033)	1.6 (0.033)	0.062 J (0.033)	7.93 (0.084)	ND (0.038) (0.013)	ND (0.045) (0.015)	ND (2.100) (0.003)	1.800 (0.003)	0.470 (0.003)	7.3 (0.033)	0.650 J (0.033)	ND (0.520) (0.033)	ND (0.500) (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.1 (0.033)	0.960 J (0.033)	1.6 J (0.033)	1.9 J (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{sol}^	58_{sol}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	0.31 J ()	4.2 (0.033)	ND (1.9) (0.033)	6.5 (0.033)	0.550 (0.033)	5.4 (0.033)	0.110 J (0.033)	ND (0.180) (0.033)	0.470 (0.033)	2.0 (0.033)	0.270 (0.033)	ND (0.26) (0.070)	0.0225 J (0.010)	ND (0.045) (0.012)	6.200 (0.003)	5.000 (0.003)	3.100 (0.003)	-	-	-	-
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	-	2.6 (0.033)	7.3 (0.033)	2.9 (0.033)	0.360 (0.033)	4.4 (0.033)	0.240 J (0.033)	ND (0.180) (0.033)	0.990 (0.033)	7.1 (0.033)	0.490 (0.033)	10.6 (0.12)	0.165 (0.017)	0.0423 J (0.021)	6.300 (0.003)	6.600 (0.003)	2.700 (0.003)	17 (0.033)	1.7 J (0.033)	3.0 (0.033)	2.5 J (0.033)
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	-	3.6 (0.033)	13 (0.033)	1.9 (0.033)	0.440 (0.033)	ND (0.210) (0.033)	0.360 (0.033)	0.250 (0.033)	1.9 (0.033)	5.9 (0.033)	0.930 (0.033)	2.05 (0.099)	0.284 (0.015)	0.0751 (0.017)	5.400 (0.003)	8.500 (0.003)	2.800 (0.003)	23 (0.033)	3.5 (0.033)	2.0 J (0.033)	2.3 J (0.033)
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	10.6 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{tri}^	190_{tri}[B]	***972 H*** [AB] ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	228 ()	252 (0.005)	***814*** [B] (0.005)	396 (0.005)	218 (0.02)	251 (0.02)	103 (0.02)	98.7 (0.02)	98.6 (0.02)	***1370*** [B] (0.005)	164 (0.005)	286 (0.17)	273 (0.14)	127 (0.17)	***793*** [B] (0.550)	324 (0.550)	198 (0.550)	450 (0.591)	99.9 (0.591)	330 (0.591)	366 (0.591)
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	7.9 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	ND (0.09) L ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	305 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	21.4 (0.5)	14.3 (0.5)	24.2 (0.5)	9.7 (0.5)	20.5 (0.5)	35.1 (0.5)	9.5 (0.5)	12.9 (0.5)	10.9 (0.5)	6.2 (0.5)	-	-	-	18.7 (0.50)	21.2 (0.50)	18.8 (0.50)	44.9 (0.50)	15.0 (0.50)	35.9 (0.50)	33.8 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.53) ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	64.4 ()	81.5 ()	69.4 ()	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	24.6 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	2.2 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	9220 J ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	94.6 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-15	GP-271-GP-1	GP-271-GP-2	GP-271-GP-3	GP-271-GP-4		GP-271-GP-5		GP-271-GP-6	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4	GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	GP-1002-1002	GP 1002-1002 PIPE-1	GP 1002-1002 PIPE-2	GP 1002-1002-1	GP 1002-1002-2
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	4-Jun-02	4-Jun-02	17-Sep-02	4-Jun-02	17-Sep-02	4-Jun-02	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	11-May-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06
Sample ID				S-15 (1.5-2.0)	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4	GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	1002	1002 PIPE-1	1002 PIPE-2	1002-1	1002-2
Sample Depth				1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft					
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	WGI	WGI	WGI	WGI	WGI	PIP	PIP	PIP	PIP	PIP	PIP	PIP	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	074100	074100	074100	074100	074097	074097	074097	989527	985190	985190	985190	985190
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799597	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	0705-4569	0705-4570	0705-4571	0705-4572	0705-4554	0705-4555	0705-4556	4771679	4748119	4748120	4748121	4748122
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	38 ()	-	ND (5) ()	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290^	0.5[B]	0.110 J (0.0005)	ND (0.27) ()	ND (0.22) ()	0.15 J ()	**2.2[B]** ()	-	**1.2[B]** ()	-	0.076 J ()	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()	**2.3 D[B]** ()	ND (0.140) D ()	ND (0.160) D ()	U	U	0.16 (0.025)	U	**1.4[B]** (0.12)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86^	0.5[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890^	70[B]	0.190 J (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()	0.680 D ()	ND (0.140) D ()	ND (0.160) D ()	U	U	0.047 J (0.025)	0.63 (0.12)	1.9 (0.12)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.110) (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()	0.120 J D ()	ND (0.140) D ()	ND (0.160) D ()	0.52 (0.034)	U	0.064 J (0.063)	5.8 (0.3)	12 (0.31)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600^	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	0.430 J (0.001)	-	-	-	-	-	-	-	-	0.230 J D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()	0.580 D ()	0.130 J D ()	0.130 J D ()	0.043 J (0.034)	4 J (2.6)	2.5 (0.13)	14 (0.59)	**30[B]** (0.62)
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	0.630 (0.001)	-	-	-	-	-	-	-	-	ND (0.240) D ()	ND (0.210) D ()	ND (0.230) D ()	ND (0.160) D ()	1.7 D ()	0.098 J D ()	ND (0.160) D ()	U	U	0.12 (0.025)	0.6 (0.12)	1.2 (0.12)
TRANS-1,2-DICHLOROETHENE	mg/kg	4800^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560^	35[B]	0.160 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.110) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000^	1000[B]	0.640 (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	U	U	0.27 (0.063)	2.2 (0.3)	6.8 (0.31)
Crotonaldehyde (2-Butenal)	mg/kg	48^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	4.4 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	ND (0.360) ()	ND (0.360) ()	ND (0.380) ()	4.8 (0.21)	U	0.076 J (0.015)	9.1 (0.17)	5.5 (0.18)
BENZENETHIOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130^	130[B]	5.8 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.25 J ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	0.730 D ()	ND (0.360) ()	ND (0.380) ()	2.9 (0.21)	0.17 (0.032)	0.31 (0.033)	6.1 (0.39)	3 (0.39)
BENZO(A)PYRENE	mg/kg	12^	12[B]	6.5 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	*ND (16)* ()	-	0.33 J ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	0.760 D ()	ND (0.360) ()	ND (0.380) ()	2.3 (0.21)	1.2 (0.048)	1.2 (0.05)	5.8 (0.58)	2.8 J (0.59)
BENZO(B)FLUORANTHENE	mg/kg	76^	76[B]	7.5 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.44 ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	0.830 D ()	ND (0.360) ()	0.260 J ()	2.6 (0.21)	0.83 (0.064)	1 (0.067)	4.8 (0.77)	2.5 J (0.79)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	4.6 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	0.630 J D ()	ND (0.360) ()	ND (0.380) ()	1.6 (0.21)	13 (0.064)	5.7 (0.067)	6 (0.77)	-
BENZO(K)FLUORANTHENE	mg/kg	76^	76[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760^	230[B]	7.3 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	ND (16) ()	-	0.41 J ()	0.230 J ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	1.7 D ()	ND (0.360) ()	ND (0.380) ()	3.6 (0.21)	0.65 (0.048)	0.33 J (0.05)	11 (0.58)	6.6 (0.59)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22^	22[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-15	GP-271-GP-1	GP-271-GP-2	GP-271-GP-3	GP-271-GP-4		GP-271-GP-5		GP-271-GP-6	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4	GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	GP-1002-1002	GP 1002-1002 PIPE-1	GP 1002-1002 PIPE-2	GP 1002-1002-1	GP 1002-1002-2
Sample Date				6-Oct-09	4-Jun-02	4-Jun-02	4-Jun-02	4-Jun-02	17-Sep-02	4-Jun-02	17-Sep-02	4-Jun-02	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	25-May-07	11-May-06	7-Apr-06	7-Apr-06	7-Apr-06	7-Apr-06
Sample ID				S-15 (1.5-2.0)	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)	GP-275-LINE1	GP-275-LINE2	GP-275-LINE3	GP-275-LINE4	GP-277-LINE1	GP-277-LINE2	GP-277-LINE3	1002	1002 PIPE-1	1002 PIPE-2	1002-1	1002-2
Sample Depth				1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft					
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	PIP	PIP	PIP	PIP	PIP	PIP	PIP	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	WGI	WGI	WGI	WGI	WGI	WGI	WGI	WGI	074100	074100	074100	074100	074097	074097	074097	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1165331	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	0705-4569	0705-4570	0705-4571	0705-4572	0705-4554	0705-4555	0705-4556	989527	985190	985190	985190	985190
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5799597	GP-1(0-0.5)	GP-2 (0.5-1.0)	GP-3 (1.5-2.0)	GP-4 (1.5-2.0)	GP-4 (1.5-2)	GP-5 (1.5-2.0)	GP-5 (1.5-2)	GP-6 (0-0.5)								4771679	4748119	4748120	4748121	4748122
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	130000^	3800[B]	3.2 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	0.75 ()	-	120 ()	-	ND (0.44) ()	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	ND (0.720) D ()	ND (0.360) ()	ND (0.380) ()	6.3 (0.21)	2 (0.096)	0.47 J (0.1)	22 (1.2)	20 (1.2)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76^	76[B]	3.6 (0.033)	-	-	-	-	-	-	-	-	ND (0.340) ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	0.460 J D ()	ND (0.360) ()	ND (0.380) ()	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{10}^	58_{10}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760^	25[B]	-	ND (0.27) ()	ND (0.22) ()	1.2 ()	1.5 ()	-	ND (0.54) ()	-	0.19 J ()	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	4.9 (0.033)	ND (0.37) ()	ND (0.37) ()	0.29 J ()	0.84 ()	-	110 ()	-	0.39 J ()	0.560 ()	0.210 J ()	ND (0.370) ()	ND (0.350) ()	0.860 D ()	ND (0.360) ()	ND (0.380) ()	13 (0.21)	0.16 J (0.048)	0.85 (0.05)	41 (0.58)	26 (0.59)
PHENOL	mg/kg	16000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	96000^	2200[B]	15 (0.033)	ND (0.37) ()	ND (0.37) ()	ND (0.53) ()	ND (0.65) ()	-	11 J ()	-	0.44 ()	0.330 J ()	ND (0.360) ()	ND (0.370) ()	ND (0.350) ()	2.5 D ()	ND (0.360) ()	0.300 J ()	7.3 (0.21)	0.53 J (0.11)	1.3 (0.12)	14 (1.4)	34 (1.4)
PYRIDINE	mg/kg	3200^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	30^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	1300^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1^	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{11}^	190_{11}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	2240^	450[B]	386 (0.591)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	mg/kg	510^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	16000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	220^	220[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	35.5 (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22 (0.5)	16.8 (0.5)	20.3 (0.5)	31.1 (0.5)	32.1 (0.5)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP 1002-1002-3	GP 1100-1100-1	GP 1100-1100-2	GP 1100-1100-3	GP 1100-1100-CV-1		GP 1100-1100-CV-2	GP 1100-1100-CV-3	GP 1100-1100-Elbow	GP 1100-1100-Joints	GP280-08	GP280-09	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3	LO-1000-LINE-4
Sample Date				7-Apr-06	11-May-06	11-May-06	11-May-06	11-May-06	19-Jun-06	11-May-06	11-May-06	11-May-06	11-May-06	29-Aug-16	29-Aug-16	24-Feb-16	24-Feb-16	24-Feb-16	24-Feb-16	30-May-07	30-May-07	30-May-07	30-May-07
Sample ID				1002-3	1100-1	1100-2	1100-3	1100-CV-1	1100CV-1	1100-CV-2	1100-CV-3	1100-Elbow	1100-Joints	GP280-08-20160829-1.0	GP280-09-20160829-1.0	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3	LO-1000-LINE-4
Sample Depth														1 ft	1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	985190	989526	989526	989526	989526	994824	989526	989526	989526	989526	1701349	1701349	1634471/1629086	1634471/1629086	1634471/1629086	1634471/1629086	074145	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4748123	4771671	4771672	4771673	4771674	4800867	4771675	4771676	4771677	4771678	8557113	8557114	8256671/8231752	8256672/8231753	8256673/8231754	8256674/8231755	0706-0474	0706-0475	0706-0476	0706-0477
Volatile Organic Compounds																							
ACETONITRILE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.6[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	33[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	µg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	290[A]	0.5[B]	U	1.1[B] (0.017)	0.097 J (0.017)	0.25 (0.021)	0.017 J (0.015)	-	U	U	0.16 J (0.017)	0.33 (0.019)	ND (0.0008) (0.0005)	ND (0.064) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	97[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	0.013 (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.003 J (0.001)	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	86[A]	0.5[B]	-	-	-	-	-	-	-	-	-	-	ND (0.002) (0.001)	ND (0.13) (0.001)	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	220[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	890[A]	70[B]	0.56 (0.052)	0.59 (0.035)	0.28 (0.034)	0.33 (0.042)	U	-	U	U	U	1.3 (0.038)	0.004 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	6.2 (0.13)	0.18 (0.035)	0.09 J (0.034)	0.076 J (0.042)	U	-	U	U	U	2.6 (0.038)	0.004 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	8600[A]	2[B]	-	-	-	-	-	-	-	-	-	-	ND (0.0008) (0.0005)	ND (0.064) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.005) (0.0005)	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	0.003 J (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	0.002 J (0.001)	ND (0.001) (0.001)	0.044 (0.001)	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	4.5 (0.26)	0.099 J (0.035)	0.35 (0.034)	1.2 (0.042)	0.18 (0.03)	-	0.18 (0.031)	0.054 J (0.03)	0.048 J (0.033)	5.6 (0.038)	0.005 J (0.001)	0.50 J (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	0.008 (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	0.005 J (0.001)	ND (0.001) (0.001)	0.002 J (0.001)	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	ND (0.002) (0.001)	ND (0.13) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.0008) (0.001)	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	0.23 (0.052)	U	U	U	U	-	U	U	0.25 (0.033)	5.6 (0.038)	0.003 J (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.005) (0.001)	-	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	4800[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	16[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	160[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	560[A]	35[B]	-	-	-	-	-	-	-	-	-	-	0.16 (0.001)	0.22 J (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	0.006 (0.001)	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	-	-	-	-	-	0.026 (0.001)	ND (0.13) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.005) (0.001)	0.013 (0.001)	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	8000[A]	1000[B]	1.9 (0.13)	0.042 J (0.035)	0.13 J (0.034)	0.11 J (0.042)	U	-	0.18 (0.031)	0.031 J (0.03)	0.12 J (0.033)	86 (0.38)	0.011 (0.001)	ND (0.13) (0.001)	0.002 J (0.001)	0.022 (0.001)	ND (0.001) (0.001)	0.004 J (0.001)	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	48[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	170[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																							
1,2-DIBROMOETHANE (EDB)	mg/kg	3.7[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	ND (0.0026) (0.00020)	ND (0.0024) (0.00020)	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																							
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	0.83 J (0.0033)	0.85 (0.0033)	0.22 J (0.0033)	0.27 (0.0033)	ND (0.021) (0.0033)	ND (0.10) (0.0033)	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	8.9 (0.16)	82 (5.3)	21 (0.26)	32 (0.55)	-	5.6 (0.2)	41 (0.42)	0.84 J (0.41)	1.6 J (0.43)	7.4 (0.44)	2.7 (0.0033)	1.4 (0.0033)	0.31 J (0.0033)	0.35 (0.0033)	0.11 (0.0033)	0.11 J (0.0033)	-	-	-	-
BENZENETHIOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	0.4[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	130[A]	130[B]	5.4 (0.36)	16 (0.53)	3.8 (0.26)	8.2 (0.55)	-	10 (0.2)	26 (0.42)	0.63 J (0.41)	0.89 J (0.43)	5 (0.44)	1.9 (0.0033)	0.99 (0.0033)	0.42 J (0.0033)	0.53 (0.0033)	0.20 (0.0033)	0.32 J (0.0033)	-	-	-	-
BENZO(A)PYRENE	mg/kg	12[A]	12[B]	4.9 (0.54)	9.7 (0.53)	2.6 (0.26)	3.8 (0.55)	-	6.8 (0.2)	13[AB] (0.42)	0.79 J (0.41)	1.2 J (0.43)	2.3 (0.44)	1.2 (0.0033)	0.58 (0.0033)	0.44 J (0.0033)	0.46 (0.0033)	0.19 (0.0033)	0.28 J (0.0033)	-	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	76[A]	76[B]	5.5 (0.72)	9.3 (0.53)	2.6 (0.26)	4 (0.55)	-	7.9 (0.2)	8.5 (0.42)	0.81 J (0.41)	0.87 J (0.43)	1.8 J (0.44)	2.8 (0.0033)	0.88 (0.0033)	0.51 J (0.0033)	0.59 (0.0033)	0.25 (0.0033)	0.42 J (0.0033)	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	5.5 (0.72)	4.2 (0.53)	1.9 (0.26)	2.4 J (0.55)	-	3.8 (0.2)	6.2 (0.42)	3.4 (0.41)	1.8 J (0.43)	3.3 (0.44)	1.4 (0.0033)	0.67 (0.0033)	0.47 J (0.0033)	0.42 (0.0033)	0.25 (0.0033)	ND (0.10) (0.0033)	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	76[A]	76[B]	-	-	-	-	-	-	-	-	-	-	1.1 J (0.0033)	0.41 J (0.0033)	0.19 J (0.0033)	0.20 (0.0033)	0.077 J (0.0033)	0.12 J (0.0033)	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	11000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	ND (1.1) (0.017)	0.96 (0.017)	ND (0.53) (0.017)	0.47 (0.017)	0.13 J (0.017)	ND (0.52) (0.017)	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	6.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	6500[A]	130[B]	-	-	-	-	-	-	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	760[A]	230[B]	11 (0.54)	29 (0.53)	7.1 (0.26)	22 (0.55)	-	16 (0.2)	41 (0.42)	2.3 (0.41)	3 (0.43)	8.2 (0.44)	8.0 (0.0033)	4.0 (0.0033)	1.9 (0.0033)	1.8 (0.0033)	0.32 (0.0033)	1.5 (0.0033)	-	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	22[A]	22[B]	-	-	-	-	-	-	-	-	-	-	0.50 J (0.0033)	0.31 J (0.0033)	0.17 J (0.0033)	0.10 J (0.0033)	0.071 J (0.0033)	ND (0.10) (0.0033)	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP 1002-1002-3	GP 1100-1100-1	GP 1100-1100-2	GP 1100-1100-3	GP 1100-1100-CV-1		GP 1100-1100-CV-2	GP 1100-1100-CV-3	GP 1100-1100-Elbow	GP 1100-1100-Joints	GP280-08	GP280-09	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3	LO-1000-LINE-4
Sample Date				7-Apr-06	11-May-06	11-May-06	11-May-06	11-May-06	19-Jun-06	11-May-06	11-May-06	11-May-06	11-May-06	29-Aug-16	29-Aug-16	24-Feb-16	24-Feb-16	24-Feb-16	24-Feb-16	30-May-07	30-May-07	30-May-07	30-May-07
Sample ID				1002-3	1100-1	1100-2	1100-3	1100-CV-1	1100CV-1	1100-CV-2	1100-CV-3	1100-Elbow	1100-Joints	GP280-08-20160829-1.0	GP280-09-20160829-1.0	GP284-01	GP284-02	GP284-03	GP284-04	LO-1000-LINE-1	LO-1000-LINE-2	LO-1000-LINE-3	LO-1000-LINE-4
Sample Depth														1 ft	1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0.5 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	985190	989526	989526	989526	989526	994824	989526	989526	989526	989526	1701349	1701349	1634471/1629086	1634471/1629086	1634471/1629086	1634471/1629086	074145	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	4748123	4771671	4771672	4771673	4771674	4800867	4771675	4771676	4771677	4771678	8557113	8557114	8256671/8231752	8256672/8231753	8256673/8231754	8256674/8231755	0706-0474	0706-0475	0706-0476	0706-0477
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROPHENOL	mg/kg	6400[A]	23[B]	-	-	-	-	-	-	-	-	-	-	ND (20) (0.30)	ND (7.6) (0.30)	ND (9.5) (0.30)	ND (1.9) (0.30)	ND (1.9) (0.30)	ND (9.3) (0.30)	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	290[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	130000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	5.2 (0.0033)	1.6 (0.0033)	0.66 (0.0033)	0.57 (0.0033)	0.28 (0.0033)	0.42 J (0.0033)	-	-	-	-
FLUORENE	mg/kg	130000[A]	3800[B]	20 (1.1)	210 (5.3)	64 (2.6)	160 (5.5)	-	11 (0.2)	59 (2.1)	U	1.1 (0.43)	16 (0.44)	2.0 (0.0033)	2.7 (0.0033)	0.34 J (0.0033)	0.41 (0.0033)	0.069 J (0.0033)	0.16 J (0.0033)	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	76[A]	76[B]	-	3.2 (0.53)	1.5 (0.26)	1.8 J (0.55)	-	2.7 (0.2)	4 (0.42)	1.5 J (0.41)	1.2 J (0.43)	1.6 J (0.44)	0.88 J (0.0033)	0.45 (0.0033)	0.39 J (0.0033)	0.31 (0.0033)	0.14 (0.0033)	ND (0.10) (0.0033)	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	13000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	2.5 (0.0033)	8.1 (0.0033)	1.1 (0.0033)	2.1 (0.0033)	0.60 (0.0033)	0.12 J (0.0033)	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{32}[A]	58_{20}[B]	-	-	-	-	-	-	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	160000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	16000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	760[A]	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	0.71 (0.0033)	1.8 (0.0033)	0.54 (0.0033)	0.10 J (0.0033)	-	-	-	-
4-NITROANILINE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	6400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	26000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	*ND (11)* (0.17)	ND (4.2) (0.17)	ND (5.3) (0.17)	ND (1.1) (0.17)	ND (1.1) (0.17)	ND (5.2) (0.17)	-	-	-	-
PENTACHLOROPHENOL	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	36 (0.54)	620 (5.3)	180 (2.6)	440 (5.5)	-	22 (0.2)	160 (2.1)	0.63 J (0.41)	2.6 (0.43)	31 (0.44)	7.4 (0.0033)	8.5 (0.0033)	0.88 (0.0033)	0.95 (0.0033)	0.37 (0.0033)	0.22 J (0.0033)	-	-	-	-
PHENOL	mg/kg	16000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	ND (1.1) (0.017)	ND (0.42) (0.017)	ND (0.53) (0.017)	ND (0.11) (0.017)	ND (0.11) (0.017)	ND (0.52) (0.017)	-	-	-	-
PYRENE	mg/kg	96000[A]	2200[B]	16 (1.3)	60 (0.53)	17 (0.26)	41 (0.55)	-	31 (0.41)	78 (2.1)	1 J (0.41)	2.9 (0.43)	13 (0.44)	5.6 (0.0033)	2.3 (0.0033)	1.4 (0.0033)	0.98 (0.0033)	0.28 (0.0033)	1.0 (0.0033)	-	-	-	-
PYRIDINE	mg/kg	3200[A]	12[B]	-	-	-	-	-	-	-	-	-	-	ND (4.3) (0.067)	ND (1.7) (0.067)	ND (2.1) (0.067)	ND (0.43) (0.067)	ND (0.43) (0.067)	ND (2.1) (0.067)	-	-	-	-
QUINOLINE	mg/kg	30[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	*ND (2.2)* (0.033)	*ND (0.85)* (0.033)	*ND (1.1)* (0.033)	ND (0.21) (0.033)	ND (0.21) (0.033)	*ND (1.0)* (0.033)	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	3100[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	3200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	79[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	45[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.036[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	1500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																							
ANTIMONY	mg/kg	1300[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	61[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	11[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	6.1[A]	6.1[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	220_{11}[A]	190_{11}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	960[A]	160[B]	-	-	-	-	-	-	-	-	-	-	10.9 (0.120)	11.9 (0.120)	7.70 (0.0810)	6.50 (0.0810)	5.39 (0.0810)	7.79 (0.0810)	-	-	-	-
LEAD	mg/kg	2240[A]	450[B]	-	-	-	-	-	-	-	-	-	-	98.5 (0.550)	50.3 (0.550)	-	-	-	-	-	-	-	-
MERCURY	mg/kg	510[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	64000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	32.9 (0.300)	21.6 (0.300)	34.3 (0.230)	17.9 (0.230)	22.1 (0.230)	53.1 (0.230)	-	-	-	-
SELENIUM	mg/kg	16000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65 J ()	820 ()	110 J ()	46 J ()
VANADIUM	mg/kg	220[A]	220[B]	-	-	-	-	-	-	-	-	-	-	85.0 (0.140)	60.1 (0.140)	119 (0.230)	29.3 (0.230)	28.6 (0.230)	***633*** [AB] (0.230)	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	185 (0.680)	86.7 (0.680)	538 (0.770)	149 (0.770)	94.6 (0.770)	886 (0.770)	-	-	-	-
General Chemistry																							
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	220[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	26.2 (0.5)	36.9 (0.5)	35.3 (0.5)	39.3 (0.5)	19.3 (0.5)	18.1 (0.0005)	20.8 (0.5)	17.9 (0.5)	23.3 (0.5)	24.7 (0.5)	23.2 (0.50)	21.3 (0.50)	20.9 (0.50)	22.3 (0.50)	23.5 (0.50)	20.2 (0.50)	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.33 ()	11.39 ()	5.45 ()	11.44 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	1900[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J2 - Historical Soil Analytical Results Summary - AOI 7 (0-2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Notes:

MSC-PA	Pennsylvania Department of Environmental Protection - 2016
[A]	Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Soil - Direct Contact - Non-Residential Surface Soil (0-2 ft). Lead value is the site-specific standard.
SHS-PA	Pennsylvania Department of Environmental Protection - Statewide Health Standards - 2016
[B]	PADEP Non-Residential Statewide Health Standards (0-2 ft bgs) (Unsaturated Soil)
6.5 [A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.50)	Laboratory reporting limit was greater than the applicable standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value in database - 2016 values have been populated for Evergreen Comprehensive List only. Criteria for other analytes may be available but may not be represented here.
-	Parameter not analyzed / not available.
s1 [AB]	Standards for total chromium are not established in soil. These concentrations have been compared the values for hexavalent chromium, which is the strictest of the chromium standards.
s2 [AB]	Cresol, m&p (3-Methylphenol & 4-Methylphenol) co-elute and are reported as the summation of the co-eluting compounds. Standards shown are the stricter of the two.
B	Indicates the analyte is detected in the associated blank as well as in the sample.
D	Indicates an identified compound in an analysis that has been diluted. This flag alerts the data user to any differences between the concentrations reported in the two analyses.
H	SAMPLE RESULT IS ESTIMATED AND BIASED HIGH.
J	Indicates an estimated value.
L	SAMPLE RESULT IS ESTIMATED AND BIASED LOW.
R	The data are unusable. The analyte may or may not be present in the sample.
mg/kg	milligrams per kilogram
ug/L	micrograms per liter
S.U.	Standard Units.
meq/100g	milliequivalents per 100 grams
ft	Feet
LL	Eurofins Lancaster Laboratories Environmental
PIP	Pace Analytical Services, Inc.
	Method detection limit is shown in second set of parentheses.

