

CORRECTIVE ACTION PROCESS REPORT/PLAN COVER SHEET
CHAPTER 245 - STORAGE TANK AND SPILL PREVENTION ACT

Storage Tank Facility ID #: 51-33624

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Media of Concern: **Soil** **Groundwater**

Contaminant(s) (e.g. unleaded gasoline): petroleum products

(check all that apply to the enclosed submission)

- Remedial Action Progress Report**
- Risk Assessment Report** (e.g. vapor intrusion, ecological, or human health risk calculations)
- Site Characterization Report – Section 245.310(b)**
 - Residential Nonresidential
- Site Characterization Report – Statewide Health or Background Standard**
 - Residential Nonresidential
- Site Characterization Report – Site Specific Standard**
 - Residential Nonresidential
- Remedial Action Plan – Statewide Health or Background Standard**
 - Residential Nonresidential
- Remedial Action Plan – Site Specific Standard**
 - Residential Nonresidential
- Remedial Action Completion Report – Statewide Health or Background Standard**
 - Residential Nonresidential
- Remedial Action Completion Report – Site Specific Standard**
 - Residential Nonresidential
- Post Remediation Care Report**
- Environmental Covenant**
 - Draft Final
- Other:** _____

FINAL

Site Characterization Report - Tank Group 07

Former Philadelphia Energy Solutions Refinery
3144 West Passyunk Avenue
Philadelphia, Pennsylvania
Incident #57973

Prepared for

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Prepared by

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February 2023

Project Number P044.001.002



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Acronyms and Abbreviations

25 PA Code	Title 25 Pennsylvania Code
Act 2	Pennsylvania Land Recycling and Environmental Remediation Standards Act
Act 32	Storage Tank and Spill Prevention Act
AOI	Area of Interest
AOI 6 RIR	Remedial Investigation Report, Area of Interest 6
AST	aboveground storage tank
B(a)P	benzo(a)pyrene
bgs	below ground surface
COC	constituents of concern
COPC	constituents of potential concern
Evergreen	Evergreen Resources Group, LLC; includes Sunoco, Inc. n/k/a ETC Sunoco Holdings LLC, Sunoco, Inc. (R&M) n/k/a Sunoco (R&M), LLC n/k/a Energy Transfer (R&M), LLC and Evergreen collectively referred to as “Evergreen”
Facility	former Philadelphia Energy Solutions refinery facility
ft	feet or foot
HI	hazard index
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSC	medium-specific concentrations
MTBE	methyl tert-butyl ether
MtGW	migration-to-groundwater
MtSW	migration-to-surface water
Non-Res Soil DC	Non-residential Soil Direct Contact
Non-Res UA S-GW	Non-residential Used Aquifer Soil-to-Groundwater
PADEP	Pennsylvania Department of Environmental Protection
PESRM	Philadelphia Energy Solutions Refining and Marketing LLC
PID	photoionization detector
the Report	Site Characterization Report
RBSL	Risk based screening level
RPD	relative percent difference
the Site	Tank Group 07 location within the former Philadelphia Energy Solutions refinery facility
SHS	Statewide Health Standard
SSS	Site-Specific Standard
TEG	tetraethylene glycol



Terraphase	Terraphase Engineering, Inc.
TMB	trimethylbenzene
TPI	TPI Environmental, LLC
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Work Plan	Aboveground Storage Tank Closure Work Plan



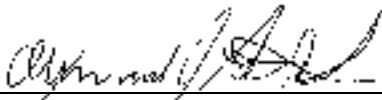
Certification

Pursuant to the requirements of the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2), adopted May 19, 1995, which states:

Interpretation of geologic and hydrogeologic data shall be prepared by a professional geologist licensed in this Commonwealth.

I hereby attest that, as a Professional Geologist licensed in the Commonwealth of Pennsylvania, I am familiar with, and have reviewed and/or prepared the interpretation of the geology and hydrogeology presented in the attached report entitled, *Site Characterization Report – Tank Group 07, Former Philadelphia Energy Solutions Refinery, 3144 West Passyunk Avenue, Philadelphia, Pennsylvania*, dated February 2023.

Based on the available data represented in the report, I believe that the geologic and hydrogeologic interpretations made herein are reasonable and accurate.



Alexander J. Strohl, PG
Senior