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54	AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64		AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73	AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'	BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'	BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'	BH-12-74_4'	BH-12-76_3'	BH-12-77_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft	3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549	JB22549	1352569	1352569	JB22561	JB22561	JB22561	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915	6876912	6876911	6876920
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330^	0.5[B]	ND (0.004) (0.0005)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	0.340 (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.0005)	ND (0.036) (0.0005)	ND (0.00087) (0.00087	0.135 (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	0.00097 (0.00089)	ND (0.00079) (0.00079	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.006) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	*ND (0.066)* (0.066)	*ND (0.066)* (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.001)	*ND (0.073)* (0.001)	ND (0.00087) (0.00087	*ND (0.070)* (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	ND (0.00089) (0.00089	ND (0.00079) (0.00079	*ND (0.006)* (0.001)	ND (0.005) (0.001)	*ND (0.006)* (0.001)	*ND (0.006)* (0.001)	*ND (0.009)* (0.001)	ND (0.004) (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	ND (0.066) (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087	ND (0.070) (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	ND (0.00089) (0.00089	ND (0.00079) (0.00079	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000^	70[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.164 (0.066)	5.98 (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087	0.143 (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	ND (0.00089) (0.00089	ND (0.00079) (0.00079	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	ND (0.33) (0.33)	2.24 (0.33)	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	ND (0.004) (0.0005)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	ND (0.066) (0.066)	ND (0.066) (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.0005)	ND (0.036) (0.0005)	ND (0.00087) (0.00087	ND (0.070) (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	ND (0.00089) (0.00089	ND (0.00079) (0.00079	ND (0.006) (0.0005)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.006) (0.0005)	ND (0.009) (0.0005)	ND (0.004) (0.0005)
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	0.989 (0.33)	4.58 (0.33)	ND (0.0053) (0.0053)	-	-	ND (0.0043) (0.0043)	0.816 (0.35)	ND (0.0049) (0.0049)	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	ND (0.004) (0.001)	ND (0.0013) (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.148 (0.066)	0.569 (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.001)	0.21 J (0.001)	ND (0.00087) (0.00087	0.421 (0.070)	ND (0.00099) (0.00099	ND (0.0013) (0.0013)	ND (0.00089) (0.00089	ND (0.00079) (0.00079	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	1.86 (0.33)	34.9 (3.3)	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.004) (0.001)	ND (0.0063) (0.0063)	ND (0.0062) (0.0062)	ND (0.0042) (0.0042)	0.474 (0.33)	9.72 (0.33)	ND (0.0053) (0.0053)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.0043) (0.0043)	ND (0.35) (0.35)	ND (0.0049) (0.0049)	ND (0.0064) (0.0064)	ND (0.0045) (0.0045)	ND (0.0039) (0.0039)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	ND (0.004) (0.001)	0.0021 (0.0013)	ND (0.0012) (0.0012)	ND (0.00083) (0.00083)	0.942 (0.066)	17.2 (0.066)	ND (0.0011) (0.0011)	ND (0.005) (0.001)	ND (0.073) (0.001)	ND (0.00087) (0.00087	0.300 (0.070)	ND (0.00099) (0.00099	0.0024 (0.0013)	ND (0.00089) (0.00089	0.0020 (0.00079)	ND (0.006) (0.001)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.009) (0.001)	ND (0.004) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	0.59 (0.003)	1.04 (0.040)	0.820 (0.084)	0.0698 (0.036)	0.409 (0.080)	0.932 (0.038)	0.265 (0.073)	0.13 (0.003)	3.3 (0.003)	0.0828 (0.029)	1.88 (0.072)	0.382 (0.034)	0.791 (0.039)	0.158 (0.064)	1.54 (0.031)	ND (0.019) (0.003)	0.31 (0.003)	0.12 (0.003)	0.85 (0.003)	1.5 (0.003)	ND (0.018) (0.003)
BENZENETHIOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	1.8 (0.003)	2.16 (0.040)	0.800 (0.084)	0.260 (0.036)	0.914 (0.080)	1.35 (0.038)	0.612 (0.073)	0.27 (0.003)	5.2 (0.003)	0.276 (0.029)	2.13 (0.072)	0.969 (0.034)	1.52 (0.039)	0.390 (0.064)	2.77 (0.031)	ND (0.019) (0.003)	0.76 (0.003)	0.24 (0.003)	1.9 (0.003)	0.87 (0.003)	0.026 (0.003)
BENZO(A)PYRENE	mg/kg	190000^	46[B]	2.0 (0.003)	2.89 (0.040)	1.02 (0.084)	0.278 (0.036)	0.921 (0.080)	1.04 (0.038)	0.599 (0.073)	0.30 (0.003)	5.3 (0.003)	0.329 (0.029)	2.26 (0.072)	0.916 (0.034)	1.57 (0.039)	0.392 (0.064)	2.38 (0.031)	ND (0.019) (0.003)	0.93 (0.003)	0.22 (0.003)	1.6 (0.003)	0.66 (0.003)	0.028 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	2.6 (0.003)	2.82 (0.040)	0.717 (0.084)	0.263 (0.036)	0.895 (0.080)	1.32 (0.038)	0.701 (0.073)	0.35 (0.003)	6.2 (0.003)	0.415 (0.029)	1.95 (0.072)	0.771 (0.034)	1.55 (0.039)	0.337 (0.064)	2.64 (0.031)	ND (0.019) (0.003)	1.1 (0.003)	0.32 (0.003)	1.9 (0.003)	1.1 (0.003)	0.032 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.4 (0.003)	1.93 (0.040)	1.14 (0.084)	0.226 (0.036)	0.839 (0.080)	0.709 (0.038)	0.557 (0.073)	0.28 (0.003)	3.7 (0.003)	0.281 (0.029)	1.52 (0.072)	0.678 (0.034)	1.01 (0.039)	0.305 (0.064)	1.71 (0.031)	ND (0.019) (0.003)	0.70 (0.003)	0.21 (0.003)	1.1 (0.003)	0.56 (0.003)	0.020 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000^	230[B]	2.0 (0.003)	2.35 (0.040)	1.60 (0.084)	0.305 (0.036)	1.31 (0.080)	1.43 (0.038)	0.718 (0.073)	0.27 (0.003)	6.3 (0.003)	0.325 (0.029)	2.89 (0.072)	0.987 (0.034)	1.65 (0.039)	0.449 (0.064)	2.67 (0.031)	ND (0.019) (0.003)	0.90 (0.003)	0.25 (0.003)	2.2 (0.003)	1.1 (0.003)	0.032 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-43	AOI7 BH-12-45	AOI7 BH-12-48	AOI7 BH-12-49	AOI7 BH-12-53	AOI7 BH-12-54	AOI7 BH-12-55	AOI7 BH-12-58		AOI7 BH-12-62	AOI7 BH-12-64		AOI7 BH-12-67	AOI7 BH-12-68	AOI7 BH-12-69	AOI7 BH-12-70	AOI7 BH-12-72	AOI7 BH-12-73	AOI7 BH-12-74	AOI7 BH-12-76	AOI7 BH-12-77
Sample Date				28-Nov-12	29-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	30-Nov-12	28-Nov-12	28-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	29-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12	28-Nov-12
Sample ID				BH-12-43_2.5'	BH-12-45_3.5'	BH-12-48_3'	BH-12-49_2.5'	BH-12-53_2.5'	BH-12-54_3'	BH-12-55_2.5'	BH-12-58_3'	BH-12-58_4'	BH-12-62_3'	BH-12-64_2.5'	BH-12-64_3'	BH-12-67_3'	BH-12-68_3'	BH-12-69_2.5'	BH-12-70_4'	BH-12-72_3.5'	BH-12-73_5'	BH-12-74_4'	BH-12-76_3'	BH-12-77_3'
Sample Depth				2 - 2.5 ft	3 - 3.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	3.5 - 4 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	3.5 - 4 ft	3 - 3.5 ft	4.5 - 5 ft	3.5 - 4 ft	2.5 - 3 ft	2.5 - 3 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1352569	JB22561	JB22549	JB22549	JB22549	JB22549	JB22549	1352569	1352569	JB22561	JB22561	JB22561	JB22561	JB22561	JB22561	1352569	1352569	1352569	1352569	1352569	1352569
Laboratory Sample ID	Units	MSC-PA	SHS-PA	6876921	JB22561-11	JB22549-5	JB22549-6	JB22549-4	JB22549-1	JB22549-2	6876918	6876919	JB22561-10	JB22561-3	JB22561-12	JB22561-5	JB22561-7	JB22561-2	6876925	6876916	6876915	6876912	6876911	6876920
2,4-DINITROPHENOL	mg/kg	190000[^]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[^]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[^]	3800[B]	0.26 (0.003)	1.14 (0.040)	0.217 (0.084)	ND (0.036) (0.036)	0.297 (0.080)	0.890 (0.038)	0.100 (0.073)	0.040 (0.003)	2.4 (0.003)	0.0428 (0.029)	1.73 (0.072)	0.141 (0.034)	0.426 (0.039)	ND (0.064) (0.064)	0.459 (0.031)	ND (0.019) (0.003)	0.090 (0.003)	0.045 (0.003)	0.18 (0.003)	0.78 (0.003)	ND (0.018) (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[^]	22000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[^]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{10}[^]	58_{2}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[^]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[^]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[^]	25[B]	0.54 (0.003)	-	-	-	-	-	-	0.52 (0.003)	12 (0.003)	-	-	-	-	-	-	ND (0.019) (0.003)	1.0 (0.003)	0.11 (0.003)	0.19 (0.003)	18 (0.003)	ND (0.018) (0.003)
4-NITROANILINE	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[^]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[^]	10000[B]	1.7 (0.003)	1.42 (0.040)	1.25 (0.084)	0.201 (0.036)	1.25 (0.080)	2.73 (0.038)	0.792 (0.073)	0.34 (0.003)	4.1 (0.003)	0.527 (0.029)	4.08 (0.072)	0.932 (0.034)	1.66 (0.039)	0.433 (0.064)	5.63 (0.15)	ND (0.019) (0.003)	0.88 (0.003)	0.26 (0.003)	3.7 (0.003)	5.2 (0.003)	ND (0.018) (0.003)
PHENOL	mg/kg	18000[^]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[^]	2200[B]	3.0 (0.003)	3.39 (0.040)	2.10 (0.084)	0.410 (0.036)	1.81 (0.080)	3.35 (0.038)	0.928 (0.073)	0.34 (0.003)	10 (0.003)	0.664 (0.029)	4.06 (0.072)	1.69 (0.034)	2.31 (0.039)	0.565 (0.064)	5.68 (0.15)	ND (0.019) (0.003)	1.0 (0.003)	0.36 (0.003)	4.5 (0.003)	1.8 (0.003)	0.035 (0.003)
PYRIDINE	mg/kg	10000[^]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[^]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[^]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[^]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[^]	38[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{11}[^]	190_{11}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[^]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[^]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000[^]	450[B]	119 (0.0044)	***758*** [B] (2.7)	***1530*** [B] (2.9)	107 (4.3)	***510*** [B] (2.3)	190 (4.9)	313 (2.5)	350 (0.0044)	***467*** [B] (0.0044)	26.1 (2.0)	***594*** [B] (2.5)	360 (2.5)	***672*** [B] (2.6)	210 (2.4)	43.5 (2.2)	7.46 (0.0044)	185 (0.0044)	27.3 (0.0044)	***538*** [B] (0.0044)	380 (0.0044)	4.40 (0.0044)
MERCURY	mg/kg	190000[^]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[^]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[^]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[^]	820[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[^]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[^]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	9.4 (0.50)	-	-	-	-	-	-	13.0 (0.50)	26.5 (0.50)	-	-	-	-	-	-	8.3 (0.50)	11.6 (0.50)	28.6 (0.50)	15.0 (0.50)	34.7 (0.50)	7.2 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	71.6 (J)	74.1 (J)	89.9 (J)	82.9 (J)	79.1 (J)	82.9 (J)	-	-	99.2 (J)	79.3 (J)	81.7 (J)	72.8 (J)	87.4 (J)	92.2 (J)	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[^]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001		AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017	AOI7-BH-16-018	AOI7-BH-16-020
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13	13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16	28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16	11-Jul-16	1-Jul-16
Sample ID				BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'	BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5 031313	AOI7-BH-13-47_2.5-3 031313	AOI7-BH-13-48_2.5-3 031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116	AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116	AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB31265	JB31265	JB31265	1679350	1679350	1678008	1678008	1678008	1682473	1682473	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-17	JB22267-10	JB22267-11	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4	JB31265-6	JB31265-2	8460988	8460989	8455724	8455737	8455735	8473659	8473660	8461000
Volatile Organic Compounds																					
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)	**2.35[B]** (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)	ND (0.16) (0.16)	**0.845[B]** (0.11)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.006) (0.0005)	0.081 J (0.0005)	*ND (0.660)* (0.0005)	-	-	0.150 J (0.0005)
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)	*ND (0.099)* (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	*ND (0.13)* (0.13)	*ND (0.16)* (0.16)	*ND (0.11)* (0.11)	ND (0.005) (0.001)	*ND (0.006)* (0.001)	*ND (0.006)* (0.001)	*ND (0.660)* (0.001)	*ND (0.660)* (0.001)	-	-	*ND (0.660)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)	ND (0.099) (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)	ND (0.16) (0.16)	ND (0.11) (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	*ND (0.660)* (0.001)	*ND (0.660)* (0.001)	-	-	*ND (0.660)* (0.001)
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)	0.382 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)	ND (0.16) (0.16)	0.401 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-	-	0.230 J (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)	ND (0.49) (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)	0.870 (0.79)	1.96 (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-	-	ND (0.660) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	ND (0.00086) (0.00086)	ND (0.099) (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)	ND (0.16) (0.16)	ND (0.11) (0.11)	ND (0.005) (0.0005)	ND (0.006) (0.0005)	ND (0.006) (0.0005)	ND (0.660) (0.0005)	ND (0.660) (0.0005)	-	-	ND (0.660) (0.0005)
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)	1.04 (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	0.0011 (0.00086)	1.16 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	ND (0.13) (0.13)	0.475 (0.16)	1.08 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	0.280 J (0.001)	0.430 J (0.001)	-	-	1.700 (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)	1.03 (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)	ND (0.79) (0.79)	ND (0.56) (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-	-	0.180 J (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	ND (0.0054) (0.0054)	ND (0.0085) (0.0085)	ND (0.0043) (0.0043)	ND (0.49) (0.49)	ND (0.0095) (0.0095)	ND (0.0051) (0.0051)	ND (0.0046) (0.0046)	ND (0.64) (0.64)	ND (0.79) (0.79)	ND (0.56) (0.56)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-	-	ND (0.660) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	ND (0.0011) (0.0011)	ND (0.0017) (0.0017)	0.0012 (0.00086)	1.64 (0.099)	ND (0.0019) (0.0019)	ND (0.0010) (0.0010)	ND (0.00091) (0.00091)	0.394 (0.13)	0.364 (0.16)	1.58 (0.11)	ND (0.005) (0.001)	ND (0.006) (0.001)	ND (0.006) (0.001)	ND (0.660) (0.001)	ND (0.660) (0.001)	-	-	0.410 J (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																					
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																					
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	0.0448 (0.030)	0.362 (0.047)	ND (0.033) (0.033)	0.256 (0.045)	0.204 (0.047)	ND (0.037) (0.037)	0.159 (0.033)	0.256 (0.21)	2.03 (0.24)	1.12 (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)	2.000 (0.003)	4.300 (0.003)	2.600 (0.003)	-	-	1.200 (0.003)
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	0.152 (0.030)	0.845 (0.047)	0.0454 (0.033)	0.455 (0.045)	0.662 (0.047)	0.0591 (0.037)	0.818 (0.033)	0.550 (0.21)	3.13 (0.24)	1.56 (0.077)	0.007 J (0.003)	0.006 J (0.003)	1.800 (0.003)	3.500 (0.003)	2.300 (0.003)	-	-	1.500 (0.003)
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	0.161 (0.030)	0.870 (0.047)	0.0430 (0.033)	0.524 (0.045)	0.695 (0.047)	0.0748 (0.037)	0.796 (0.033)	0.600 (0.21)	2.50 (0.24)	1.50 (0.077)	0.009 J (0.003)	0.007 J (0.003)	1.500 (0.003)	1.800 (0.003)	1.800 (0.003)	2.800 (0.003)	1.200 (0.003)	1.800 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	0.158 (0.030)	0.973 (0.047)	0.0646 (0.033)	0.460 (0.045)	0.593 (0.047)	0.129 (0.037)	0.821 (0.033)	0.643 (0.21)	2.40 (0.24)	1.44 (0.077)	0.011 J (0.003)	0.007 J (0.003)	1.700 (0.003)	2.300 (0.003)	2.200 (0.003)	-	-	2.100 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	0.106 (0.030)	0.693 (0.047)	0.0338 (0.033)	0.494 (0.045)	0.560 (0.047)	0.0754 (0.037)	0.489 (0.033)	0.601 (0.21)	1.37 (0.24)	0.986 (0.077)	0.010 J (0.003)	ND (0.022) (0.003)	1.500 (0.003)	1.000 (0.003)	1.300 (0.003)	-	-	1.600 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	0.151 (0.030)	0.887 (0.047)	0.0657 (0.033)	0.518 (0.045)	0.687 (0.047)	0.0824 (0.037)	0.768 (0.033)	1.29 (0.21)	4.13 (0.24)	2.07 (0.077)	0.008 J (0.003)	0.005 J (0.003)	2.200 (0.003)	4.200 (0.003)	2.900 (0.003)	-	-	1.800 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7 BH-12-80	AOI7 BH-12-83	AOI7 BH-12-84	AOI7 BH-12-85	AOI7 BH-12-87	AOI7 BH-12-88	AOI7 BH-12-100	AOI7-BH-13-45	AOI7-BH-13-47	AOI7-BH-13-48	AOI7-BH-16-001		AOI7-BH-16-011	AOI7-BH-16-013	AOI7-BH-16-015	AOI7-BH-16-017	AOI7-BH-16-018	AOI7-BH-16-020
Sample Date				27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	27-Nov-12	13-Mar-13	13-Mar-13	13-Mar-13	1-Jul-16	1-Jul-16	28-Jun-16	29-Jun-16	29-Jun-16	11-Jul-16	11-Jul-16	1-Jul-16
Sample ID				BH-12-80_3.0'	BH-12-83_3.0'	BH-12-84_3.0'	BH-12-85_3.0'	BH-12-87_3.0'	BH-12-88_2.5'	BH-12-100_3.0'	AOI7-BH-13-45_2-2.5_031313	AOI7-BH-13-47_2.5-3_031313	AOI7-BH-13-48_2.5-3_031313	AOI7-BH-16-001-2-4-070116	AOI7-BH-16-001D-2-4-070116	AOI7-BH-16-011-062816-2-4	AOI7-BH-16-013-2-4-062916	AOI7-BH-16-015-2-4-062916	AOI7-BH-16-017-2-4-071116	AOI7-BH-16-018-2-4-071116	AOI7-BH-16-020-2-4-070116
Sample Depth				2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2.5 - 3 ft	2.5 - 3 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB22267	JB31265	JB31265	JB31265	1679350	1679350	1678008	1678008	1678008	1682473	1682473	1679350
Laboratory Sample ID	Units	MSC-PA	SHS-PA	JB22267-17	JB22267-10	JB22267-11	JB22267-8	JB22267-5	JB22267-12	JB22267-6	JB31265-4	JB31265-6	JB31265-2	8460988	8460989	8455724	8455737	8455735	8473659	8473660	8461000
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	ND (0.030) (0.030)	0.122 (0.047)	ND (0.033) (0.033)	0.139 (0.045)	0.0573 (0.047)	ND (0.037) (0.037)	0.0385 (0.033)	ND (0.21) (0.21)	3.36 (0.24)	1.58 (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)	1.400 (0.003)	3.900 (0.003)	1.900 (0.003)	-	-	0.550 (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{32}[A]	58_{32}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	-	-	-	-	-	-	-	ND (0.21) (0.21)	ND (0.24) (0.24)	ND (0.077) (0.077)	ND (0.022) (0.003)	ND (0.022) (0.003)	10.000 (0.003)	10.000 (0.003)	10.000 (0.003)	-	-	15.000 (0.003)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	0.217 (0.030)	1.01 (0.047)	0.0508 (0.033)	0.613 (0.045)	0.611 (0.047)	ND (0.037) (0.037)	0.469 (0.033)	0.217 (0.21)	7.92 (0.24)	2.27 (0.077)	0.006 J (0.003)	ND (0.022) (0.003)	4.000 (0.003)	15.000 (0.003)	4.400 (0.003)	-	-	3.300 (0.003)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	0.276 (0.030)	1.03 (0.047)	0.0768 (0.033)	0.540 (0.045)	0.896 (0.047)	0.0767 (0.037)	0.835 (0.033)	1.95 (0.21)	5.58 (0.24)	3.34 (0.077)	0.012 J (0.003)	0.007 J (0.003)	3.000 (0.003)	10.000 (0.003)	5.400 (0.003)	-	-	1.900 (0.003)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																					
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{51}[A]	190_{51}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	104 (2.3)	264 (3.2)	58.0 (2.3)	344 (2.8)	***1110*** [B] (2.9)	198 (2.4)	135 (2.3)	***753*** [C] (2.0)	***567*** [B] (2.0)	348 (2.5)	2.19 (0.550)	2.23 (0.550)	439 (0.550)	425 (0.550)	***452*** [C] (0.550)	-	-	281 (0.550)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																					
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	22.6 (0.50)	22.7 (0.50)	31.6 (0.50)	44.4 (0.50)	44.5 (0.50)	33.1 (0.50)	36.6 (0.50)	36.1 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	92.4 ()	64.0 ()	87.8 ()	71.7 ()	64.2 ()	80.6 ()	85.6 ()	79.9 ()	65.3 ()	81.9 ()	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-021		AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025		AOI7-BH-16-026	AOI7-BH-16-028	AOI7-BH-16-029		AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033	AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038		AOI7-BH-16-041	AOI7-BH-16-042
Sample Date				30-Jun-16	30-Jun-16	5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16	8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	30-Jun-16	6-Jul-16	6-Jul-16
Sample ID				AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016	AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116	AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816	AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116	AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016	AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft	4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1680744	1679350	1680744	1679350	1679350	1679350	1682473	1681418	1681418	1682473	1682473	1682473	1681418	1679350	1678008	1679350	1679350	1680744	1680744
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460979	8460980	8466400	8460995	8466412	8460996	8460997	8460991	8473657	8469166	8469167	8473656	8473668	8473661	8469171	8460985	8455742	8460982	8460983	8466407	8466405
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330^	0.5[B]	ND (0.007) (0.0005)	0.079 J (0.0005)	ND (0.006) (0.0005)	0.0009 J (0.0005)	0.0007 J (0.0005)	***1.400 J*** [B] (0.0005)	***0.930 J*** [B] (0.0005)	0.170 J (0.0005)	0.014 (0.0005)	***6.600*** [B] (0.0005)	***7.400*** [B] (0.0005)	***1.200 J*** [B] (0.0005)	ND (0.400) (0.0005)	-	0.120 J (0.0005)	0.110 J (0.0005)	0.410 J (0.0005)	ND (0.008) (0.0005)	ND (0.007) (0.0005)	0.012 (0.0005)	*ND (0.540)* (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	*ND (0.007)* (0.001)	*ND (0.470)* (0.001)	*ND (0.006)* (0.001)	*ND (0.008)* (0.001)	ND (0.004) (0.001)	*ND (4.900)* (0.001)	*ND (5.200)* (0.001)	*ND (0.430)* (0.001)	*ND (0.006)* (0.001)	*ND (0.650)* (0.001)	*ND (0.580)* (0.001)	*ND (1.300)* (0.001)	*ND (0.400)* (0.001)	-	*ND (0.540)* (0.001)	*ND (0.580)* (0.001)	*ND (2.300)* (0.001)	*ND (0.008)* (0.001)	*ND (0.007)* (0.001)	*ND (0.007)* (0.001)	*ND (0.540)* (0.001)
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	ND (0.007) (0.001)	ND (0.470) (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	*ND (4.900)* (0.001)	*ND (5.200)* (0.001)	ND (0.430) (0.001)	ND (0.006) (0.001)	*ND (0.650)* (0.001)	*ND (0.580)* (0.001)	*ND (1.300)* (0.001)	ND (0.400) (0.001)	-	*ND (0.540)* (0.001)	*ND (0.580)* (0.001)	*ND (2.300)* (0.001)	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.007) (0.001)	*ND (0.540)* (0.001)
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000^	70[B]	ND (0.007) (0.001)	ND (0.470) (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	2.000 J (0.001)	1.300 J (0.001)	0.210 J (0.001)	ND (0.006) (0.001)	4.800 (0.001)	3.900 (0.001)	0.300 J (0.001)	ND (0.400) (0.001)	-	0.130 J (0.001)	0.130 J (0.001)	ND (2.300) (0.001)	ND (0.008) (0.001)	0.002 J (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.007) (0.001)	ND (0.470) (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	12.000 (0.001)	12.000 (0.001)	0.360 J (0.001)	ND (0.006) (0.001)	9.300 (0.001)	5.200 (0.001)	11.000 (0.001)	ND (0.400) (0.001)	-	0.470 J (0.001)	ND (0.580) (0.001)	ND (2.300) (0.001)	0.024 (0.001)	0.011 (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	ND (0.007) (0.0005)	ND (0.470) (0.0005)	ND (0.006) (0.0005)	ND (0.008) (0.0005)	ND (0.004) (0.0005)	*ND (4.900)* (0.0005)	*ND (5.200)* (0.0005)	ND (0.430) (0.0005)	ND (0.006) (0.0005)	ND (0.650) (0.0005)	ND (0.580) (0.0005)	ND (1.300) (0.0005)	ND (0.400) (0.0005)	-	ND (0.540) (0.0005)	ND (0.580) (0.0005)	*ND (2.300)* (0.0005)	ND (0.008) (0.0005)	ND (0.007) (0.0005)	ND (0.007) (0.0005)	ND (0.540) (0.0005)
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	ND (0.007) (0.001)	1.100 (0.001)	0.002 J (0.001)	0.006 J (0.001)	ND (0.004) (0.001)	1.200 J (0.001)	ND (5.200) (0.001)	0.200 J (0.001)	0.015 (0.001)	2.000 (0.001)	2.000 (0.001)	0.510 J (0.001)	ND (0.400) (0.001)	-	1.300 (0.001)	1.500 (0.001)	1.000 J (0.001)	0.004 J (0.001)	0.002 J (0.001)	0.007 J (0.001)	0.220 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	ND (0.007) (0.001)	0.120 J (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	1.100 J (0.001)	1.200 J (0.001)	0.350 J (0.001)	0.001 J (0.001)	15.000 (0.001)	9.600 (0.001)	0.420 J (0.001)	ND (0.400) (0.001)	-	2.000 (0.001)	0.200 J (0.001)	ND (2.300) (0.001)	0.013 (0.001)	0.007 (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.007) (0.001)	ND (0.470) (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	ND (4.900) (0.001)	ND (5.200) (0.001)	0.110 J (0.001)	ND (0.006) (0.001)	13.000 (0.001)	7.700 (0.001)	ND (1.300) (0.001)	ND (0.400) (0.001)	-	0.340 J (0.001)	ND (0.580) (0.001)	ND (2.300) (0.001)	0.013 (0.001)	0.006 J (0.001)	ND (0.007) (0.001)	ND (0.540) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	ND (0.007) (0.001)	0.170 J (0.001)	ND (0.006) (0.001)	ND (0.008) (0.001)	ND (0.004) (0.001)	3.800 J (0.001)	3.100 J (0.001)	0.370 J (0.001)	0.007 (0.001)	22.000 (0.001)	17.000 (0.001)	0.900 J (0.001)	ND (0.400) (0.001)	-	2.800 (0.001)	0.290 J (0.001)	0.850 J (0.001)	0.010 (0.001)	0.007 (0.001)	0.003 J (0.001)	ND (0.540) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	1.100 (0.003)	1.900 (0.003)	2.600 (0.003)	1.100 (0.003)	ND (0.018) (0.003)	2.900 (0.003)	1.900 (0.003)	0.830 (0.003)	1.600 (0.003)	0.750 (0.003)	0.590 (0.003)	1.600 (0.003)	0.015 J (0.003)	-	2.100 (0.003)	3.600 (0.003)	0.630 (0.003)	2.100 (0.003)	1.800 (0.003)	3.500 (0.003)	1.300 (0.003)
BENZENETHIOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	1.900 (0.003)	3.000 (0.003)	3.600 (0.003)	1.200 (0.003)	0.010 J (0.003)	2.600 (0.003)	1.400 (0.003)	0.680 (0.003)	7.400 (0.003)	1.200 (0.003)	0.840 (0.003)	2.200 (0.003)	0.008 J (0.003)	-	1.100 (0.003)	2.300 (0.003)	0.730 (0.003)	1.700 (0.003)	1.800 (0.003)	4.100 (0.003)	1.800 (0.003)
BENZO(A)PYRENE	mg/kg	190000^	46[B]	1.900 (0.003)	2.700 (0.003)	3.200 (0.003)	1.600 (0.003)	0.012 J (0.003)	2.500 (0.003)	1.400 (0.003)	0.550 (0.003)	3.500 (0.003)	0.870 (0.003)	0.650 (0.003)	1.400 (0.003)	0.008 J (0.003)	-	0.840 (0.003)	1.800 (0.003)	0.900 (0.003)	1.700 (0.003)	1.900 (0.003)	3.300 (0.003)	2.000 (0.003)
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	2.300 (0.003)	3.200 (0.003)	4.400 (0.003)	2.200 (0.003)	0.015 J (0.003)	3.000 (0.003)	1.700 (0.003)	0.670 (0.003)	5.100 (0.003)	1.400 (0.003)	1.000 (0.003)	1.800 (0.003)	0.012 J (0.003)	-	1.200 (0.003)	2.300 (0.003)	1.200 (0.003)	2.100 (0.003)	2.300 (0.003)	4.700 (0.003)	2.400 (0.003)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.100 (0.003)	1.600 (0.003)	2.500 (0.003)	2.000 (0.003)	0.016 J (0.003)	1.800 (0.003)	1.100 (0.003)	0.410 (0.003)	1.700 (0.003)	0.740 (0.003)	0.560 (0.003)	0.770 (0.003)	0.005 J (0.003)	-	0.810 (0.003)	1.100 (0.003)	0.870 (0.003)	2.300 (0.003)	2.100 (0.003)	1.900 (0.003)	1.400 (0.003)
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000^	230[B]	2.300 (0.003)	3.300 (0.003)	3.800 (0.003)	1.600 (0.003)	0.011 J (0.003)	3.000 (0.003)	1.600 (0.003)	0.800 (0.003)	7.400 (0.003)	1.800 (0.003)	1.400 (0.003)	2.700 (0.003)	0.017 J (0.003)	-	1.500 (0.003)	2.700 (0.003)	0.930 (0.003)	2.300 (0.003)	2.600 (0.003)	4.300 (0.003)	2.000 (0.003)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-021		AOI7-BH-16-022	AOI7-BH-16-023	AOI7-BH-16-024	AOI7-BH-16-025		AOI7-BH-16-026	AOI7-BH-16-028	AOI7-BH-16-029		AOI7-BH-16-030	AOI7-BH-16-031	AOI7-BH-16-033	AOI7-BH-16-034	AOI7-BH-16-036	AOI7-BH-16-037	AOI7-BH-16-038		AOI7-BH-16-041	AOI7-BH-16-042
Sample Date				30-Jun-16	30-Jun-16	5-Jul-16	1-Jul-16	7-Jul-16	1-Jul-16	1-Jul-16	1-Jul-16	11-Jul-16	8-Jul-16	8-Jul-16	11-Jul-16	12-Jul-16	11-Jul-16	8-Jul-16	30-Jun-16	29-Jun-16	30-Jun-16	30-Jun-16	6-Jul-16	6-Jul-16
Sample ID				AOI7-BH-16-021-2-4-063016	AOI7-BH-16-021D-2-4-063016	AOI7-BH-16-022-2-4-070516	AOI7-BH-16-023-2-4-070116	AOI7-BH-16-024-2-4-070716	AOI7-BH-16-025-4.75-5.0-070116	AOI7-BH-16-025D-4.75-5.0-070116	AOI7-BH-16-026-2-4-070116	AOI7-BH-16-028-2-4-071116	AOI7-BH-16-029-2-4-070816	AOI7-BH-16-029D-2-4-070816	AOI7-BH-16-030-2-4-071116	AOI7-BH-16-031-2-4-071216	AOI7-BH-16-033-2-4-071116	AOI7-BH-16-034-2-4-070816	AOI7-BH-16-036-2-4-063016	AOI7-BH-16-037-2-4-062916	AOI7-BH-16-038-2-4-063016	AOI7-BH-16-038D-2-4-063016	AOI7-BH-16-041-2-4-070616	AOI7-BH-16-042-2-4-070616
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4.75 - 5 ft	4.75 - 5 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD	GHD
Laboratory				LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	1679350	1679350	1680744	1679350	1680744	1679350	1679350	1679350	1682473	1681418	1681418	1682473	1682473	1682473	1681418	1679350	1678008	1679350	1679350	1680744	1680744
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8460979	8460980	8466400	8460995	8466412	8460996	8460997	8460991	8473657	8469166	8469167	8473656	8473668	8473661	8469171	8460985	8455742	8460982	8460983	8466407	8466405
2,4-DINITROPHENOL	mg/kg	190000^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000^	3800[B]	1.200 (0.003)	2.400 (0.003)	1.400 (0.003)	0.360 (0.003)	ND (0.018) (0.003)	2.200 (0.003)	1.600 (0.003)	1.000 (0.003)	0.430 (0.003)	1.300 (0.003)	1.100 (0.003)	2.400 (0.003)	0.015 J (0.003)	-	1.500 (0.003)	4.100 (0.003)	0.450 (0.003)	1.500 (0.003)	1.400 (0.003)	2.400 (0.003)	0.760 J (0.003)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000^	22000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{10}^	58_{12}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	5.500 (0.003)	9.300 (0.003)	12.000 (0.003)	12.000 (0.003)	0.009 J (0.003)	***80.000*** [B] (0.003)	***47.000*** [B] (0.003)	6.500 (0.003)	3.400 (0.003)	4.800 (0.003)	2.800 (0.003)	0.680 (0.003)	0.027 (0.003)	-	25.000 (0.003)	17.000 (0.003)	6.700 (0.003)	17.000 (0.003)	15.000 (0.003)	15.000 (0.003)	3.800 (0.003)
4-NITROANILINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	2.400 (0.003)	3.900 (0.003)	7.500 (0.003)	3.100 (0.003)	0.008 J (0.003)	8.400 (0.003)	6.400 (0.003)	3.500 (0.003)	5.000 (0.003)	4.100 (0.003)	3.400 (0.003)	8.600 (0.003)	0.034 (0.003)	-	6.400 (0.003)	6.300 (0.003)	2.100 (0.003)	5.800 (0.003)	5.100 (0.003)	6.500 (0.003)	3.200 (0.003)
PHENOL	mg/kg	18000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000^	2200[B]	4.100 (0.003)	6.600 (0.003)	5.600 (0.003)	1.600 (0.003)	0.014 J (0.003)	4.700 (0.003)	2.800 (0.003)	1.800 (0.003)	12.000 (0.003)	2.100 (0.003)	1.400 (0.003)	4.000 (0.003)	0.029 (0.003)	-	1.900 (0.003)	6.900 (0.003)	1.100 (0.003)	3.100 (0.003)	2.900 (0.003)	9.600 (0.003)	3.400 (0.003)
PYRIDINE	mg/kg	10000^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000^	38[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{33}^	190_{33}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000^	450[B]	154 (0.550)	111 (0.550)	224 (0.550)	291 (0.550)	8.79 (0.550)	***469*** [B] (0.550)	306 (0.550)	62.4 (0.550)	276 (0.550)	192 (0.550)	201 (0.550)	140 (0.550)	3.36 (0.550)	ND (7.37) (0.550)	375 (0.550)	272 (0.550)	227 (0.550)	329 (0.550)	360 (0.550)	269 (0.550)	181 (0.550)
MERCURY	mg/kg	190000^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000^	820[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	39.1 (0.50)	31.2 (0.50)	28.7 (0.50)	40.9 (0.50)	7.0 (0.50)	34.5 (0.50)	36.6 (0.50)	21.8 (0.50)	28.3 (0.50)	7.4 (0.50)	9.7 (0.50)	14.0 (0.50)	28.5 (0.50)	9.9 (0.50)	36.6 (0.50)	42.4 (0.50)	38.9 (0.50)	33.7 (0.50)	34.9 (0.50)	30.8 (0.50)	31.6 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-043	AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5	B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14	B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4
Sample Date				29-Jun-16	8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92
Sample ID				AOI7-BH-16-043-2-4-062916	AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7	B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6	B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD																		
Laboratory				LL	LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1678008	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455733	8469174	8469173	P209609	P209603	P209604	P209611	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886	P209886DL	P209885	P209934	P210010	P210012	P210013
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	-	-	-	-	-	ND (9.6) R ()	-	-	-	-	-	-	ND (83) R ()	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8^	n/v	-	-	-	-	-	-	*ND (19)* ()	-	-	-	-	-	-	*ND (170)* ()	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38^	n/v	-	-	-	-	-	-	ND (19) ()	-	-	-	-	-	-	*ND (170)* ()	-	-	-	-	-	-	-
BENZENE	mg/kg	330^	0.5[B]	0.005 J (0.0005)	0.140 J (0.0005)	*ND (1.200)* (0.0005)	-	-	-	*ND (0.96)* ()	-	-	-	-	-	-	*ND (8.3)* ()	-	-	-	-	-	-	-
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	-	-	-	-	-	ND (1.9) ()	-	-	-	-	-	-	ND (17) ()	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	*ND (0.006)* (0.001)	*ND (0.380)* (0.001)	*ND (1.200)* (0.001)	-	-	-	*ND (1.9)* ()	-	-	-	-	-	-	*ND (17)* ()	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	ND (0.006) (0.001)	ND (0.380) (0.001)	*ND (1.200)* (0.001)	-	-	-	*ND (0.96)* ()	-	-	-	-	-	-	*ND (8.3)* ()	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	-	-	-	-	-	ND (29) R ()	-	-	-	-	-	-	ND (250) R ()	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000^	70[B]	0.001 J (0.001)	0.110 J (0.001)	ND (1.200) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.006) (0.001)	0.480 (0.001)	2.300 (0.001)	-	-	-	ND (1.9) ()	-	-	-	-	-	-	13 J ()	-	-	-	-	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (1.9) ()	-	-	-	-	-	-	ND (17) ()	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	ND (0.006) (0.0005)	ND (0.380) (0.0005)	ND (1.200) (0.0005)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	-	-	-	-	-	ND (1.9) ()	-	-	-	-	-	-	ND (17) ()	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	0.005 J (0.001)	0.400 (0.001)	ND (1.200) (0.001)	-	-	-	ND (0.96) ()	-	-	-	-	-	-	64 ()	-	-	-	-	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	-	-	-	-	-	ND (0.96) ()	-	-	-	-	-	-	ND (8.3) ()	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	ND (0.006) (0.001)	0.110 J (0.001)	0.470 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	0.001 J (0.001)	ND (0.380) (0.001)	ND (1.200) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	0.001 J (0.001)	0.450 (0.001)	ND (1.200) (0.001)	-	-	-	ND (0.96) ()	-	-	-	-	-	-	24 ()	-	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (9.6) R ()	-	-	-	-	-	-	ND (83) R ()	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200^	n/v	-	-	-	-	-	-	ND (1.50) L ()	-	-	-	-	-	-	ND (1.20) L ()	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (1.900) ()	-	-	-	-	-	-	18.000 ()	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	1.100 (0.003)	4.100 (0.003)	2.000 (0.003)	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
BENZENETHIOL	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.510) ()	-	-	-	-	-	-	ND (0.880) ()	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000^	n/v	-	-	-	-	-	-	ND (2.5) ()	-	-	-	-	-	-	ND (4.3) ()	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	2.600 (0.003)	7.100 (0.003)	1.800 (0.003)	-	-	-	ND (0.51) ()	-	-	-	-	-	-	1.1 ()	-	-	-	-	-	-	-
BENZO(A)PYRENE	mg/kg	190000^	46[B]	1.800 (0.003)	5.300 (0.003)	1.000 (0.003)	-	-	-	ND (0.51) ()	-	-	-	-	-	-	0.81 J ()	-	-	-	-	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	2.200 (0.003)	5.900 (0.003)	1.200 (0.003)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.100 (0.003)	3.500 (0.003)	0.770 (0.003)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	3.300 (0.003)	0.490 (0.003)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	0.55 ()	-	-	-	-	-	-	0.73 J ()	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000^	230[B]	2.600 (0.003)	7.400 (0.003)	2.700 (0.003)	-	-	-	ND (0.310) ()	-	-	-	-	-	-	0.910 ()	-	-	-	-	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.510) ()	-	-	-	-	-	-	ND (0.880) ()	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	1.200 (0.003)	0.230 J (0.003)	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.460) ()	-	-	-	-	-	-	ND (0.800) ()	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	ND (0.51) ()	-	-	-	-	-	-	ND (0.88) ()	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	ND (2.500) ()	-	-	-	-	-	-	ND (4.300) ()	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				AOI7-BH-16-043	AOI7-BH-16-046	AOI7-BH-16-047	B90-1	B90-2	B90-3	B90-5	B90-6	B90-10	B90-10DL	B90-11	B90-12	B90-12DL	B90-13	B90-14	B90-14DL	B90-15	B90-16	B91-1	B91-2	B91-4
Sample Date				29-Jun-16	8-Jul-16	8-Jul-16	24-Aug-92	24-Aug-92	24-Aug-92	24-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	25-Aug-92	26-Aug-92	27-Aug-92	27-Aug-92	27-Aug-92
Sample ID				AOI7-BH-16-043-2-4-062916	AOI7-BH-16-046-2-4-070816	AOI7-BH-16-047-2-4-070816	B090A5	B090A2	B090A3	B090A7	B090B9	B090B4	B090B4DL	B090B8	B090B1	B090B1DL	B090B3	B090B6	B090B6DL	B090B5	B090C2	B091A6	B091A8	B091A9
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft
Sampling Company				GHD	GHD	GHD																		
Laboratory				LL	LL	LL	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	1678008	1681418	1681418	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	8455733	8469174	8469173	P209609	P209603	P209604	P209611	P209932	P209884	P209884DL	P209931	P209881	P209881DL	P209883	P209886	P209886DL	P209885	P209934	P210010	P210012	P210013
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	-	ND (2.5) (J)	-	-	-	-	-	-	ND (4.3) (J)	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	1.3 (J)	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	0.470 (0.003)	4.300 (0.003)	2.800 (0.003)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.000) (J)	-	-	-	-	-	-	ND (1.800) (J)	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	0.67 J (J)	-	-	-	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.000) (J)	-	-	-	-	-	-	5.000 (J)	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{12}[A]	58_{12}[B]	-	-	-	-	-	-	ND (0.510) (J)	-	-	-	-	-	-	ND (0.880) (J)	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	-	ND (1.5) (J)	-	-	-	-	-	-	ND (2.7) (J)	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	2.400 (0.003)	7.400 (0.003)	ND (0.480) (0.003)	**67[B]** (J)	0.31 J (J)	0.31 J (J)	ND (0.51) (J)	0.75 (J)	8 J (J)	6.9 (J)	1 (J)	13 J (J)	11 (J)	11 (J)	**34 J[B]** (J)	**35[B]** (J)	0.67 (J)	2.3 (J)	0.53 (J)	3.5 (J)	1.5 (J)
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (2.5) (J)	-	-	-	-	-	-	ND (4.3) (J)	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	-	ND (2.5) (J)	-	-	-	-	-	-	ND (4.3) (J)	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (2.5) (J)	-	-	-	-	-	-	ND (4.3) (J)	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	2.200 (0.003)	8.400 (0.003)	9.100 (0.003)	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	0.79 J (J)	-	-	-	-	-	-	-
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	3.900 (0.003)	10.000 (0.003)	3.900 (0.003)	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	1.1 (J)	-	-	-	-	-	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	ND (1) (J)	-	-	-	-	-	-	ND (1.8) (J)	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	*ND (1)* (J)	-	-	-	-	-	-	*ND (1.8)* (J)	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.310) (J)	-	-	-	-	-	-	ND (0.530) (J)	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0.510) (J)	-	-	-	-	-	-	ND (0.880) (J)	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.8) (J)	-	-	-	-	-	-	1.3 J (J)	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	-	ND (0.51) (J)	-	-	-	-	-	-	ND (0.88) (J)	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (1.000) (J)	-	-	-	-	-	-	ND (1.800) (J)	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	ND (0) (J)	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	-	ND (2.6) (J)	-	-	-	-	-	-	ND (4.5) (J)	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	-	1.9 L (J)	-	-	-	-	-	-	ND (1.30) L (J)	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	-	-	-	10.0 H (J)	17.9 H (J)	**31.1 H[B]** (J)	5.8 H (J)	20.9 H (J)	1.5 H (J)	-	15.9 H (J)	4.4 H (J)	-	5.3 H (J)	3.0 H (J)	-	17.5 H (J)	7.5 H (J)	13.8 H (J)	6.3 H (J)	9.6 H (J)
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	-	159 (J)	-	-	-	-	-	-	88.9 (J)	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	-	1.2 (J)	-	-	-	-	-	-	ND (0.66) (J)	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	-	0.93 (J)	-	-	-	-	-	-	ND (0.66) (J)	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{13}[A]	190_{13}[B]	-	-	-	19.5 L (J)	77.1 L (J)	63.7 L (J)	37.3 (J)	64.9 L (J)	4.7 L (J)	-	66.3 L (J)	29.4 L (J)	-	24.1 (J)	25.8 L (J)	-	31.1 L (J)	56.7 L (J)	**588 L[B]** (J)	167 J (J)	49.9 J (J)
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	ND (7.8) (0.50)	ND (1.7) (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	-	16.4 (J)	-	-	-	-	-	-	10.2 (J)	-	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	**2590[B]** (0.550)	408 (0.550)	34.1 (0.550)	138 H (J)	**464 H[B]** (J)	313 H (J)	188 (J)	388 H (J)	243 H (J)	-	381 H (J)	115 H (J)	-	148 (J)	110 H (J)	-	198 H (J)	321 H (J)	257 H (J)	195 (J)	258 (J)
MERCURY	mg/kg	190000[A]	10[B]	-	4.14 (0.0100)	0.145 (0.0100)	-	-	-	0.78 J (J)	-	-	-	-	-	-	0.43 J (J)	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	-	27.5 (J)	-	-	-	-	-	-	18.7 (J)	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	-	ND (0.62) (J)	-	-	-	-	-	-	1.0 (J)	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	-	19.3 (J)	-	-	-	-	-	-	13.8 (J)	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	10.4 (J)	12.0 (J)	11.1 (J)	15.3 (J)	17.6 (J)	0.10 (J)	-	11.4 (J)	11.5 (J)	-	14.1 (J)	11.1 (J)	-	17.1 (J)	11.3 (J)	0.55 (J)	10.5 J (J)	8.9 J (J)
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	ND (0.10) (J)	ND (0.13) (J)	ND (0.12) (J)	ND (0.15) (J)	ND (0.13) (J)	ND (0.08) (J)	-	ND (0.12) (J)	ND (0.09) (J)	-	ND (0.13) (J)	ND (0.09) (J)	-	ND (0.12) (J)	ND (0.11) (J)	ND (0.10) (J)	ND (0.13) L (J)	ND (0.15) L (J)
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	3330 J (J)	2360 J (J)	3830 J (J)	3120 J (J)	562 J (J)	1610 J (J)	-	3230 J (J)	1810 J (J)	-	1820 J (J)	507 J (J)	-	4740 J (J)	2720 J (J)	1410 J (J)	4300 L (J)	839 L (J)
MOISTURE, PERCENT	%	n/v	n/v	21.9 (0.50)	23.4 (0.50)	12.5 (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	3.0 (J)	ND (0.85) (J)	ND (0.69) (J)	ND (0.80) (J)	1.0 (J)	ND (0.34) (J)	-	ND (0.66) (J)	ND (0.58) (J)	-	ND (0.52) (J)	ND (0.37) (J)	-	1.0 (J)	1.0 (J)	ND (0.60) (J)	ND (0.58) L (J)	ND (0.69) L (J)
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	ND (5.30) (J)	ND (6.7) (J)	30.5 H (J)	ND (6.20) J (J)	80.2 (J)	29.0 (J)	-	52.1 (J)	14.7 H (J)	-	34.4 H (J)	20.2 (J)	-	55.4 (J)	ND (5.70) (J)	41.2 (J)	26.7 (J)	18.0 (J)
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	-	-	-	1.1 (J)	3.8 (J)	3.7 (J)	2.1 (J)	5.6 (J)	0.59 (J)	-	2.1 (J)	0.88 (J)	-	1.4 (J)	0.60 (J)	-	2.1 (J)	2.7 (J)	2.3 (J)	1.9 (J)	1.3 (J)
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	16000 J (J)	45600 J (J)	37000 J (J)	43400 L (J)	49500 J (J)	1870 J (J)	-	45200 J (J)	5270 J (J)	-	14600 L (J)	16400 J (J)	-	44700 J (J)	34200 J (J)	19100 J (J)	40000 (J)	39300 (J)
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	ND (25.90) (J)	ND (32.40) (J)	38.6 (J)	ND (29.70) (J)	ND (29.80) (J)	ND (18.20) (J)	-	ND (28.80) (J)	ND (23.70) (J)	-	ND (24.70) (J)	ND (25.3) (J)	-	35.2 (J)	ND (26.50) (J)	ND (19.20) (J)	ND (23.30) (J)	ND (26.60) (J)

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-5	B91-6	B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16	B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2	BNA-3	BNA-4	BNA-5
Sample Date				26-Aug-92	27-Aug-92	28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92	21-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091A2	B091A4	B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9	B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5	B087B1	B087A4	B087A3
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft
Sampling Company																								
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209936	P210008	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881	P209532	P208880	P208879
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	ND (6.6) R ()	-	-	ND (0.075) ()	-	-	-	-	ND (0.071) ()	-	-	ND (8.7) R ()	-	-	-	-	-	-	ND (0.058) ()	-
ACROLEIN	mg/kg	1.8^	n/v	-	*ND (13)* ()	-	-	ND (0.15) ()	-	-	-	-	ND (0.14) ()	-	-	*ND (17)* ()	-	-	-	-	-	-	ND (0.12) ()	-
ACRYLONITRILE	mg/kg	38^	n/v	-	ND (13) ()	-	-	ND (0.15) ()	-	-	-	-	ND (0.14) ()	-	-	ND (17) ()	-	-	-	-	-	-	ND (0.12) ()	-
BENZENE	mg/kg	330^	0.5[B]	-	*ND (0.66)* ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	*ND (0.87)* ()	-	-	-	-	-	-	0.004 J ()	-
CARBON DISULFIDE	mg/kg	10000^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	0.004 J ()	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
CHLOROFORM	mg/kg	110^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	ND (1.3) ()	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()	-	-	ND (1.7) ()	-	-	-	-	-	-	ND (0.12) ()	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	*ND (1.3)* ()	-	-	*ND (0.015)* ()	-	-	-	-	*ND (0.014)* ()	-	-	*ND (1.7)* ()	-	-	-	-	-	-	*ND (0.012)* ()	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	-	*ND (0.66)* ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	*ND (0.87)* ()	-	-	-	-	-	-	ND (0.006) ()	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	ND (20) R ()	-	-	ND (0.22) R ()	-	-	-	-	ND (0.12) R ()	-	-	ND (26) R ()	-	-	-	-	-	-	ND (0.17) R ()	-
ETHYLBENZENE	mg/kg	1000^	70[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	-	1.5 ()	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()	-	-	7.3 ()	-	-	-	-	-	-	ND (0.012) ()	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	ND (1.3) ()	-	-	0.033 ()	-	-	-	-	ND (0.014) ()	-	-	ND (1.7) ()	-	-	-	-	-	-	0.055 ()	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	ND (0.66) ()	-	-	0.01 B ()	-	-	-	-	ND (0.007) ()	-	-	0.85 J ()	-	-	-	-	-	-	0.013 B ()	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	ND (1.3) ()	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()	-	-	ND (1.7) ()	-	-	-	-	-	-	ND (0.012) ()	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
TOLUENE	mg/kg	10000^	100[B]	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	0.71 J ()	-	-	-	-	-	-	0.004 J ()	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	ND (0.66) ()	-	-	ND (0.007) ()	-	-	-	-	ND (0.007) ()	-	-	ND (0.87) ()	-	-	-	-	-	-	ND (0.006) ()	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	-	9 ()	-	-	0.006 J ()	-	-	-	-	ND (0.007) ()	-	-	18 ()	-	-	-	-	-	-	0.012 ()	-
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	ND (6.6) R ()	-	-	ND (0.075) R ()	-	-	-	-	ND (0.071) R ()	-	-	ND (8.7) R ()	-	-	-	-	-	-	ND (0.058) R ()	-
Ethylene oxide	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-
Ethyleneimine	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-
Formaldehyde	mg/kg	200^	n/v	-	ND (0.90) L ()	-	-	1.9 L ()	-	-	-	-	2.2 L ()	-	-	ND (1.10) L ()	-	-	-	-	-	-	ND (1.00) L ()	-
Methanethiol	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	-	-	ND (0) ()	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	1.600 ()	-	-	ND (0.015) ()	-	-	-	-	ND (0.014) ()	-	-	7.300 ()	-	-	-	-	-	-	ND (0.012) ()	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	0.18 L ()	-	0.65 ()	-	-	-	-	-	-	0.27 J ()	-
BENZENETHIOL	mg/kg	10000^	n/v	-	ND (0.350) ()	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-	-	ND (0.380) J ()	-
BENZIDINE	mg/kg	190000^	n/v	-	ND (1.7) ()	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-	-	ND (1.9) J ()	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	-	ND (0.35) ()	-	-	0.35 J ()	-	-	-	-	0.17 L ()	0.65 L ()	-	1.6 ()	-	-	-	-	-	-	1.4 J ()	-
BENZO(A)PYRENE	mg/kg	190000^	46[B]	-	ND (0.35) ()	-	-	0.38 J ()	-	-	-	-	0.18 L ()	0.45 L ()	-	1.7 ()	-	-	-	-	-	-	1.5 J ()	-
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	0.58 B ()	-	-	0.63 B ()	-	-	-	-	0.34 B ()	0.32 L ()	-	1.1 B ()	-	-	-	-	-	-	0.69 B ()	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
CHRYSENE	mg/kg	190000^	230[B]	-	ND (0.210) ()	-	-	0.370 ()	-	-	-	-	0.190 L ()	0.620 L ()	-	1.700 ()	-	-	-	-	-	-	1.400 J ()	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	ND (0.350) ()	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-	-	ND (0.380) J ()	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	ND (0.320) ()	-	-	ND (0.450) ()	-	-	-	-	ND (0.430) R ()	ND (0.430) R ()	-	ND (0.420) ()	-	-	-	-	-	-	ND (0.350) J ()	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	ND (1.700) ()	-	-	ND (2.400) ()	-	-	-	-	ND (2.300) R ()	ND (2.300) R ()	-	ND (2.200) ()	-	-	-	-	-	-	ND (1.900) J ()	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				B91-5	B91-6	B91-9	B91-10	B91-11	B91-12	B91-13	B91-14	B91-15	B91-16	B91-16RE	B91-17	B91-18	B91-20	B91-21	B91-22	BNA-1	BNA-2	BNA-3	BNA-4	BNA-5
Sample Date				26-Aug-92	27-Aug-92	28-Aug-92	28-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	31-Aug-92	28-Aug-92	28-Aug-92	26-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	28-Aug-92	18-Aug-92	18-Aug-92	21-Aug-92	18-Aug-92	18-Aug-92
Sample ID				B091A2	B091A4	B091B3	B091B1	B091C4	B091C3	B091C6	B091C5	B091C2	B091B9	B091B9RE	B091C1	B091B6	B091B4	B091B8	B091B7	B087A6	B087A5	B087B1	B087A4	B087A3
Sample Depth				2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	4 - 6 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft
Sampling Company																								
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P209936	P210008	P210086	P210084	P210153	P210152	P210158	P210157	P210094	P210092	P210092RE	P210093	P210089	P210087	P210091	P210090	P208882	P208881	P209532	P208880	P208879
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	ND (1.7) ()	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-	-	ND (1.9) J ()	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	0.16 J ()	-	-	0.44 J ()	-	-	-	-	0.21 L ()	0.79 L ()	-	3.7 ()	-	-	-	-	-	-	1.4 J ()	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	ND (0.710) ()	-	-	ND (1.000) ()	-	-	-	-	ND (0.960) R ()	ND (0.960) R ()	-	ND (0.930) ()	-	-	-	-	-	-	ND (0.780) J ()	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	ND (0.35) ()	-	-	0.21 J ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	0.74 ()	-	-	-	-	-	-	0.72 J ()	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	0.560 J ()	-	-	ND (1.000) ()	-	-	-	-	ND (0.960) R ()	0.370 L ()	-	2.000 ()	-	-	-	-	-	-	ND (0.780) J ()	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000$_{12}$[A]	58$_{12}$[B]	-	ND (0.350) ()	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-	-	ND (0.380) J ()	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	ND (1.1) ()	-	-	ND (1.5) ()	-	-	-	-	ND (1.4) R ()	ND (1.4) R ()	-	0.2 J ()	-	-	-	-	-	-	ND (1.2) J ()	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.45 J ()	0.81 ()	0.78 ()	2.1 ()	0.31 J ()	ND (0.52) ()	0.33 J ()	0.61 ()	0.77 J ()	ND (0.47) R ()	0.56 L ()	1.1 ()	3.7 ()	2.4 ()	0.37 J ()	1.8 ()	ND (0.46) J ()	0.19 J ()	ND (0.42) ()	0.25 J ()	2.9 J ()
4-NITROANILINE	mg/kg	190000[A]	n/v	-	ND (1.7) ()	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-	-	ND (1.9) J ()	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	ND (1.7) ()	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-	-	ND (1.9) J ()	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	ND (1.7) ()	-	-	ND (2.4) ()	-	-	-	-	ND (2.3) R ()	ND (2.3) R ()	-	ND (2.2) ()	-	-	-	-	-	-	ND (1.9) J ()	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	0.14 J ()	-	-	0.32 J ()	-	-	-	-	0.19 L ()	0.98 L ()	-	2.3 ()	-	-	-	-	-	-	0.75 J ()	-
PHENOL	mg/kg	18000[A]	200[B]	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	0.14 J ()	-	-	0.37 J ()	-	-	-	-	0.2 L ()	0.71 L ()	-	2.7 ()	-	-	-	-	-	-	-	-
PYRIDINE	mg/kg	10000[A]	12[B]	-	ND (0.71) ()	-	-	ND (1) ()	-	-	-	-	ND (0.96) R ()	ND (0.96) R ()	-	ND (0.93) ()	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	*ND (0.71)* ()	-	-	*ND (1)* ()	-	-	-	-	*ND (0.96) R* ()	*ND (0.96) R* ()	-	*ND (0.93)* ()	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	ND (0.210) ()	-	-	ND (0.300) ()	-	-	-	-	ND (0.290) R ()	ND (0.290) R ()	-	ND (0.280) ()	-	-	-	-	-	-	ND (0.230) J ()	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	ND (0.350) ()	-	-	ND (0.490) ()	-	-	-	-	ND (0.470) R ()	ND (0.470) R ()	-	ND (0.460) ()	-	-	-	-	-	-	ND (0.380) J ()	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) R ()	ND (0) R ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Aniline	mg/kg	91[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
Benz(c)acridine	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) R ()	ND (0) R ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	0.15 J ()	-	-	0.69 J ()	-	-	-	-	0.32 L ()	0.42 L ()	-	3.4 J ()	-	-	-	-	-	-	0.89 J ()	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	ND (0.35) ()	-	-	ND (0.49) ()	-	-	-	-	ND (0.47) R ()	ND (0.47) R ()	-	ND (0.46) ()	-	-	-	-	-	-	ND (0.38) J ()	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) ()	ND (0) ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) R ()	ND (0) R ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	ND (0.690) ()	-	-	ND (0.990) ()	-	-	-	-	ND (0.940) R ()	ND (0.940) R ()	-	ND (0.920) ()	-	-	-	-	-	-	ND (0.770) J ()	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) R ()	ND (0) R ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	ND (0) ()	-	-	ND (0) ()	-	-	-	-	ND (0) R ()	ND (0) R ()	-	ND (0) ()	-	-	-	-	-	-	ND (0) J ()	-
Hydroquinone	mg/kg	190000[A]	n/v	-	ND (1.8) ()	-	-	ND (2.5) ()	-	-	-	-	ND (2.4) R ()	ND (2.4) R ()	-	ND (2.4) ()	-	-	-	-	-	-	ND (2) J ()	-
Metals																								
ANTIMONY	mg/kg	190000[A]	n/v	-	1.7 L ()	-	-	ND (1.50) L ()	-	-	-	-	ND (1.40) L ()	-	-	ND (1.40) L ()	-	-	-	-	-	-	ND (1.20) L ()	-
ARSENIC	mg/kg	190000[A]	29[B]	4.8 H ()	11.8 H ()	3.0 H ()	10.9 H ()	5.7 H ()	6.4 H ()	5.9 H ()	23.3 H ()	12.2 H ()	8.8 H ()	-	5.1 H ()	8.0 H ()	6.8 H ()	3.1 H ()	8.5 H ()	2.7 ()	12.7 ()	12.0 ()	11.2 H ()	7.9 ()
BARIUM	mg/kg	190000[A]	8200[B]	-	151 ()	-	-	208 ()	-	-	-	-	178 ()	-	-	141 ()	-	-	-	-	-	-	162 ()	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	0.53 ()	-	-	1.9 ()	-	-	-	-	1.7 ()	-	-	1.2 ()	-	-	-	-	-	-	0.58 ()	-
CADMIUM	mg/kg	190000[A]	38[B]	-	ND (0.53) ()	-	-	1.5 ()	-	-	-	-	ND (0.72) ()	-	-	ND (0.69) ()	-	-	-	-	-	-	0.58 ()	-
CHROMIUM	mg/kg	20000$_{13}$[A]	190$_{13}$[B]	83.5 L ()	163 ()	16.8 J ()	45.9 J ()	55.2 ()	35.2 J ()	73.6 J ()	68.4 J ()	54.6 J ()	43.0 ()	-	31.5 J ()	46.6 ()	25.4 J ()	71.7 J ()	56.9 J ()	***869 H*[B]** ()	***227 H*[B]** ()	62.5 H ()	32.2 ()	52.5 H ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	5.8 ()	-	-	26.6 ()	-	-	-	-	20.5 ()	-	-	18.3 ()	-	-	-	-	-	-	11.4 ()	-
LEAD	mg/kg	190000[A]	450[B]	305 H ()	369 ()	110 ()	299 ()	307 ()	121 ()	304 ()	354 ()	300 ()	222 ()	-	197 ()	182 ()	189 ()	191 ()	270 ()	115 ()	***973*[B]** ()	***528*[B]** ()	291 ()	450 ()
MERCURY	mg/kg	190000[A]	10[B]	-	ND (0.08) J ()	-	-	1.8 J ()	-	-	-	-	2.1 J ()	-	-	0.95 J ()	-	-	-	-	-	-	3.1 J ()	-
NICKEL	mg/kg	190000[A]	650[B]	-	16.0 ()	-	-	48.4 ()	-	-	-	-	45.5 ()	-	-	33.7 ()	-	-	-	-	-	-	21.1 ()	-
SELENIUM	mg/kg	190000[A]	26[B]	-	ND (0.42) ()	-	-	3.8 ()	-	-	-	-	3.3 ()	-	-	2.8 ()	-	-	-	-	-	-	0.70 ()	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	66.6 ()	-	-	28.8 ()	-	-	-	-	23.8 ()	-	-	22.3 ()	-	-	-	-	-	-	43.6 ()	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	13.2 ()	8.2 ()	9.3 J ()	12.8 J ()	9.9 ()	14.4 J ()	12.5 J ()	9.2 J ()	17.6 J ()	11.5 ()	-	17.1 J ()	20.4 ()	15.2 J ()	14.1 J ()	17.3 J ()	10.8 J ()	23.0 J ()	7.5 J ()	9.2 ()	14.3 J ()
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.12) ()	ND (0.11) ()	ND (0.11) L ()	ND (0.14) L ()	ND (0.15) ()	ND (0.16) L ()	0.17 L ()	0.16 L ()	ND (0.18) L ()	ND (0.14) ()	-	ND (0.14) L ()	ND (0.14) ()	ND (0.14) L ()	ND (0.12) L ()	ND (0.16) L ()	ND (0.11) L ()	ND (0.09) L ()	ND (0.10) L ()	ND (0.12) ()	ND (0.09) L ()
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	1760 J ()	ND (20.70) J ()	2740 L ()	806 L ()	363 J ()	ND (31.40) L ()	ND (29.20) L ()	ND (27.00) L ()	15100 L ()	ND (36.40) J ()	-	ND (54.10) L ()	2290 J ()	3660 L ()	ND (25.60) L ()	6970 L ()	681 ()	26900 ()	14500 ()	372 J ()	8020 ()
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.74) ()	0.72 ()	ND (0.54) L ()	ND (0.70) L ()	ND (0.73) ()	ND (0.79) L ()	ND (0.74) L ()	ND (0.70) L ()	ND (0.88) L ()	ND (0.67) ()	-	ND (0.67) L ()	ND (0.72) ()	ND (0.61) L ()	ND (0.61) L ()	ND (0.81) L ()	6.8 ()	0.75 ()	ND (0.64) ()	ND (0.58) ()	ND (0.62) ()
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	43.2 ()	46.8 J ()	97.2 ()	109 ()	ND (6.00) L ()	ND (6.20) L ()	6.0 L ()	28.0 L ()	ND (7.10) L ()	ND (5.70) L ()	-	ND (5.50) L ()	16.8 L ()	87.2 ()	ND (5.00) L ()	73.1 L ()	58.1 ()	25.0 ()	ND (5.20) ()	ND (4.60) J ()	ND (5.00) ()
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	0.04 ()	0.48 ()	0.49 ()	1.8 ()	1.4 ()	ND (0.39) ()	1.8 ()	1.5 ()	5.2 ()	1.3 ()	-	0.54 ()	1.3 ()	1.0 ()	0.34 ()	6.8 ()	0.42 ()	0.46 ()	0.36 ()	0.41 ()	0.62 ()
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	40100 J ()	5030 L ()	15300 ()	44800 ()	47000 L ()	18400 ()	52000 ()	48500 ()	65400 ()	28600 L ()	-	25300 ()	37400 L ()	38100 ()	11200 ()	45900 ()	15500 J ()	55700 J ()	17200 J ()	14100 L ()	37800 J ()
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (29.90) ()	ND (20.70) ()	ND (20.70) ()	ND (25.20) ()	ND (25.80) ()	ND (29.40) ()	ND (43.4) ()	ND (26.80) ()	ND (33.50) ()	40.1 ()	-	ND (26.30) ()	ND (26.40) ()	ND (27.60) ()	ND (23.80) ()	ND (28.50) ()	ND (24.20) ()	89.0 ()	ND (25.70) ()	ND (20.70) ()	ND (22.70) ()

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-6		BNA-7	BNA-8	BNA-9	BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13		C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3	GP-270-S-4	GP-270-S-5	GP-270-S-7
Sample Date				18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92	7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09	22-Sep-09	22-Sep-09	29-Sep-09
Sample ID				B087A1	B087A2	B088A3	B088A4	B088A2	B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5	AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)	S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)
Sample Depth				2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft	4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft
Sampling Company																GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1680744	1680744	1680744	1163143	1163143	1163143	1163143	1163143	1163948
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208877	P208878	P208789	P208790	P208788	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747	8466414	8466397	8466403	5784781	5784782	5784783	5784784	5784785	5790787
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	-	-	-	-	ND (0.062) J ()	-	ND (0.062) ()	ND (9.5) ()	ND (0.071) ()	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8^	n/v	-	-	-	-	-	ND (0.12) J ()	-	ND (0.12) ()	*ND (19)* ()	ND (0.14) ()	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38^	n/v	-	-	-	-	-	ND (0.12) J ()	-	ND (0.12) ()	ND (19) ()	ND (0.14) ()	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330^	0.5[B]	-	-	-	-	-	0.005 J ()	-	0.006 J ()	*ND (0.95)* ()	ND (0.007) ()	-	-	ND (0.008) (0.0005)	ND (0.007) (0.0005)	ND (0.003) (0.0005)	ND (0.029) (0.0005)	ND (0.025) (0.0005)	ND (0.041) (0.0005)	ND (0.035) (0.0005)	ND (0.031) (0.0005)	ND (0.044) (0.0005)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	0.005 J ()	-	0.01 J ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	-	-	-	-	ND (0.012) J ()	-	ND (0.012) ()	ND (1.9) ()	ND (0.014) ()	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	*ND (0.012) J* ()	-	*ND (0.012)* ()	*ND (1.9)* ()	*ND (0.014)* ()	-	-	*ND (0.008)* (0.001)	*ND (0.007)* (0.001)	ND (0.003) (0.001)	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	*ND (0.95)* ()	ND (0.007) ()	-	-	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	-	-	-	-	ND (0.19) R ()	-	ND (0.19) J ()	ND (28) R ()	ND (0.21) R ()	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000^	70[B]	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	-	-	-	-	-	ND (0.012) J ()	-	0.005 J ()	3 ()	0.014 J ()	-	-	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)	ND (0.070) (0.001)	ND (0.061) (0.001)	0.100 J (0.001)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	0.048 J ()	-	0.041 ()	ND (1.9) ()	0.17 ()	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	0.012 B ()	-	0.015 B ()	0.9 J ()	0.011 B ()	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.008) (0.0005)	ND (0.007) (0.0005)	ND (0.003) (0.0005)	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.180 J (0.001)	ND (0.051) (0.001)	0.410 J (0.001)	ND (0.070) (0.001)	0.130 J (0.001)	0.390 J (0.001)
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	-	-	-	-	ND (0.012) J ()	-	ND (0.012) ()	ND (1.9) ()	ND (0.014) ()	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	-	-	-	-	ND (0.006) ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	-	-	-	-	-	ND (0.006) ()	-	0.009 ()	ND (0.95) ()	ND (0.007) ()	-	-	0.003 J (0.001)	0.003 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	0.410 J (0.001)	ND (0.070) (0.001)	0.071 J (0.001)	0.280 J (0.001)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	-	-	-	-	ND (0.006) J ()	-	ND (0.006) ()	ND (0.95) ()	ND (0.007) ()	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	-	-	-	-	-	-	-	-	-	-	-	-	0.003 J (0.001)	0.003 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	-	-	-	-	-	-	-	-	-	-	-	-	ND (0.008) (0.001)	ND (0.007) (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	-	-	-	-	-	0.018 J ()	-	0.045 ()	ND (0.95) ()	ND (0.007) ()	-	-	0.002 J (0.001)	0.005 J (0.001)	ND (0.003) (0.001)	ND (0.059) (0.001)	ND (0.051) (0.001)	ND (0.082) (0.001)	ND (0.070) (0.001)	ND (0.061) (0.001)	ND (0.088) (0.001)
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.062) R ()	-	ND (0.062) J ()	ND (9.5) R ()	ND (0.071) R ()	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200^	n/v	-	-	-	-	-	ND (1.20) L ()	-	NT	1.5 L ()	ND (1.40) L ()	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) J ()	-	ND (0) ()	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.012) J ()	-	ND (0.012) ()	1.000 J ()	ND (0.014) J ()	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	-	-	-	-	-	3.6 ()	3.6 J ()	-	1 ()	0.38 J ()	-	-	0.940 J (0.003)	2.500 (0.003)	2.500 (0.003)	0.430 (0.033)	0.110 J (0.033)	4.7 (0.033)	0.230 J (0.033)	0.095 J (0.033)	4.1 (0.033)
BENZENETHIOL	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000^	n/v	-	-	-	-	-	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	-	-	-	-	-	4.9 ()	5.1 J ()	-	ND (1) ()	0.53 ()	-	-	1.400 (0.003)	4.400 (0.003)	3.700 (0.003)	1.4 (0.033)	0.320 (0.033)	6.4 (0.033)	0.520 (0.033)	0.230 (0.033)	4.9 (0.033)
BENZO(A)PYRENE	mg/kg	190000^	46[B]	-	-	-	-	-	3.8 ()	4.8 J ()	-	ND (1) ()	0.59 ()	-	-	1.900 (0.003)	4.300 (0.003)	4.000 (0.003)	1.7 (0.033)	0.360 (0.033)	5.1 (0.033)	0.590 (0.033)	0.260 (0.033)	3.5 (0.033)
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	-	-	-	-	-	-	-	-	-	-	-	-	2.400 (0.003)	4.800 (0.003)	4.500 (0.003)	2.2 (0.033)	0.410 (0.033)	7.0 (0.033)	0.690 (0.033)	0.340 (0.033)	3.9 (0.033)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	-	-	-	-	-	-	-	-	-	-	-	-	2.000 (0.003)	4.600 (0.003)	2.700 (0.003)	1.4 (0.033)	0.290 (0.033)	3.4 (0.033)	0.470 (0.033)	0.230 (0.033)	1.6 J (0.033)
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	1.1 B ()	1.1 B ()	-	ND (1) ()	1.1 B ()	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000^	230[B]	-	-	-	-	-	4.800 ()	5.300 J ()	-	0.720 ()	0.630 ()	-	-	1.600 (0.003)	3.800 (0.003)	3.600 (0.003)	1.4 (0.033)	0.340 (0.033)	7.1 (0.033)	0.610 (0.033)	0.260 (0.033)	5.6 (0.033)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	0.13 J ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.380) ()	ND (1.200) J ()	-	ND (0.910) ()	ND (0.430) ()	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	ND (2.000) ()	ND (6.700) J ()	-	ND (4.800) ()	ND (2.300) ()	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				BNA-6		BNA-7	BNA-8	BNA-9	BNA-10	BNA-10DL	BNA-10RE	BNA-11	BNA-12	BNA-13		C-170	C-171	C-172	GP-270-S-1	GP-270-S-2	GP-270-S-3	GP-270-S-4	GP-270-S-5	GP-270-S-7
Sample Date				18-Aug-92	18-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	17-Aug-92	14-Aug-92	14-Aug-92	14-Aug-92	7-Jul-16	5-Jul-16	6-Jul-16	21-Sep-09	21-Sep-09	21-Sep-09	22-Sep-09	22-Sep-09	29-Sep-09
Sample ID				B087A1	B087A2	B088A3	B088A4	B088A2	B088A1	B088A1DL	B088A1RE	B088A6	B089A3	B089A4	B089A5	AOI7-C-170-2-4-070716	AOI7-C-171-2-4-070516	AOI7-C-172-2-4-070616	S-1 (4.0-4.5)	S-2 (4.0-4.5)	S-3 (3.0-3.5)	S-4 (4.0-4.5)	S-5 (4.0-4.5)	S-7 (2.5-3.0)
Sample Depth				2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 6 ft	2 - 4 ft	2 - 4 ft	6 - 8 ft	2 - 4 ft	2 - 4 ft	2 - 4 ft	4 - 4.5 ft	4 - 4.5 ft	3 - 3.5 ft	4 - 4.5 ft	4 - 4.5 ft	2.5 - 3 ft
Sampling Company																GHD	GHD	GHD	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	LL	LL	LL	LL	LL	LL	LL	LL	LL
Laboratory Work Order		A	B	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	CCR Historical	1680744	1680744	1680744	1163143	1163143	1163143	1163143	1163143	1163948
Laboratory Sample ID	Units	MSC-PA	SHS-PA	P208877	P208878	P208789	P208790	P208788	P208787	P208787DL	P208787RE	P208792	P208745	P208746	P208747	8466414	8466397	8466403	5784781	5784782	5784783	5784784	5784785	5790787
2,4-DINITROPHENOL	mg/kg	190000[A]	23[B]	-	-	-	-	-	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000[A]	3200[B]	-	-	-	-	-	12 J ()	11 J ()	-	0.64 J ()	0.82 ()	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000[A]	3800[B]	-	-	-	-	-	-	-	-	-	-	-	-	0.490 J (0.003)	1.100 J (0.003)	2.000 (0.003)	0.210 J (0.033)	0.062 J (0.033)	4.1 (0.033)	0.160 J (0.033)	0.047 J (0.033)	4.3 (0.033)
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.840) ()	ND (2.800) J ()	-	ND (2.000) ()	ND (0.960) ()	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000[A]	22000[B]	-	-	-	-	-	1.6 ()	2.1 J ()	-	ND (1) ()	0.39 J ()	-	-	-	-	-	1.2 (0.033)	0.250 (0.033)	2.8 (0.033)	0.410 (0.033)	0.210 J (0.033)	1.4 J (0.033)
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	0.750 J ()	0.660 J ()	-	1.500 J ()	0.240 J ()	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000[A]	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{12}[A]	58_{12}[B]	-	-	-	-	-	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000[A]	580[B]	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000[A]	58[B]	-	-	-	-	-	ND (1.2) ()	ND (4.2) J ()	-	ND (3) ()	ND (1.4) ()	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.48 ()	0.18 J ()	0.69 ()	0.78 ()	ND (2.4) J ()	0.68 ()	0.69 J ()	-	ND (1) ()	0.63 ()	0.52 ()	1.7 ()	9.700 (0.003)	15.000 (0.003)	7.300 (0.003)	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000[A]	6[B]	-	-	-	-	-	ND (2) ()	*ND (6.7) J* ()	-	ND (4.8) ()	ND (2.3) ()	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2) ()	ND (6.7) J ()	-	ND (4.8) ()	ND (2.3) ()	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000[A]	10000[B]	-	-	-	-	-	9.2 J ()	9.4 J ()	-	1.5 ()	0.84 ()	-	-	2.800 (0.003)	4.800 (0.003)	7.500 (0.003)	1.1 (0.033)	0.270 (0.033)	11 (0.033)	1.1 (0.033)	0.210 J (0.033)	18 (0.033)
PHENOL	mg/kg	18000[A]	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000[A]	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	1.900 (0.003)	5.200 (0.003)	6.100 (0.003)	1.9 (0.033)	0.440 (0.033)	15 (0.033)	0.930 (0.033)	0.330 (0.033)	13 (0.033)
PYRIDINE	mg/kg	10000[A]	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000[A]	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.250) ()	ND (0.830) J ()	-	ND (0.610) ()	ND (0.290) ()	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.410) ()	ND (1.400) J ()	-	ND (1.000) ()	ND (0.470) ()	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	7 J ()	3.3 J ()	-	ND (3.6) ()	1 J ()	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52[A]	n/v	-	-	-	-	-	ND (0.41) ()	ND (1.4) J ()	-	ND (1) ()	ND (0.47) ()	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041[A]	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	ND (0.820) ()	ND (2.700) J ()	-	ND (2.000) ()	ND (0.940) ()	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	ND (0) ()	ND (0) J ()	-	ND (0) ()	ND (0) ()	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (2.1) ()	ND (7.1) J ()	-	ND (5.2) ()	ND (2.4) ()	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	190000[A]	n/v	-	-	-	-	-	104 L ()	-	-	ND (1.50) L ()	ND (1.40) L ()	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000[A]	29[B]	17.3 ()	27.8 ()	18.1 ()	25.4 ()	11.9 ()	22.0 H ()	-	-	23.7 H ()	22.7 H ()	15.2 ()	17.9 ()	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000[A]	8200[B]	-	-	-	-	-	830 ()	-	-	445 ()	370 ()	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000[A]	n/v	-	-	-	-	-	ND (0.69) ()	-	-	2.4 ()	1.9 ()	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000[A]	38[B]	-	-	-	-	-	2.2 ()	-	-	ND (0.76) ()	1.6 ()	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{31}[A]	190_{31}[B]	62.4 H ()	30.3 H ()	68.9 H ()	75.8 H ()	157 H ()	77.8 ()	-	-	91.7 ()	97.9 ()	180 H ()	108 H ()	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000[A]	160[B]	-	-	-	-	-	11.6 ()	-	-	24.7 ()	17.3 ()	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000[A]	450[B]	204 ()	62.0 ()	***513*** [B] ()	***540*** [B] ()	***887*** [B] ()	***5200*** [B] ()	-	-	***576*** [B] ()	421 ()	388 ()	***1140*** [B] ()	343 (0.550)	200 (0.550)	151 (0.550)	73.1 (0.591)	47.1 (0.591)	264 (0.591)	20.7 (0.591)	28.9 (0.591)	387 (0.591)
MERCURY	mg/kg	190000[A]	10[B]	-	-	-	-	-	3.7 J ()	-	-	***25.2 J*** [B] ()	2.0 J ()	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000[A]	650[B]	-	-	-	-	-	66.6 ()	-	-	58.1 ()	40.8 ()	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000[A]	26[B]	-	-	-	-	-	1.1 ()	-	-	1.7 ()	2.6 ()	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000[A]	820[B]	-	-	-	-	-	43.1 ()	-	-	41.0 ()	39.8 ()	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000[A]	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	11.8 J ()	10.2 J ()	9.9 J ()	10.7 J ()	14.5 J ()	14.2 ()	-	-	12.9 ()	11.6 ()	10.4 J ()	12.5 J ()	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000[A]	190[B]	ND (0.10) L ()	ND (0.12) L ()	ND (0.10) L ()	ND (0.10) L ()	0.23 L ()	ND (0.12) ()	-	-	ND (0.15) ()	ND (0.14) ()	ND (0.09) L ()	ND (0.10) L ()	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	4530 ()	7460 ()	1240 ()	1540 ()	96800 ()	3690 J ()	-	-	58800 J ()	3890 J ()	2340 ()	16800 ()	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	36.0 (0.50)	34.6 (0.50)	21.0 (0.50)	30.1 (0.50)	26.4 (0.50)	34.7 (0.50)	30.3 (0.50)	25.2 (0.50)	38.8 (0.50)
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	ND (0.66) ()	ND (0.85) ()	ND (0.69) ()	ND (0.63) ()	1.1 ()	ND (0.60) ()	-	-	1.2 ()	ND (0.68) ()	ND (0.61) ()	0.93 ()	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	121 ()	40.7 ()	ND (5.50) ()	22.1 ()	25.4 ()	ND (51.2) ()	-	-	50.1 J ()	35.5 J ()	20.0 ()	57.1 ()	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000[A]	n/v	2.5 ()	2.1 ()	4.8 ()	1.9 ()	0.74 ()	2.4 ()	-	-	1.9 ()	2.4 ()	1.0 ()	2.5 ()	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	35100 J ()	40700 J ()	41100 J ()	44700 J ()	93200 J ()	32900 L ()	-	-	69100 L ()	61300 L ()	18300 J ()	62600 J ()	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	ND (24.20) ()	33.5 ()	32.0 ()	ND (26.30) ()	144 ()	ND (23.90) ()	-	-	ND (28.70) ()	64.3 ()	76.7 ()	167 ()	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-8	GP-270-S-9	GP-270-S-10	GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3	GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2	GP-277-PER3	GP-277-PER4
Sample Date				29-Sep-09	6-Oct-09	6-Oct-09	6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07	24-May-07	24-May-07
Sample ID				S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)	S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3	GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2	GP-277-PER3	GP-277-PER4
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	WGI	WGI	WGI	LL	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	1163948	1165331	1165331	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100	074100	074100	074100	076856	076856	076856	074097	074097	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5790788	5799591	5799592	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546	0705-4547	0705-4548
Volatile Organic Compounds																								
ACETONITRILE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330^	0.5[B]	ND (0.044) (0.0005)	ND (0.057) (0.0005)	ND (0.051) (0.0005)	0.061 J (0.0005)	ND (0.41) (J)	ND (0.35) (J)	ND (0.39) (J)	ND (0.390) (0.001)	ND (0.270) D (J)	ND (0.270) D (J)	ND (0.230) D (J)	ND (0.230) D (J)	ND (0.200) D (J)	ND (0.340) D (J)	ND (0.0058) (J)	ND (0.0054) (J)	ND (0.0051) (J)	1.1 D[B] (J)	2.8 D[B] (J)	3.3 D[B] (J)	3.0 D[B] (J)
CARBON DISULFIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000^	6900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98^	0.5[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000^	70[B]	ND (0.088) (0.001)	ND (0.110) (0.001)	0.120 J (0.001)	ND (0.097) (0.001)	-	-	-	-	ND (0.270) D (J)	ND (0.270) D (J)	ND (0.230) D (J)	ND (0.230) D (J)	ND (0.200) D (J)	ND (0.340) D (J)	ND (0.0058) (J)	ND (0.0054) (J)	ND (0.0051) (J)	1.2 D (J)	1.9 D (J)	1.8 D (J)	4.1 D (J)
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000^	2500[B]	ND (0.088) (0.001)	ND (0.110) (0.001)	ND (0.100) (0.001)	ND (0.097) (0.001)	-	-	-	-	ND (0.270) D (J)	ND (0.270) D (J)	ND (0.230) D (J)	ND (0.230) D (J)	ND (0.200) D (J)	ND (0.340) D (J)	ND (0.0058) (J)	ND (0.0054) (J)	ND (0.0051) (J)	1.7 D (J)	2.4 D (J)	2.7 D (J)	4.3 D (J)
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900^	2[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEXANE	mg/kg	10000^	5600[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	0.710 (0.001)	0.660 (0.001)	0.870 (0.001)	0.850 (0.001)	-	-	-	-	0.430 D (J)	0.600 D (J)	0.350 D (J)	0.370 D (J)	0.200 J D (J)	ND (0.340) D (J)	0.0022 J (J)	0.0020 J (J)	0.0023 J (J)	1.0 D (J)	0.870 D (J)	0.480 D (J)	1.5 D (J)
BUTYLBENZENE, SEC-	mg/kg	10000^	2800[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STYRENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000^	2200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000^	100[B]	0.440 J (0.001)	0.990 (0.001)	0.700 (0.001)	0.940 (0.001)	-	-	-	-	0.590 D (J)	0.710 D (J)	0.490 D (J)	0.500 D (J)	0.380 D (J)	ND (0.340) D (J)	ND (0.0058) (J)	ND (0.0054) (J)	ND (0.0051) (J)	1.4 D (J)	2.6 D (J)	2.7 D (J)	4.0 D (J)
TRANS-1,2-DICHLOROETHENE	mg/kg	5500^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640^	35[B]	ND (0.088) (0.001)	0.120 J (0.001)	ND (0.100) (0.001)	0.120 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000^	210[B]	ND (0.088) (0.001)	ND (0.110) (0.001)	ND (0.100) (0.001)	ND (0.097) (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100^	1000[B]	0.180 J (0.001)	0.170 J (0.001)	0.250 J (0.001)	0.190 J (0.001)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																								
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3^	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds																								
ACENAPHTHENE	mg/kg	190000^	4700[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTHRACENE	mg/kg	190000^	350[B]	2.1 J (0.033)	2.5 J (0.033)	2.0 J (0.033)	0.780 J (0.033)	ND (0.58) (J)	0.39 J (J)	-	-	ND (0.580) (J)	ND (0.560) (J)	ND (0.550) (J)	ND (0.510) (J)	ND (0.500) (J)	ND (0.480) (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	ND (0.400) (J)	ND (0.380) (J)	ND (0.550) (J)	2.7 (J)
BENZENETHIOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000^	430[B]	2.2 J (0.033)	3.5 (0.033)	2.1 J (0.033)	1.0 J (0.033)	ND (0.58) (J)	0.44 J (J)	-	-	1.8 (J)	0.380 J (J)	0.810 (J)	1.1 (J)	1.0 (J)	0.460 J (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	0.320 J (J)	ND (0.380) (J)	0.330 J (J)	ND (0.540) (J)
BENZO(A)PYRENE	mg/kg	190000^	46[B]	2.2 J (0.033)	2.9 (0.033)	3.6 (0.033)	1.0 J (0.033)	ND (0.58) (J)	0.41 J (J)	-	-	2.0 (J)	0.400 J (J)	0.990 (J)	1.7 (J)	1.4 (J)	0.590 (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	0.310 J (J)	ND (0.380) (J)	0.350 J (J)	ND (0.540) (J)
BENZO(B)FLUORANTHENE	mg/kg	190000^	170[B]	2.5 J (0.033)	3.1 (0.033)	3.5 (0.033)	1.4 J (0.033)	ND (0.58) (J)	0.46 J (J)	-	-	2.5 (J)	0.560 (J)	1.3 (J)	2.6 (J)	1.5 (J)	0.600 (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	0.420 (J)	ND (0.380) (J)	0.490 J (J)	0.480 J (J)
BENZO(G,H,I)PERYLENE	mg/kg	190000^	180[B]	1.5 J (0.033)	1.7 J (0.033)	4.5 (0.033)	0.760 J (0.033)	ND (0.58) (J)	ND (0.56) (J)	-	-	1.1 (J)	ND (0.560) (J)	0.390 J (J)	0.570 (J)	0.830 (J)	ND (0.480) (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	ND (0.400) (J)	ND (0.380) (J)	ND (0.550) (J)	ND (0.540) (J)
BENZO(K)FLUORANTHENE	mg/kg	190000^	610[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000^	130[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000^	4900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000^	230[B]	2.6 J (0.033)	3.7 (0.033)	2.6 (0.033)	1.1 J (0.033)	ND (0.58) (J)	0.58 (J)	-	-	2.0 (J)	0.700 (J)	0.890 (J)	1.2 (J)	1.2 (J)	0.510 (J)	ND (0.380) (J)	ND (0.360) (J)	ND (0.340) (J)	0.410 (J)	ND (0.380) (J)	0.370 J (J)	0.440 J (J)
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000^	270[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000^	9300[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000^	230[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-270-S-8	GP-270-S-9	GP-270-S-10	GP-270-S-12	GP-271-GP-2	GP-271-GP-4	GP-271-GP-5		GP-275-PER1	GP-275-PER2	GP-275-PER3	GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2	GP-277-PER3	GP-277-PER4
Sample Date				29-Sep-09	6-Oct-09	6-Oct-09	6-Oct-09	4-Jun-02	4-Jun-02	17-Sep-02	17-Sep-02	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	4-Sep-07	4-Sep-07	4-Sep-07	24-May-07	24-May-07	24-May-07	24-May-07
Sample ID				S-8 (2.0-2.5)	S-9 (2.5-3.0)	S-10 (2.0-2.5)	S-12 (2.0-2.5)	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	GP-5(3.5-4)	GP-275-PER1	GP-275-PER2	GP-275-PER3	GP-275-PER4	GP-275-PER5	GP-275-PER6	GP-275-SUB-1	GP-275-SUB-2	GP-275-SUB-3	GP-277-PER1	GP-277-PER2	GP-277-PER3	GP-277-PER4
Sample Depth				2 - 2.5 ft	2.5 - 3 ft	2 - 2.5 ft	2 - 2.5 ft	8.5 - 9 ft	3.5 - 4 ft	3.5 - 4 ft	3.5 - 4 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.5 ft	5 - 5.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				LL	LL	LL	LL	WGI	WGI	WGI	WGI	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	1163948	1165331	1165331	1165331	UNKNOWN	UNKNOWN	UNKNOWN	823333	074100	074100	074100	074100	074100	074100	076856	076856	076856	074097	074097	074097	074097
Laboratory Sample ID	Units	MSC-PA	SHS-PA	5790788	5799591	5799592	5799594	GP-2 (8.5-9.0)	GP-4 (3.5-4.0)	GP-5 (3.5-4)	3901263	0705-4563	0705-4564	0705-4565	0705-4566	0705-4567	0705-4568	0709-0958	0709-0959	0709-0960	0705-4545	0705-4546	0705-4547	0705-4548
2,4-DINITROPHENOL	mg/kg	190000^	23[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000^	3200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORENE	mg/kg	190000^	3800[B]	1.7 J (0.033)	2.2 J (0.033)	0.960 J (0.033)	0.620 J (0.033)	ND (0.58) ()	0.4 J ()	-	-	ND (0.580) ()	ND (0.560) ()	ND (0.550) ()	ND (0.510) ()	ND (0.500) ()	ND (0.480) ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()	ND (0.550) ()	1.1 ()
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000^	22000[B]	1.1 J (0.033)	1.3 J (0.033)	3.5 (0.033)	0.620 J (0.033)	-	-	-	-	1.1 ()	ND (0.560) ()	0.360 J ()	0.540 ()	0.700 ()	0.430 J ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	ND (0.400) ()	ND (0.380) ()	ND (0.550) ()	ND (0.540) ()
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000^	1900[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{12}^	58_{12}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000^	580[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000^	58[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25[B]	-	-	-	-	0.92 ()	0.72 ()	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000^	6[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000[B]	5.5 (0.033)	8.9 (0.033)	3.1 (0.033)	2.1 J (0.033)	0.6 ()	1.5 ()	-	-	2.2 ()	0.590 ()	0.830 ()	0.850 ()	0.640 ()	0.470 J ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.510 ()	ND (0.380) ()	ND (0.550) ()	2.7 ()
PHENOL	mg/kg	18000^	200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PYRENE	mg/kg	190000^	2200[B]	5.2 (0.033)	8.5 (0.033)	2.7 (0.033)	1.9 J (0.033)	0.57 J ()	1.4 ()	-	-	2.9 ()	1.0 ()	1.8 ()	1.4 ()	1.4 ()	0.690 ()	ND (0.380) ()	ND (0.360) ()	ND (0.340) ()	0.820 ()	ND (0.380) ()	0.460 J ()	0.400 J ()
PYRIDINE	mg/kg	10000^	12[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUINOLINE	mg/kg	10000^	0.37[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,i)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																								
ANTIMONY	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000^	29[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000^	38[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{51}^	190_{51}[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000^	160[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAD	mg/kg	190000^	450[B]	443 (0.591)	328 (0.591)	447 (0.591)	235 (0.591)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MERCURY	mg/kg	190000^	10[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000^	650[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SELENIUM	mg/kg	190000^	26[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VANADIUM	mg/kg	190000^	820[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZINC	mg/kg	190000^	12000[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																								
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	37.1 (0.50)	36.1 (0.50)	31.8 (0.50)	30.7 (0.50)	-	-	-	37.7 (0.50)	-	-	-	-	-	-	-	-	-	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01	GP280-02	GP280-03	GP280-04	GP280-05	GP280-06	GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2	LO-1000-PER-3	LO-1000-SUB-1
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07	29-May-07	29-May-07
Sample ID				GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0	GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0	GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2	LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft	3 ft	2 ft	3 ft	3 ft	3 ft	3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	074145	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103	8557105	8557106	8557107	8557109	8557110	8557112	8557104	8557108	8557111	0706-0470	0706-0471	0706-0472	0706-0473
Volatile Organic Compounds																						
ACETONITRILE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACROLEIN	mg/kg	1.8[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ACRYLONITRILE	mg/kg	38[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZENE	mg/kg	330[A]	0.5[B]	**8.6 D[B]** ()	**3.8 D[B]** ()	**0.790 D[B]** ()	**1.3 D[B]** ()	**2.1 D[B]** ()	ND (0.0008) (0.0005)	ND (0.0007) (0.0005)	0.002 J (0.0005)	0.085 J (0.0005)	ND (0.0009) (0.0005)	ND (0.001) (0.0005)	ND (0.0006) (0.0005)	ND (0.0006) (0.0005)	ND (0.0008) (0.0005)	ND (0.0006) (0.0005)	-	-	-	-
CARBON DISULFIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROBENZENE	mg/kg	4600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROFORM	mg/kg	110[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHLOROMETHANE	mg/kg	1400[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CYCLOHEXANE	mg/kg	10000[A]	6900[B]	-	-	-	-	-	0.002 J (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	0.005 J (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.003 J (0.001)	ND (0.001) (0.001)	-	-	-	-
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE (EDC)	mg/kg	98[A]	0.5[B]	-	-	-	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
1,1-DICHLOROETHENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROPROPANE	mg/kg	260[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DIOXANE (P-DIOXANE)	mg/kg	330[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETHYLBENZENE	mg/kg	1000[A]	70[B]	1.1 D ()	12 D ()	0.250 D ()	0.530 D ()	0.520 D ()	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.10 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
ISOPROPYLBENZENE (CUMENE)	mg/kg	10000[A]	2500[B]	2.5 D ()	7.2 D ()	0.900 D ()	0.160 J D ()	0.920 D ()	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
METHYL ETHYL KETONE (2-BUTANONE)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYLENE CHLORIDE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
METHYL TERTIARY BUTYL ETHER	mg/kg	9900[A]	2[B]	-	-	-	-	-	ND (0.0008) (0.0005)	ND (0.0007) (0.0005)	ND (0.0006) (0.0005)	ND (0.034) (0.0005)	ND (0.0009) (0.0005)	ND (0.001) (0.0005)	ND (0.0006) (0.0005)	ND (0.0006) (0.0005)	ND (0.0008) (0.0005)	ND (0.0006) (0.0005)	-	-	-	-
HEXANE	mg/kg	10000[A]	5600[B]	-	-	-	-	-	ND (0.002) (0.001)	0.004 J (0.001)	0.002 J (0.001)	0.34 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	0.002 J (0.001)	-	-	-	-
NAPHTHALENE	mg/kg	190000[A]	25[B]	0.570 D ()	8.2 D ()	0.440 D ()	0.450 D ()	0.550 D ()	0.003 J (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	1.4 (0.001)	0.004 J (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
BUTYLBENZENE, SEC-	mg/kg	10000[A]	2800[B]	-	-	-	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
STYRENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BUTYLBENZENE, TERT-	mg/kg	10000[A]	2200[B]	-	-	-	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
1,1,1,2-TETRACHLOROETHANE	mg/kg	340[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-TETRACHLOROETHANE	mg/kg	44[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TETRACHLOROETHYLENE(PCE)	mg/kg	3600[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	mg/kg	10000[A]	100[B]	3.1 D ()	4.3 D ()	0.370 D ()	0.790 D ()	1.0 D ()	ND (0.002) (0.001)	ND (0.001) (0.001)	0.001 J (0.001)	1.4 (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
TRANS-1,2-DICHLOROETHENE	mg/kg	5500[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TRICHLOROETHANE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-TRICHLOROETHANE	mg/kg	18[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRICHLOROETHYLENE (TCE)	mg/kg	180[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-TRIMETHYLBENZENE	mg/kg	640[A]	35[B]	-	-	-	-	-	0.002 J (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.18 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
1,3,5-TRIMETHYLBENZENE	mg/kg	10000[A]	210[B]	-	-	-	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.089) (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
XYLENES, TOTAL (DIMETHYLBENZENE)	mg/kg	9100[A]	1000[B]	-	-	-	-	-	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	0.24 J (0.001)	ND (0.002) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	ND (0.001) (0.001)	ND (0.002) (0.001)	ND (0.001) (0.001)	-	-	-	-
Crotonaldehyde (2-Butenal)	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylene oxide	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethyleneimine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Formaldehyde	mg/kg	200[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanethiol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-PROPYLBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (SW8011)																						
1,2-DIBROMOETHANE (EDB)	mg/kg	4.3[A]	0.005[B]	-	-	-	-	-	ND (0.00029) (0.00020)	ND (0.00026) (0.00020)	ND (0.00024) (0.00020)	ND (0.00027) (0.00020)	ND (0.00029) (0.00020)	ND (0.00037) (0.00020)	ND (0.00022) (0.00020)	ND (0.00029) (0.00020)	ND (0.00030) (0.00020)	ND (0.0024) (0.00020)	-	-	-	-
Semi-Volatile Organic Compounds																						
ACENAPHTHENE	mg/kg	190000[A]	4700[B]	-	-	-	-	-	0.96 (0.0033)	1.2 (0.0033)	0.088 J (0.0033)	2.1 (0.0033)	1.5 (0.0033)	0.65 (0.0033)	0.0048 J (0.0033)	0.31 (0.0033)	1.1 (0.0033)	0.31 (0.0033)	-	-	-	-
ANTHRACENE	mg/kg	190000[A]	350[B]	ND (5.3) D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.8 (0.0033)	2.7 (0.0033)	0.24 (0.0033)	4.5 (0.0033)	2.1 (0.0033)	1.6 (0.0033)	0.021 (0.0033)	0.94 (0.0033)	2.1 (0.0033)	0.86 (0.0033)	-	-	-	-
BENZENETHIOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZIDINE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZO(A)ANTHRACENE	mg/kg	190000[A]	430[B]	ND (5.3) D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.9 (0.0033)	1.9 (0.0033)	0.43 (0.0033)	2.9 (0.0033)	1.4 (0.0033)	1.5 (0.0033)	0.020 (0.0033)	1.2 (0.0033)	1.4 (0.0033)	0.79 (0.0033)	-	-	-	-
BENZO(A)PYRENE	mg/kg	190000[A]	46[B]	ND (5.3) D ()	3.9 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.5 (0.0033)	2.0 (0.0033)	0.52 (0.0033)	2.3 (0.0033)	1.1 (0.0033)	1.3 (0.0033)	0.021 (0.0033)	1.3 (0.0033)	1.1 (0.0033)	0.75 (0.0033)	-	-	-	-
BENZO(B)FLUORANTHENE	mg/kg	190000[A]	170[B]	ND (5.3) D ()	3.5 J D ()	ND (5.5) D ()	0.550 ()	ND (0.540) ()	2.4 (0.0033)	2.4 (0.0033)	0.61 (0.0033)	2.9 (0.0033)	1.6 (0.0033)	1.8 (0.0033)	0.030 (0.0033)	1.6 (0.0033)	1.5 (0.0033)	0.82 (0.0033)	-	-	-	-
BENZO(G,H,I)PERYLENE	mg/kg	190000[A]	180[B]	ND (5.3) D ()	4.4 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.6 (0.0033)	1.9 (0.0033)	0.47 (0.0033)	1.5 (0.0033)	1.2 (0.0033)	1.2 (0.0033)	0.022 (0.0033)	1.1 (0.0033)	1.1 (0.0033)	1.0 (0.0033)	-	-	-	-
BENZO(K)FLUORANTHENE	mg/kg	190000[A]	610[B]	-	-	-	-	-	1.2 (0.0033)	1.0 (0.0033)	0.31 (0.0033)	1.1 (0.0033)	0.83 (0.0033)	0.90 (0.0033)	0.012 J (0.0033)	0.73 (0.0033)	0.74 (0.0033)	0.35 (0.0033)	-	-	-	-
BENZYL BUTYL PHTHALATE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1'-BIPHENYL	mg/kg	190000[A]	190[B]	-	-	-	-	-	1.5 (0.017)	2.0 (0.017)	ND (0.20) (0.017)	2.0 (0.017)	2.5 (0.017)	1.8 (0.017)	ND (0.019) (0.017)	0.80 (0.017)	2.1 (0.017)	0.75 (0.017)	-	-	-	-
BIS(2-CHLOROETHYL) ETHER (2-CHLOROETHYL ETHER)	mg/kg	7.7[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-CHLOROISOPROPYL) ETHER	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	10000[A]	130[B]	-	-	-	-	-	ND (1.0) (0.067)	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-	-	-
DI-N-BUTYL PHTHALATE	mg/kg	10000[A]	4900[B]	-	-	-	-	-	ND (1.0) (0.067)	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-	-	-
2-CHLORONAPHTHALENE	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-CHLOROPHENOL	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHRYSENE	mg/kg	190000[A]	230[B]	5.5 D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	2.1 (0.0033)	2.1 (0.0033)	0.77 (0.0033)	3.6 (0.0033)	1.7 (0.0033)	1.9 (0.0033)	0.046 (0.0033)	1.3 (0.0033)	1.6 (0.0033)	1.3 (0.0033)	-	-	-	-
DIBENZ(A,H)ACRIDINE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIBENZ(A,H)ANTHRACENE	mg/kg	190000[A]	270[B]	-	-	-	-	-	0.66 (0.0033)	0.49 (0.0033)	0.11 J (0.0033)	0.44 (0.0033)	0.31 (0.0033)	0.37 (0.0033)	0.0057 J (0.0033)	0.33 (0.0033)	0.32 (0.0033)	0.28 (0.0033)	-	-	-	-
1,2-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-DICHLOROBENZENE	mg/kg	10000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-DICHLOROBENZENE	mg/kg	230[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	mg/kg	10000[A]	9300[B]	-	-	-	-	-	ND (1.0) (0.067)	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-	-	-
DIMETHYL PHTHALATE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-DIMETHYLBENZ(A)ANTHRACENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-DIMETHYLPHENOL	mg/kg	10000[A]	230[B]	-	-	-	-	-	ND (0.25) (0.017)	ND (0.22) (0.017)	ND (0.20) (0.017)	1.1 (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-	-	-
4,6-DINITRO-2-METHYLPHENOL	mg/kg	190000[A]	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Sample Location				GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01	GP280-02	GP280-03	GP280-04	GP280-05	GP280-06	GP280-07	GP280-10	GP280-11	GP280-12	LO-1000-PER-1	LO-1000-PER-2	LO-1000-PER-3	LO-1000-SUB-1
Sample Date				24-May-07	24-May-07	24-May-07	24-May-07	24-May-07	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-Aug-16	29-May-07	29-May-07	29-May-07	29-May-07
Sample ID				GP-277-PER5	GP-277-PER6	GP-277-SUB1	GP-277-SUB2	GP-277-SUB3	GP280-01-20160829-3.0	GP280-02-20160829-3.0	GP280-03-20160829-2.0	GP280-04-20160829-3.0	GP280-05-20160829-3.0	GP280-06-20160829-3.0	GP280-07-20160829-3.0	GP280-10-20160829-2.0	GP280-11-20160829-5.0	GP280-12-20160829-2.0	LO-1000-PER-1	LO-1000-PER-2	LO-1000-PER-3	LO-1000-SUB-1
Sample Depth				3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft	5 - 5.6 ft	5 - 5.5 ft	3 ft	3 ft	2 ft	3 ft	3 ft	3 ft	3 ft	2 ft	5 ft	2 ft	3 - 3.5 ft	3 - 3.5 ft	3 - 3.5 ft	5 - 5.5 ft
Sampling Company				UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Laboratory				PIP	PIP	PIP	PIP	PIP	LL	LL	LL	LL	LL	LL	LL	LL	LL	LL	PIP	PIP	PIP	PIP
Laboratory Work Order		A	B	074097	074097	074097	074097	074097	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	1701349	074145	074145	074145	074145
Laboratory Sample ID	Units	MSC-PA	SHS-PA	0705-4549	0705-4550	0705-4551	0705-4552	0705-4553	8557103	8557105	8557106	8557107	8557109	8557110	8557112	8557104	8557108	8557111	0706-0470	0706-0471	0706-0472	0706-0473
2,4-DINITROPHENOL	mg/kg	190000^	23^{B}	-	-	-	-	-	ND (4.5) (0.30)	ND (3.9) (0.30)	ND (3.6) (0.30)	ND (4.2) (0.30)	ND (4.6) (0.30)	ND (5.6) (0.30)	ND (0.34) (0.30)	ND (4.3) (0.30)	ND (4.6) (0.30)	ND (3.7) (0.30)	-	-	-	-
2,4-DINITROTOLUENE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DI-N-OCTYLPHTHALATE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DIPHENYLHYDRAZINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FLUORANTHENE	mg/kg	190000^	3200^{B}	-	-	-	-	-	2.5 (0.0033)	3.2 (0.0033)	0.66 (0.0033)	6.6 (0.0033)	2.6 (0.0033)	2.6 (0.0033)	0.036 (0.0033)	1.6 (0.0033)	2.7 (0.0033)	0.96 (0.0033)	-	-	-	-
FLUORENE	mg/kg	190000^	3800^{B}	3.7 J D ()	ND (5.6) D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.5 (0.0033)	1.8 (0.0033)	0.10 J (0.0033)	3.3 (0.0033)	1.3 (0.0033)	0.93 (0.0033)	0.0077 J (0.0033)	0.45 (0.0033)	1.3 (0.0033)	0.40 (0.0033)	-	-	-	-
INDENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDENO(1,2,3-C,D)PYRENE	mg/kg	190000^	22000^{B}	ND (5.3) D ()	3.1 J D ()	ND (5.5) D ()	ND (0.540) ()	ND (0.540) ()	1.8 (0.0033)	1.4 (0.0033)	0.38 (0.0033)	1.1 (0.0033)	0.94 (0.0033)	1.0 (0.0033)	0.015 J (0.0033)	0.96 (0.0033)	0.82 (0.0033)	0.63 (0.0033)	-	-	-	-
1-METHYLNAPHTHALENE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-METHYLNAPHTHALENE	mg/kg	190000^	1900^{B}	-	-	-	-	-	8.4 (0.0033)	14 (0.0033)	0.62 (0.0033)	20 (0.0033)	20 (0.0033)	14 (0.0033)	0.053 (0.0033)	5.1 (0.0033)	17 (0.0033)	5.5 (0.0033)	-	-	-	-
CRESOL, M,P- (3&4-METHYLPHENOL)	mg/kg	10000_{52}^	58_{52}^{B}	-	-	-	-	-	0.87 (0.017)	1.5 (0.017)	ND (0.20) (0.017)	4.2 (0.017)	1.1 (0.017)	2.3 (0.017)	ND (0.019) (0.017)	0.40 J (0.017)	1.2 (0.017)	0.68 (0.017)	-	-	-	-
CRESOL, O- (2-METHYLPHENOL)	mg/kg	190000^	580^{B}	-	-	-	-	-	ND (0.25) (0.017)	ND (0.22) (0.017)	ND (0.20) (0.017)	ND (0.23) (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-	-	-
CRESOL, P- (4-METHYLPHENOL)	mg/kg	190000^	58^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NAPHTHALENE	mg/kg	190000^	25^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROANILINE	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NITROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-NITROPHENOL	mg/kg	190000^	6^{B}	-	-	-	-	-	ND (2.5) (0.17)	ND (2.2) (0.17)	ND (2.0) (0.17)	ND (2.3) (0.17)	ND (2.6) (0.17)	ND (3.1) (0.17)	ND (0.19) (0.17)	ND (2.4) (0.17)	ND (2.5) (0.17)	ND (2.0) (0.17)	-	-	-	-
PENTACHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHENANTHRENE	mg/kg	190000^	10000^{B}	11 D ()	ND (5.6) D ()	ND (5.5) D ()	0.620 ()	ND (0.540) ()	5.8 (0.0033)	6.9 (0.0033)	0.64 (0.0033)	11 (0.0033)	6.7 (0.0033)	5.2 (0.0033)	0.050 (0.0033)	2.8 (0.0033)	6.1 (0.0033)	2.6 (0.0033)	-	-	-	-
PHENOL	mg/kg	18000^	200^{B}	-	-	-	-	-	ND (0.25) (0.017)	ND (0.22) (0.017)	ND (0.20) (0.017)	ND (0.23) (0.017)	ND (0.26) (0.017)	ND (0.31) (0.017)	ND (0.019) (0.017)	ND (0.24) (0.017)	ND (0.25) (0.017)	ND (0.20) (0.017)	-	-	-	-
PYRENE	mg/kg	190000^	2200^{B}	4.9 J D ()	ND (5.6) D ()	ND (5.5) D ()	0.530 J ()	ND (0.540) ()	2.6 (0.0033)	3.3 (0.0033)	0.74 (0.0033)	7.5 (0.0033)	2.3 (0.0033)	2.4 (0.0033)	0.055 (0.0033)	1.7 (0.0033)	2.5 (0.0033)	1.1 (0.0033)	-	-	-	-
PYRIDINE	mg/kg	10000^	12^{B}	-	-	-	-	-	ND (1.0) (0.067)	ND (0.86) (0.067)	ND (0.81) (0.067)	ND (0.93) (0.067)	ND (1.0) (0.067)	ND (1.2) (0.067)	ND (0.075) (0.067)	ND (0.96) (0.067)	ND (1.0) (0.067)	ND (0.82) (0.067)	-	-	-	-
QUINOLINE	mg/kg	10000^	0.37^{B}	-	-	-	-	-	*ND (0.50)* (0.033)	*ND (0.43)* (0.033)	*ND (0.40)* (0.033)	*ND (0.47)* (0.033)	*ND (0.51)* (0.033)	*ND (0.62)* (0.033)	ND (0.038) (0.033)	*ND (0.48)* (0.033)	*ND (0.51)* (0.033)	*ND (0.41)* (0.033)	-	-	-	-
1,2,4-TRICHLOROBENZENE	mg/kg	10000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-TRICHLOROPHENOL	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-3-Dichloro-2-propanol	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylcholanthrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Nitroacenapthalene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7h-Dibenzo(c,g)carbazole	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aniline	mg/kg	91^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(c)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b,j,k)fluoranthene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENZYL CHLORIDE	mg/kg	52^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-chloromethyl)ether	mg/kg	0.041^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,e)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)pyrene	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroquinone	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																						
ANTIMONY	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARSENIC	mg/kg	190000^	29^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BARIUM	mg/kg	190000^	8200^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BERYLLIUM	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CADMIUM	mg/kg	190000^	38^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM	mg/kg	20000_{11}^	190_{11}^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COBALT	mg/kg	190000^	160^{B}	-	-	-	-	-	20.5 (0.120)	16.7 (0.120)	13.1 (0.120)	11.7 (0.120)	17.4 (0.120)	22.4 (0.120)	7.17 (0.120)	14.6 (0.120)	34.9 (0.120)	11.4 (0.120)	-	-	-	-
LEAD	mg/kg	190000^	450^{B}	-	-	-	-	-	286 (0.550)	254 (0.550)	214 (0.550)	172 (0.550)	327 (0.550)	397 (0.550)	10.9 (0.550)	201 (0.550)	344 (0.550)	209 (0.550)	-	-	-	-
MERCURY	mg/kg	190000^	10^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NICKEL	mg/kg	190000^	650^{B}	-	-	-	-	-	42.7 (0.300)	35.5 (0.300)	152 (0.300)	31.3 (0.300)	43.9 (0.300)	40.6 (0.300)	12.4 (0.300)	35.8 (0.300)	70.1 (0.300)	30.1 (0.300)	-	-	-	-
SELENIUM	mg/kg	190000^	26^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SODIUM	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330 J ()	210 J ()	120 J ()	110 J ()
VANADIUM	mg/kg	190000^	820^{B}	-	-	-	-	-	51.4 (0.140)	41.0 (0.140)	226 (0.140)	37.9 (0.140)	38.0 (0.140)	94.5 (0.140)	37.5 (0.140)	67.1 (0.140)	44.1 (0.140)	60.7 (0.140)	-	-	-	-
ZINC	mg/kg	190000^	12000^{B}	-	-	-	-	-	546 (0.680)	595 (0.680)	1180 (0.680)	440 (0.680)	637 (0.680)	381 (0.680)	32.9 (0.680)	319 (0.680)	621 (0.680)	285 (0.680)	-	-	-	-
General Chemistry																						
Cation Exchange Capacity	meq/100g	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHROMIUM, HEXAVALENT	mg/kg	20000^	190^{B}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEM PETROLEUM HYDROCARBONS	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOISTURE, PERCENT	%	n/v	n/v	-	-	-	-	-	34.6 (0.50)	22.9 (0.50)	18.3 (0.50)	29.1 (0.50)	35.0 (0.50)	46.8 (0.50)	11.7 (0.50)	31.0 (0.50)	35.4 (0.50)	18.9 (0.50)	-	-	-	-
pH, LABORATORY MEASURED	S.U.	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.98 ()	7.84 ()	8.22 ()	7.80 ()
Phenols (Phenolics)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOLIDS, PERCENT	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SULFIDE	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CYANIDE (WATER)	mg/kg	190000^	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC CARBON	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ORGANIC HALOGEN	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table J3 - Historical Soil Analytical Results Summary - AOI 7 (>2 feet)
Philadelphia Refinery Operations, a Series of Evergreen Resources Group, LLC

Notes:

MSC-PA	Pennsylvania Department of Environmental Protection - 2016
A	Medium-Specific Concentrations (MSCs) for Organic/Inorganic Regulated Substances in Soil - Direct Contact - Non-Residential Subsurface Soil (2-15 ft)
SHS-PA	Pennsylvania Department of Environmental Protection - Statewide Health Standards - 2016
B	PADEP Non-Residential Statewide Health Standards (>2 ft bgs) (Unsaturated Soil)
6.5 A	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
ND (0.50)	Laboratory reporting limit was greater than the applicable standard.
ND (0.03)	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value in database - 2016 values have been populated for Evergreen Comprehensive List only. Criteria for other analytes may be available but may not be represented here.
-	Parameter not analyzed / not available.
t1 AB	Standards for total chromium are not established in soil. These concentrations have been compared the values for hexavalent chromium, which is the strictest of the chromium standards.
t2 AB	Cresol, m&p (3-Methylphenol & 4-Methylphenol) co-elute and are reported as the summation of the co-eluting compounds. Standards shown are the stricter of the two.
B	Indicates the analyte is detected in the associated blank as well as in the sample.
D	Indicates an identified compound in an analysis that has been diluted. This flag alerts the data user to any differences between the concentrations reported in the two analyses.
H	SAMPLE RESULT IS ESTIMATED AND BIASED HIGH.
J	Indicates an estimated value.
L	SAMPLE RESULT IS ESTIMATED AND BIASED LOW.
R	The data are unusable. The analyte may or may not be present in the sample.
mg/kg	milligrams per kilogram
S.U.	Standard Units.
meq/100g	milliequivalents per 100 grams
ft	Feet
LL	Eurofins Lancaster Laboratories Environmental
PIP	Pace Analytical Services, Inc.
	Method detection limit is shown in second set of parentheses.

Appendix K
Indoor Air Sampling Information

A

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

Sample Identification Number: AOI7-AA-16-001
Site Address: PHILA ENERGY SOLUTIONS, PHILA, PA
Sample Canister Location: _____

Sample Date: 7.28.16 Sampler: ALISSA CANNON
Sample Time: Start: 0803 Stop: 1533
Shipping Date: _____

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):
6-LITER SUMMA CANISTER
Canister Serial No.: 1366
Flow Controller Serial No.: ~~710535~~ RB 958072

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

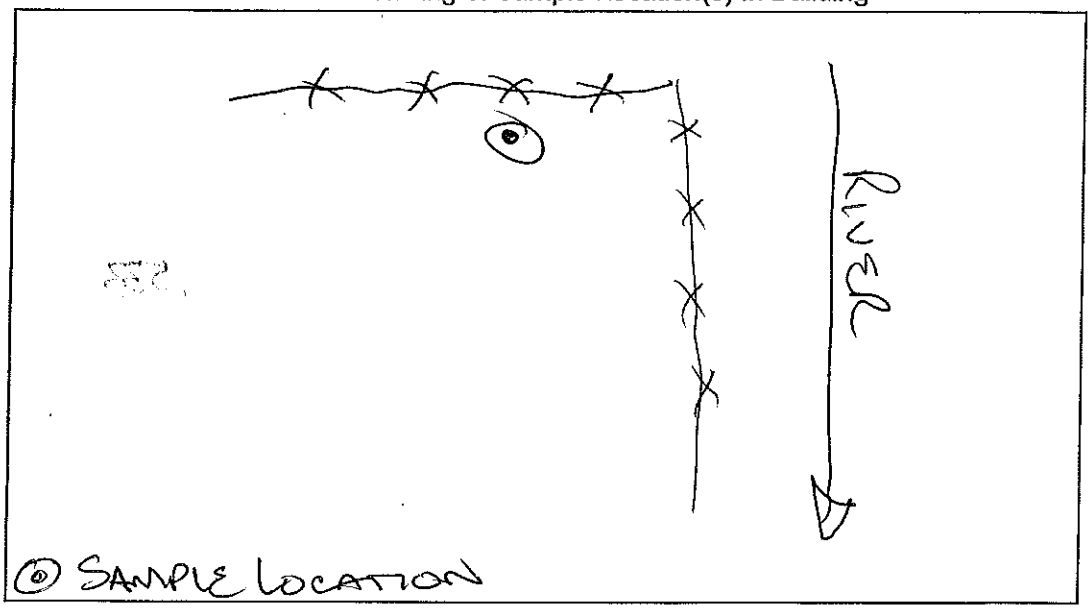
	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	89°F	—	73.°F rain	—
Barometric Pressure	29.92 in		29.89 in	

	Start	Stop
Canister Pressure Gauge Reading:	-30 in Hg	-11
Time:	~~0800~~ 0803	1533
PID Reading: ppm	0.0	0.0
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☒ No

Describe the general weather conditions:
MOSTLY SUNNY, NO WIND, HUMID

Provide Drawing of Sample Location(s) in Building



C) Comments

AOI-7
WASTE WATER SEPARATOR BULKHEAD

B

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

Sample Identification Number: AOI 7-AA 16-002
Site Address: PHILA ENERGY SOLUTIONS, PHILA, PA
Sample Canister Location: _____

Sample Date: 7.28.16 Sampler: ALISSA CANNON
Sample Time: Start: 0805 Stop: 1536
Shipping Date: _____

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):
6-LITER SUMMA CANISTER
Canister Serial No.: 829
Flow Controller Serial No.: 710535

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No —

B) Sampling Information

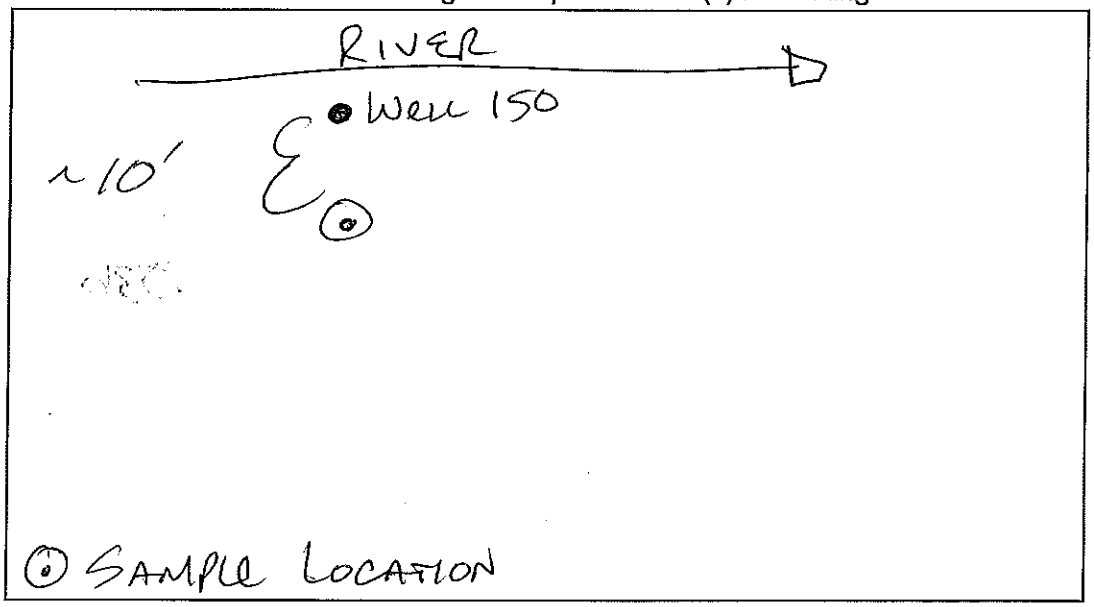
	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	91	—	73°F am	—
Barometric Pressure	29.92 in		29.89 in	

	Start	Stop
Canister Pressure Gauge Reading:	-30 in Hg	-7+
Time:	~~0803~~ 0805	1536
PID Reading:	0.00 ppm	0.0
Basement Depth (ft below grade):		
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☒ No

Describe the general weather conditions:
MOSTLY SUNNY, NO WIND, HUMID

Provide Drawing of Sample Location(s) in Building



C) Comments

AOI-7
Waste Water Separator BULKHEAD

STARTED AT 0800; immediately stopped due to leak in flow controller; re-tightened + re-started at 0805. Vacuum Δ from -30 to -26 in Hg.

C

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

Sample Identification Number: AOI7-AA-16-003
Site Address: PHILA EnergySolutions, PHILA, PA
Sample Canister Location: _____

Sample Date: 7.28.16 Sampler: Alissa Cannor
Sample Time: Start: 0834 Stop: 1527
Shipping Date: _____

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):
6-LITER SUMMA CANISTER
Canister Serial No.: 1117
Flow Controller Serial No.: 399392

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No —

B) Sampling Information

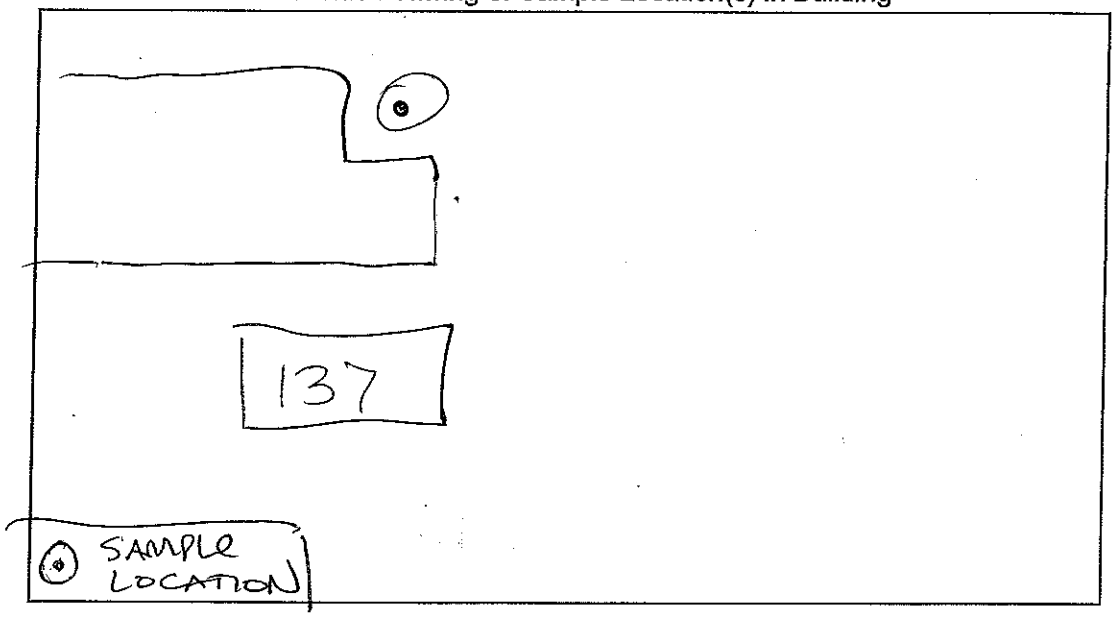
	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	96		73 rain	
Barometric Pressure	29.92 in		29.89 in	

	Start	Stop
Canister Pressure Gauge Reading:	-30 in Hg	-11 in Hg
Time:	0834	1527
PID Reading:	0.0 ppm	0.0 ppm
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☒ No

Describe the general weather conditions:
Mostly Sunny, HOT, Humid, Light Breeze

Provide Drawing of Sample Location(s) in Building



C) Comments

AOI-7

UNIT 137 BLOCKHOUSE

7

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

CANTEEN BLDG Lunch

Sample Identification Number: IA-A01.7-595

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 595 BUILDING

Sample Date: 3.29.16 Sampler: T. O'Brien

Sample Time: Start: 0821 Stop: 1604

Shipping Date: 3.31.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 8661 / 714

Flow Controller Serial No.: 1026

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	47	68	—	73
Barometric Pressure	30.20		30.21	

	Start	Stop
Canister Pressure Gauge Reading:	-30	-6.5
Time:	0821	1604
PID Reading:	0.00 ppm	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:

Sunny cold windy 15-30 mph

8

Indoor Air Sampling Field Data Sheet
(Form SP-28)

Elect Bldg Computer Room

A) General Information

Sample Identification Number: IA-A01.7-450-1

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 450 BOUNDS

Sample Date: 3.29.16 Sampler: Fred Bums

Sample Time: Start: 0839 Stop: 1613

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 16590

Flow Controller Serial No.: 345

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	47	64		75
Barometric Pressure	30.2		30.21	

	Start	Stop
Canister Pressure Gauge Reading:	-28	-8.5
Time:	0839	1613
PID Reading:	0.00 ppm	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny cold windy 15-30 mph

9

Indoor Air Sampling Field Data Sheet
(Form SP-28)

Elect Warehouse BACK ADDITION ON Shelf

A) General Information

Sample Identification Number: IA-A01.7-450-2

Site Address: 3144 Passyunk Ave. Phila PA

Sample Canister Location: A01-7 BUILDING

Sample Date: 3.29.16 Sampler: Fred Bruns

Sample Time: Start: 0848 Stop: 1618

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 4466

Flow Controller Serial No.: 145

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	47	67	—	77
Barometric Pressure	30.20		30.20	

	Start	Stop
Canister Pressure Gauge Reading:	-30	-7.5
Time:	0848	1618
PID Reading:	0.00 ppm	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions: SUNNY

10

Indoor Air Sampling Field Data Sheet
(Form SP-28) Elect warehouse

A) General Information

Sample Identification Number: IA-A01.7-450-3 — North side

Site Address: 3144 Passyunk Ave Phila PA — on shelf

Sample Canister Location: A01-7 450 Bourne — near middle walled area

Sample Date: 3.29.16 Sampler: T. O'Brien

Sample Time: Start: 0855 Stop: 1621

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 19747

Flow Controller Serial No.: 482

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	47	70	—	72
Barometric Pressure	30.20		30.20	

	Start	Stop
Canister Pressure Gauge Reading:	-27.25	-7.5
Time:	0855	1621
PID Reading:	0.06 ppm	
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny cold windy

11

Indoor Air Sampling Field Data Sheet
(Form SP-28)

elect warehouse walled area middle Bldg electr testing "HOT Spare Room"

A) General Information

Sample Identification Number: IA-A01.7-450-4

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 450 BUILDING

Sample Date: 3.29.16 Sampler: [signature]

Sample Time: Start: 0858 Stop: 1523

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 10437 / 990

Flow Controller Serial No.: 406

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	—	73	—	
Barometric Pressure	30.2			

	Start	Stop
Canister Pressure Gauge Reading:	-30	-7.5
Time:	0858	1523
PID Reading:	0.00 PPM	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny cold windy

12

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

electr warehouse Table east side near open offices

Sample Identification Number: IA-A017450-5.

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 450 BOUNDING

Sample Date: 3.29.16 Sampler: Fred Burns

Sample Time: Start: 0904 Stop: 1526

Shipping Date: 3.31.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 1548 / 1361

Flow Controller Serial No.: 257

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	-	72	58	77
Barometric Pressure	30.20		30.20	

	Start	Stop
Canister Pressure Gauge Reading:	-30	-6
Time:	0904	1526
PID Reading:	0.00 ppm	0.00
Basement Depth (ft below grade):	-	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:

Sunny cold windy

13

Indoor Air Sampling Field Data Sheet
(Form SP-28)

Firehouse office table office

A) General Information

Sample Identification Number: IA-A01.7-442
Site Address: 3144 Passyunk Ave Phila PA
Sample Canister Location: A01-7 442 BUILDING

Sample Date: 3.29.16 Sampler: [signature]
Sample Time: Start: 0919 Stop: 1638
Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 16501 / 1618
Flow Controller Serial No.: 466

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	51	65	57	68
Barometric Pressure	30.20		30.22	

	Start	Stop
Canister Pressure Gauge Reading:	-29	-7
Time:	0919	1638
PID Reading:	0.00 PPM	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny cold windy

14

✓

Indoor Air Sampling Field Data Sheet
(Form SP-28)

WTP

A) General Information

Sample Identification Number: IA-A01.7-711

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 711 BUILDING

Sample Date: 3.29.16 Sampler: [signature]

Sample Time: Start: 0930 Stop: 1720

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 19853 / 2106

Flow Controller Serial No.: 573

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	51	63	~55	76
Barometric Pressure	30.20		30.23	

	Start	Stop
Canister Pressure Gauge Reading:	-28.5	-7.5
Time:	0930	1720
PID Reading:	0.00 PPM	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny Cold windy

Provide Drawing of Sample Location(s) in Building

C) Comments

@1700 = -10"

15

Indoor Air Sampling Field Data Sheet
(Form SP-28)

near WTP near fence

A) General Information

Sample Identification Number: IA-A01.7 OUTDOOR

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 ~~BUILDING~~ AMBIENT

Sample Date: 3.29.16 Sampler: [signature]

Sample Time: Start: 0928 Stop: ~~150~~ 1701

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 1801

Flow Controller Serial No.: 144

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	5L	—	-5.6	—
Barometric Pressure	30.2			

	Start	Stop
Canister Pressure Gauge Reading:	-30	-5.5
Time:	0928	1701
PID Reading:	0.00 ppm	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:
Sunny cold windy 15-30

16

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

CONTROL ROOM

Sample Identification Number: IA-A01.7-6622

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 6622 Bowden

Sample Date: 3.29.16 Sampler: T. O'Brien

Sample Time: Start: 0940 Stop: 1730

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 1636

Flow Controller Serial No.: 508

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	57	64	~56	76
Barometric Pressure	30.20		30.23	

	Start	Stop
Canister Pressure Gauge Reading:	-30	-12
Time:	0940	1730
PID Reading:	0.00 ppm	0.0
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:

Sunny. Cold. windy 15-30mph

Provide Drawing of Sample Location(s) in Building

C) Comments

Control Room
Rear Table
center of Room

@ 1710 = ~12"

17

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

CONTROL ROOM

Sample Identification Number: IA-A01.7-6626.

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 6626 BUILDING

Sample Date: 3.29.16 Sampler: Fred Burns

Sample Time: Start: 0947 Stop: 1735

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 641

Flow Controller Serial No.: 576

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	51	64		71
Barometric Pressure	30.20		30.24	

	Start	Stop
Canister Pressure Gauge Reading:	-29.5	-16
Time:	0947	1735
PID Reading:	0.00 PPM	0.00
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions: Sunny Cold windy 15-30mph

Provide Drawing of Sample Location(s) in Building

C) Comments

~~0-15~~ 1715 = 17"

18

Indoor Air Sampling Field Data Sheet
(Form SP-28)

A) General Information

Control Room

Sample Identification Number: IA-A01-7-6625

Site Address: 3144 Passyunk Ave Phila PA

Sample Canister Location: A01-7 6625 Building

Sample Date: 3.29.16 Sampler: [illegible]

Sample Time: Start: 0959 Stop: 1742

Shipping Date: 3.21.16

Canister Type: 400 mL – 1.0 L Summa Canister/6 L Summa Canister/Other (specify):

Canister Serial No.: 2226

Flow Controller Serial No.: 314

Were "Instructions to Occupants Building" followed?
☐ Yes ☐ No

B) Sampling Information

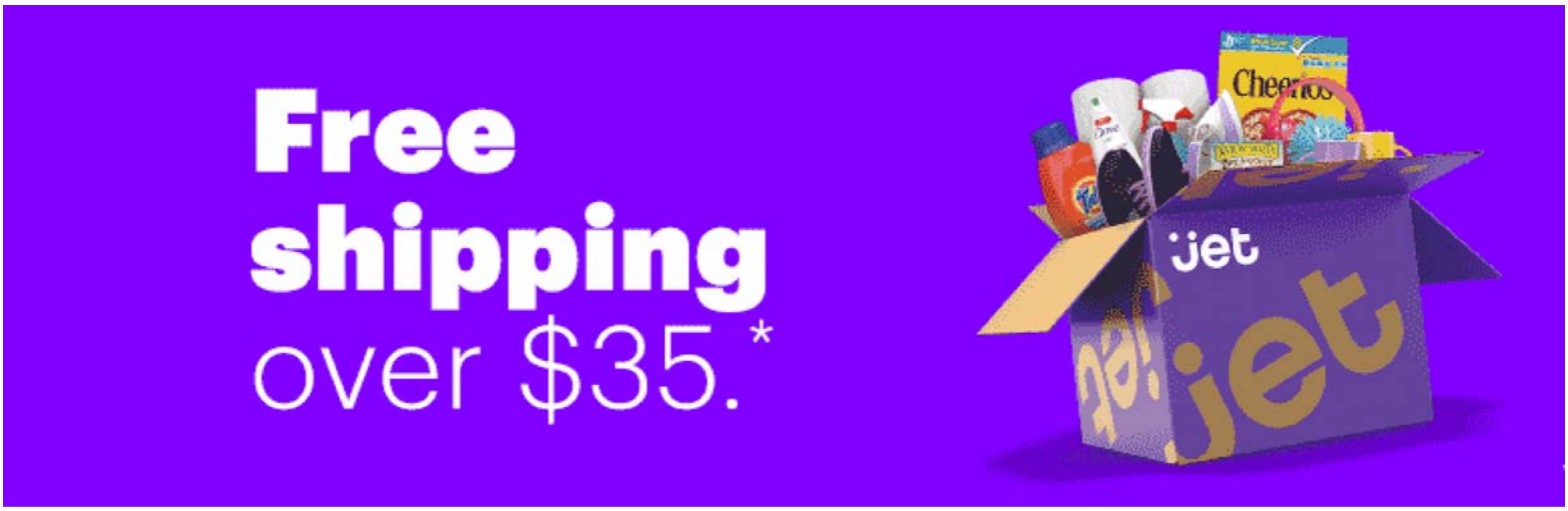
	Start		Stop	
	Ambient	Interior	Ambient	Interior
Temperature	51	67	~55	74
Barometric Pressure	30.20		30.24	

	Start	Stop
Canister Pressure Gauge Reading:	-30	-10
Time:	0959	1742
PID Reading:	0.00 ppm	~~0.00~~ 0.02 ppm
Basement Depth (ft below grade):	—	
Window Marked:	Yes/No	

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?
☐ Yes ☐ No

Describe the general weather conditions:

Sunny cold windy 15-30mph


Free
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Philadelphia, PA

Philadelphia International

8:42 AM EDT on May 15, 2017 (GMT -0400)

Today Forecast

Weather History for KPHL - March, 2016

March Precip Stats: Actual Month Total: 2.07 in | Average Month Total: 3.79 in

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Actual: 64° | 38° T in Average: 48° | 30° 0.10 in	2 Actual: 61° | 32° 0.26 in Average: 48° | 31° 0.11 in	3 Actual: 41° | 27° 0.1 in Average: 48° | 31° 0.10 in	4 Actual: 41° | 31° 0.9 in Average: 49° | 31° 0.11 in	5 Actual: 42° | 29° 0.00 in Average: 49° | 31° 0.10 in
6 Actual: 47° | 33° 0.00 in Average: 49° | 32° 0.11 in	7 Actual: 61° | 33° 0.00 in Average: 50° | 32° 0.12 in	8 Actual: 75° | 36° 0.00 in Average: 50° | 32° 0.12 in	9 Actual: 82° | 43° 0.00 in Average: 50° | 32° 0.11 in	10 Actual: 82° | 57° 0.00 in Average: 51° | 33° 0.12 in	11 Actual: 69° | 50° T in Average: 51° | 33° 0.11 in	12 Actual: 61° | 41° 0.00 in Average: 51° | 33° 0.11 in
13 Actual: 61° | 49° 0.07 in Average: 52° | 33° 0.12 in	14 Actual: 50° | 45° 1.02 in Average: 52° | 34° 0.12 in	15 Actual: 53° | 46° 0.01 in Average: 52° | 34° 0.13 in	16 Actual: 71° | 41° 0.01 in Average: 53° | 34° 0.13 in	17 Actual: 63° | 43° 0.02 in Average: 53° | 35° 0.13 in	18 Actual: 64° | 47° 0.00 in Average: 53° | 35° 0.13 in	19 Actual: 47° | 38° 0.01 in Average: 54° | 35° 0.13 in
20 Actual: 43° | 35° T in Average: 54° | 35° 0.13 in	21 Actual: 51° | 34° T in Average: 54° | 36° 0.14 in	22 Actual: 58° | 33° 0.00 in Average: 55° | 36° 0.13 in	23 Actual: 73° | 48° 0.00 in Average: 55° | 36° 0.12 in	24 Actual: 69° | 47° 0.00 in Average: 56° | 37° 0.14 in	25 Actual: 73° | 49° T in Average: 56° | 37° 0.13 in	26 Actual: 60° | 38° 0.00 in Average: 56° | 37° 0.13 in
27 Actual: 60° | 44° 0.02 in Average: 57° | 38° 0.14 in	28 Actual: 70° | 47° 0.44 in Average: 57° | 38° 0.13 in	29 Actual: 59° | 44° 0.00 in Average: 57° | 38° 0.13 in	30 Actual: 59° | 37° 0.00 in Average: 58° | 39° 0.13 in	31 Actual: 73° | 50° T in Average: 58° | 39° 0.13 in		

Calendar Legend


Sunny
Clear


Mostly Cloudy


Partly Cloudy


Cloudy


Rain


Snow


Hail Flurries

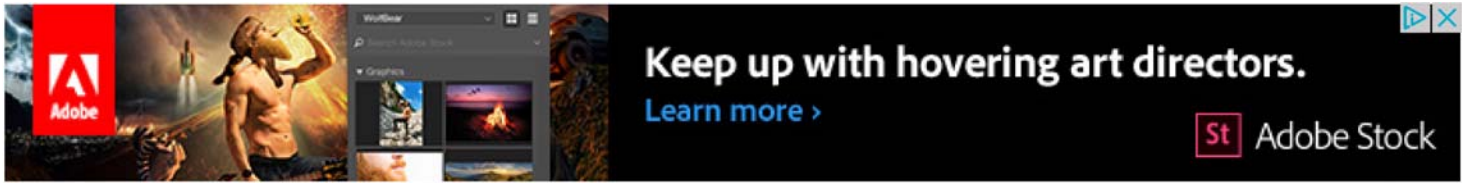

Thunderstorms


Hazy
Fog


Sleet


'?' denotes
'chance of'


Unknown



Philadelphia, PA

Philadelphia International

8:44 AM EDT on May 15, 2017 (GMT -0400)

Weather History for KPHL - March, 2016

March

29

2016

View
Tuesday, March 29, 2016

Daily | Weekly | Monthly | Custom

	Actual	Average	Record
Temperature			
Mean Temperature	**52** °F	**48** °F	
Max Temperature	**59** °F	**57** °F	**87** °F (1945)
Min Temperature	**44** °F	**38** °F	**14** °F (1923)
Degree Days			
Heating Degree Days	13	17	

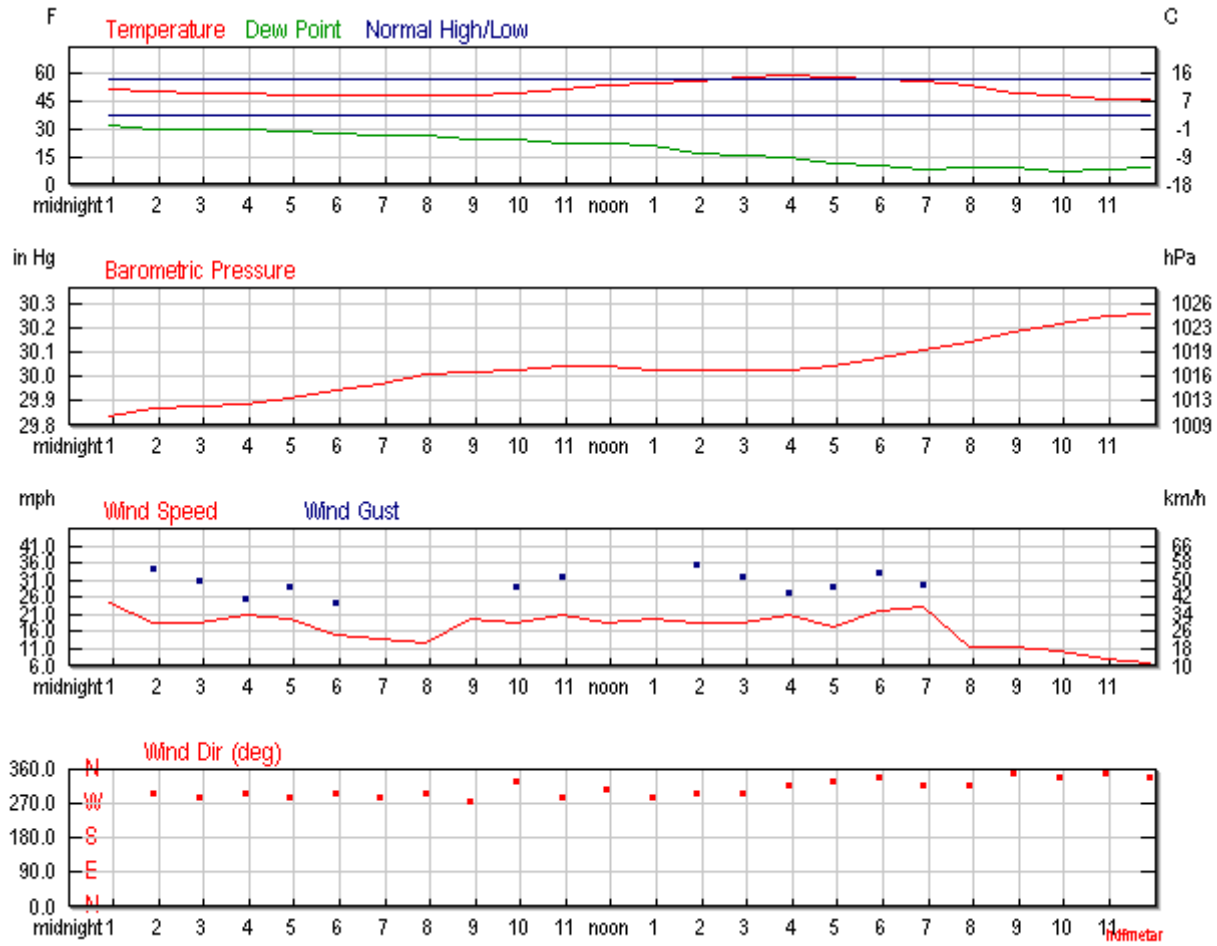
	Actual	Average	Record
Month to date heating degree days	412	633	
Since 1 July heating degree days	3098	4115	
Cooling Degree Days	0	0	
Month to date cooling degree days	5	0	
Year to date cooling degree days	5	0	
Growing Degree Days	2 (Base 50)		
Moisture			
Dew Point	**20** °F		
Average Humidity	32		
Maximum Humidity	48		
Minimum Humidity	15		
Precipitation			
Precipitation	**0.00** in	**0.13** in	**1.72** in (2014)
Month to date precipitation	2.01	3.53	
Year to date precipitation	9.00	9.21	
Snow			
Snow	**0.00** in	**0.00** in	**1.90** in (1942)
Month to date snowfall	1.0	2.8	
Since 1 July snowfall	27.2	21.8	
Snow Depth	**0.00** in		
Sea Level Pressure			
Sea Level Pressure	**30.03** in		
Wind			

	Actual	Average	Record
Wind Speed	**16** mph (NW)		
Max Wind Speed	**28** mph		
Max Gust Speed	**36** mph		
Visibility	**10** miles		
Events			

T = Trace of Precipitation, MM = Missing Value

Source: NWS Daily Summary

Daily Weather History Graph



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Airport or City:

KPHL

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

March

29

Submit

Astronomy

Mar. 29, 2016	**Rise**	**Set**
Actual Time	6:49 AM EDT	7:22 PM EDT
Civil Twilight	6:21 AM EDT	7:49 PM EDT
Nautical Twilight	5:49 AM EDT	8:21 PM EDT
Astronomical Twilight	5:17 AM EDT	8:54 PM EDT
Moon	12:11 AM EDT (3/29)	10:30 AM EDT (3/29)
Length of Visible Light	13h 27m	
Length of Day	12h 33m	

Waning Gibbous, 69% of the Moon is Illuminated

Mar 29	Mar 31	Apr 7	Apr 14	Apr 22
Waning Gibbous	Last Quarter	New	First Quarter	Full

Hourly Weather History & Observations

Time (EDT)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:54 AM	**52.0** °F	-	**32.0** °F	47%	**29.84** in	**10.0** mi	WNW	**24.2** mph	**35.7** mph	N/A		Mostly Cloudy
1:54 AM	**51.1** °F	-	**30.0** °F	44%	**29.87** in	**10.0** mi	WNW	**18.4** mph	**34.5** mph	N/A		Overcast
2:54 AM	**50.0** °F	-	**30.0** °F	46%	**29.88** in	**10.0** mi	WNW	**18.4** mph	**31.1** mph	N/A		Overcast
3:54 AM	**50.0** °F	-	**30.0** °F	46%	**29.89** in	**10.0** mi	WNW	**20.7** mph	**25.3** mph	N/A		Mostly Cloudy
4:54 AM	**48.9** °F	-	**28.9** °F	46%	**29.91** in	**10.0** mi	WNW	**19.6** mph	**28.8** mph	N/A		Overcast
5:54 AM	**48.0** °F	-	**28.0** °F	46%	**29.94** in	**10.0** mi	WNW	**15.0** mph	**24.2** mph	N/A		Mostly Cloudy
6:54 AM	**48.0** °F	-	**27.0** °F	44%	**29.97** in	**10.0** mi	WNW	**13.8** mph	-	N/A		Partly Cloudy
7:54 AM	**48.0** °F	-	**27.0** °F	44%	**30.01** in	**10.0** mi	WNW	**12.7** mph	-	N/A		Partly Cloudy
8:54 AM	**48.9** °F	-	**25.0** °F	39%	**30.02** in	**10.0** mi	West	**19.6** mph	**29.9** mph	N/A		Partly Cloudy
9:54 AM	**50.0** °F	-	**24.1** °F	36%	**30.03** in	**10.0** mi	NNW	**18.4** mph	**28.8** mph	N/A		Partly Cloudy
10:54 AM	**52.0** °F	-	**21.9** °F	31%	**30.04** in	**10.0** mi	WNW	**20.7** mph	**32.2** mph	N/A		Partly Cloudy
11:54 AM	**54.0** °F	-	**21.9** °F	29%	**30.04** in	**10.0** mi	NW	**18.4** mph	-	N/A		Partly Cloudy
12:54 PM	**55.0** °F	-	**21.0** °F	27%	**30.03** in	**10.0** mi	WNW	**19.6** mph	**31.1** mph	N/A		Partly Cloudy
1:54 PM	**55.9** °F	-	**17.1** °F	22%	**30.03** in	**10.0** mi	WNW	**18.4** mph	**35.7** mph	N/A		Partly Cloudy
2:54 PM	**57.9** °F	-	**16.0** °F	19%	**30.03** in	**10.0** mi	WNW	**18.4** mph	**32.2** mph	N/A		Partly Cloudy
3:54 PM	**59.0** °F	-	**15.1** °F	18%	**30.03** in	**10.0** mi	NW	**20.7** mph	**27.6** mph	N/A		Clear
4:54 PM	**57.9** °F	-	**10.9** °F	16%	**30.04** in	**10.0** mi	NNW	**17.3** mph	**28.8** mph	N/A		Clear

Time (EDT)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
5:54 PM	**57.0** °F	-	**10.0** °F	15%	**30.08** in	**10.0** mi	NNW	**21.9** mph	**33.4** mph	N/A		Clear
6:54 PM	**55.9** °F	-	**8.1** °F	15%	**30.11** in	**10.0** mi	NW	**23.0** mph	**29.9** mph	N/A		Clear
7:54 PM	**54.0** °F	-	**9.0** °F	17%	**30.14** in	**10.0** mi	NW	**11.5** mph	-	N/A		Clear
8:54 PM	**50.0** °F	-	**9.0** °F	19%	**30.18** in	**10.0** mi	North	**11.5** mph	-	N/A		Clear
9:54 PM	**48.9** °F	-	**7.0** °F	18%	**30.22** in	**10.0** mi	NNW	**10.4** mph	-	N/A		Clear
10:54 PM	**46.0** °F	**41.9** °F	**8.1** °F	21%	**30.25** in	**10.0** mi	North	**8.1** mph	-	N/A		Clear
11:54 PM	**46.0** °F	**42.5** °F	**9.0** °F	22%	**30.26** in	**10.0** mi	NNW	**6.9** mph	-	N/A		Clear



Philadelphia, PA

Philadelphia International

8:43 AM EDT on May 15, 2017 (GMT -0400)

Today Forecast

Weather History for KPHL - July, 2016

July Precip Totals: Actual Month Total: 3.98 in | Average Month Total: 4.35 in

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Actual: 87° | 75° T in Average: 86° | 68° 0.13 in	**2** Actual: 80° | 70° 0.00 in Average: 86° | 68° 0.13 in
3 Actual: 78° | 67° 0.00 in Average: 87° | 68° 0.12 in	**4** Actual: 80° | 67° 0.29 in Average: 87° | 68° 0.13 in	**5** Actual: 89° | 74° 0.08 in Average: 87° | 69° 0.13 in	**6** Actual: 95° | 75° 0.00 in Average: 87° | 69° 0.13 in	**7** Actual: 94° | 75° 0.00 in Average: 87° | 69° 0.13 in	**8** Actual: 94° | 75° T in Average: 87° | 69° 0.14 in	**9** Actual: 79° | 73° 0.01 in Average: 87° | 69° 0.15 in
10 Actual: 85° | 69° 0.00 in Average: 87° | 69° 0.14 in	**11** Actual: 86° | 65° 0.00 in Average: 87° | 69° 0.14 in	**12** Actual: 89° | 67° 0.00 in Average: 87° | 69° 0.15 in	**13** Actual: 84° | 71° 0.12 in Average: 87° | 69° 0.14 in	**14** Actual: 96° | 75° 0.03 in Average: 87° | 69° 0.15 in	**15** Actual: 92° | 78° 0.00 in Average: 87° | 70° 0.15 in	**16** Actual: 94° | 73° 0.10 in Average: 87° | 70° 0.15 in
17 Actual: 92° | 73° 0.00 in Average: 87° | 70° 0.15 in	**18** Actual: 96° | 74° 0.58 in Average: 87° | 70° 0.15 in	**19** Actual: 89° | 72° 0.00 in Average: 87° | 70° 0.14 in	**20** Actual: 87° | 70° 0.00 in Average: 87° | 70° 0.14 in	**21** Actual: 89° | 69° 0.00 in Average: 87° | 70° 0.14 in	**22** Actual: 94° | 73° 0.00 in Average: 87° | 70° 0.14 in	**23** Actual: 97° | 77° T in Average: 87° | 70° 0.14 in
24 Actual: 95° | 74° 0.00 in Average: 87° | 70° 0.14 in	**25** Actual: 97° | 74° 1.68 in Average: 87° | 70° 0.14 in	**26** Actual: 92° | 74° 0.00 in Average: 87° | 70° 0.15 in	**27** Actual: 94° | 77° 0.00 in Average: 87° | 70° 0.15 in	**28** Actual: 95° | 74° 0.33 in Average: 87° | 70° 0.14 in	**29** Actual: 89° | 73° 0.39 in Average: 87° | 70° 0.14 in	**30** Actual: 88° | 74° 0.27 in Average: 87° | 69° 0.14 in

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
31  Actual: **90° | 75°** **T** in Average: **87° | 69°** **0.14** in						

Calendar Legend

 Sunny Clear

 Mostly Cloudy

 Partly Cloudy

 Cloudy

 Rain

 Snow

 Hail Flurries

 Thunderstorms

 Hazy Fog

 Sleet

 '?' denotes 'chance of'

 Unknown



Philadelphia, PA

Philadelphia International

8:45 AM EDT on May 15, 2017 (GMT -0400)

Weather History for KPHL - July, 2016

July

28

2016

View
Thursday, July 28, 2016

Daily | Weekly | Monthly | Custom

	Actual	Average	Record
Temperature			

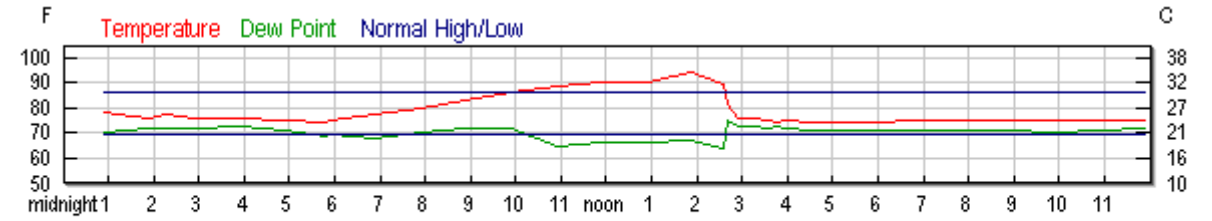
	Actual	Average	Record
Mean Temperature	**85** °F	**78** °F	
Max Temperature	**95** °F	**87** °F	**100** °F (1941)
Min Temperature	**74** °F	**70** °F	**53** °F (1962)
Degree Days			
Heating Degree Days	0	0	
Month to date heating degree days	0	0	
Since 1 June heating degree days	0	11	
Since 1 July heating degree days	0	0	
Cooling Degree Days	20	13	
Month to date cooling degree days	461	361	
Year to date cooling degree days	857	710	
Since 1 June cooling degree days	743	619	
Growing Degree Days	35 (Base 50)		
Moisture			
Dew Point	**71** °F		
Average Humidity	69		
Maximum Humidity	94		
Minimum Humidity	44		
Precipitation			
Precipitation	**0.33** in	**0.14** in	**8.02** in (2013)
Month to date precipitation	3.22	3.93	
Year to date precipitation	22.49	24.10	
Snow			

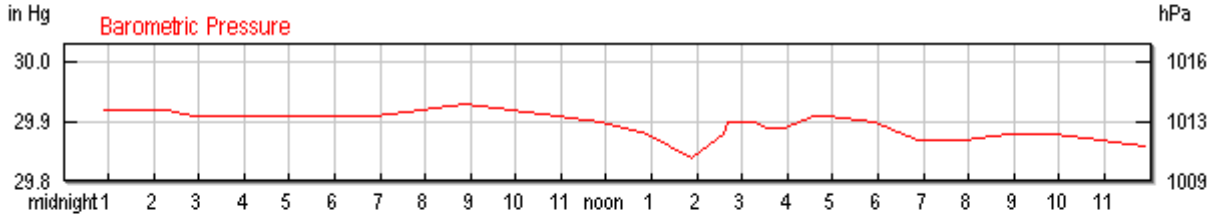
	Actual	Average	Record
Snow	**0.00** in	**0.00** in	**0.00** in (1870)
Month to date snowfall	0.0	0.0	
Since 1 June snowfall	0.0	0.0	
Since 1 July snowfall	0.0	0.0	
Snow Depth	**0.00** in		
Sea Level Pressure			
Sea Level Pressure	**29.90** in		
Wind			
Wind Speed	**5** mph (SSE)		
Max Wind Speed	**29** mph		
Max Gust Speed	**32** mph		
Visibility	**8** miles		
Events	Rain , Thunderstorm		

T = Trace of Precipitation, MM = Missing Value

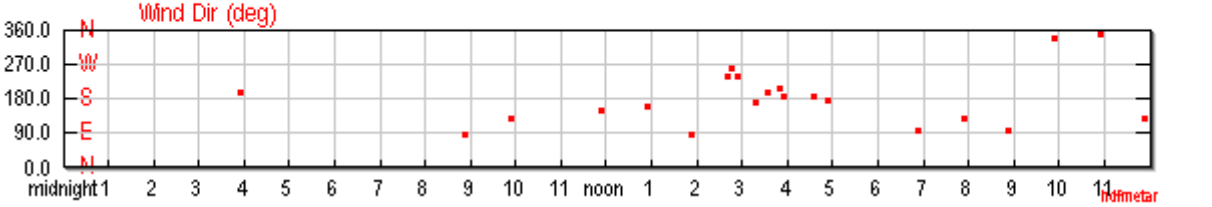
Source: NWS Daily Summary

Daily Weather History Graph









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Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

July

28

Submit

Astronomy

Jul. 28, 2016	**Rise**	**Set**
Actual Time	5:56 AM EDT	8:17 PM EDT
Civil Twilight	5:25 AM EDT	8:48 PM EDT
Nautical Twilight	4:48 AM EDT	9:25 PM EDT
Astronomical Twilight	4:06 AM EDT	10:07 PM EDT
Moon	1:14 AM EDT (7/28)	3:23 PM EDT (7/28)
Length of Visible Light	15h 22m	
Length of Day	14h 21m	

Waning Crescent, 31% of the Moon is **Ill**uminated

Jul 28	Aug 2	Aug 10	Aug 18	Aug 24
Waning Crescent	New	First Quarter	Full	Last Quarter

Hourly Weather History & Observations

Time (EDT)	**Temp.**	**Heat Index**	**Dew Point**	**Humidity**	**Pressure**	**Visibility**	**Wind Dir**	**Wind Speed**	**Gust Speed**	**Precip**	**Events**	**Conditions**
12:54 AM	**79.0** °F	-	**71.1** °F	77%	**29.92** in	**10.0** mi	Calm	Calm	-	N/A		Clear

Time (EDT)	Temp.	Heat Index	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
1:54 AM	**77.0** °F	-	**73.0** °F	88%	**29.92** in	**10.0** mi	Calm	Calm	-	N/A		Scattered Clouds
2:17 AM	**78.1** °F	-	**73.0** °F	84%	**29.92** in	**9.0** mi	Calm	Calm	-	N/A		Partly Cloudy
2:54 AM	**77.0** °F	-	**73.0** °F	88%	**29.91** in	**9.0** mi	Calm	Calm	-	N/A		Partly Cloudy
3:54 AM	**77.0** °F	-	**73.9** °F	90%	**29.91** in	**8.0** mi	SSW	**3.5** mph	-	N/A		Scattered Clouds
4:54 AM	**75.9** °F	-	**72.0** °F	87%	**29.91** in	**7.0** mi	Calm	Calm	-	N/A		Scattered Clouds
5:50 AM	**75.2** °F	-	**69.8** °F	83%	**29.91** in	**10.0** mi	Calm	Calm	-	N/A		Mostly Cloudy
5:54 AM	**75.9** °F	-	**70.0** °F	82%	**29.91** in	**10.0** mi	Calm	Calm	-	N/A		Mostly Cloudy
6:54 AM	**78.1** °F	-	**69.1** °F	74%	**29.91** in	**10.0** mi	Calm	Calm	-	N/A		Mostly Cloudy
7:54 AM	**81.0** °F	**84.9** °F	**71.1** °F	72%	**29.92** in	**10.0** mi	Calm	Calm	-	N/A		Mostly Cloudy
8:54 AM	**84.0** °F	**90.2** °F	**73.0** °F	69%	**29.93** in	**10.0** mi	East	**3.5** mph	-	N/A		Mostly Cloudy
9:54 AM	**87.1** °F	**94.5** °F	**73.0** °F	63%	**29.92** in	**9.0** mi	SE	**4.6** mph	-	N/A		Mostly Cloudy
10:54 AM	**89.1** °F	**91.3** °F	**66.0** °F	46%	**29.91** in	**10.0** mi	Variable	**3.5** mph	-	N/A		Mostly Cloudy
11:54 AM	**91.0** °F	**94.3** °F	**66.9** °F	45%	**29.90** in	**10.0** mi	SSE	**4.6** mph	-	N/A		Mostly Cloudy
12:54 PM	**91.0** °F	**94.3** °F	**66.9** °F	45%	**29.88** in	**10.0** mi	SSE	**6.9** mph	-	N/A		Mostly Cloudy
1:54 PM	**95.0** °F	**99.5** °F	**68.0** °F	41%	**29.84** in	**10.0** mi	East	**8.1** mph	-	N/A	Thunderstorm	Thunderstorm
2:35 PM	**90.0** °F	**91.7** °F	**64.9** °F	43%	**29.88** in	**5.0** mi	Variable	**3.5** mph	-	**0.00** in	Rain , Thunderstorm	Light Thunderstorms and Rain
2:42 PM	**82.0** °F	**89.4** °F	**75.9** °F	82%	**29.90** in	**2.5** mi	WSW	**23.0** mph	**27.6** mph	**0.00** in	Rain , Thunderstorm	Thunderstorms and Rain
2:45 PM	**80.1** °F	**85.1** °F	**75.0** °F	85%	**29.90** in	**0.8** mi	West	**21.9** mph	-	**0.00** in	Rain , Thunderstorm	Thunderstorms and Rain
2:54 PM	**77.0** °F	-	**73.9** °F	90%	**29.90** in	**1.0** mi	WSW	**19.6** mph	**32.2** mph	**0.06** in	Rain , Thunderstorm	Heavy Thunderstorms and Rain
3:19 PM	**77.0** °F	-	**73.9** °F	90%	**29.90** in	**1.8** mi	South	**11.5** mph	-	**0.15** in	Rain , Thunderstorm	Thunderstorms and Rain

Time (EDT)	Temp.	Heat Index	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
3:33 PM	**75.9** °F	-	**73.0** °F	91%	**29.89** in	**4.0** mi	SSW	**4.6** mph	-	**0.19** in	Rain , Thunderstorm	Thunderstorms and Rain
3:49 PM	**75.2** °F	-	**73.4** °F	94%	**29.89** in	**4.0** mi	SSW	**3.5** mph	-	**0.20** in	Rain	Light Rain
3:54 PM	**75.9** °F	-	**73.0** °F	91%	**29.89** in	**5.0** mi	South	**5.8** mph	-	**0.20** in	Rain	Light Rain
4:36 PM	**75.0** °F	-	**72.0** °F	90%	**29.91** in	**7.0** mi	South	**9.2** mph	-	**0.04** in	Rain	Light Rain
4:54 PM	**75.0** °F	-	**72.0** °F	90%	**29.91** in	**8.0** mi	South	**10.4** mph	-	**0.04** in	Rain	Light Rain
5:54 PM	**75.0** °F	-	**72.0** °F	90%	**29.90** in	**7.0** mi	Variable	**4.6** mph	-	**0.02** in	Rain	Light Rain
6:54 PM	**75.9** °F	-	**72.0** °F	87%	**29.87** in	**10.0** mi	East	**5.8** mph	-	**0.00** in		Overcast
7:54 PM	**75.9** °F	-	**72.0** °F	87%	**29.87** in	**10.0** mi	SE	**5.8** mph	-	N/A		Overcast
8:54 PM	**75.9** °F	-	**72.0** °F	87%	**29.88** in	**10.0** mi	East	**4.6** mph	-	**0.00** in	Rain	Light Rain
9:54 PM	**75.9** °F	-	**71.1** °F	85%	**29.88** in	**10.0** mi	NNW	**3.5** mph	-	**0.00** in		Overcast
10:54 PM	**75.9** °F	-	**72.0** °F	87%	**29.87** in	**7.0** mi	North	**3.5** mph	-	**0.00** in	Rain	Light Rain
11:54 PM	**75.9** °F	-	**73.0** °F	91%	**29.86** in	**8.0** mi	SE	**6.9** mph	-	**0.01** in	Rain	Light Rain

Appendix L
Potable Well Search Map

N
W E
S

Legend

Water Use

- Unknown
- Dewater
- Domestic
- Industrial
- Other
- Public Supply
- Unused
- 1 Mile Buffer of Site
- AOI Boundary

Notes:
1. World aerial imagery basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source of aerial imagery is USDA FSA from 8/16/2015. Credits: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community.
2. Well search results provided by PaGWIS, November 2016.

Figure X: 2016 One Mile Radius Well Search
PES Philadelphia Refinery
Philadelphia, Pennsylvania

Evergreen Resources Management Operations
2 Righter Parkway, Suite 200
Wilmington, DE 19803

0 1,200 2,400 Feet

SCALE: 1" = 1200'
DATE: 11/22/2016
DRN. BY: AJC
CKD. BY: DW
JOB#: 2574601

Path: \\Langan.com\data\DYL\data6\2574601\ArcGIS\MapDocuments\AOI 11 SCR\Appendix\Figure X - Well Search_113016.mxd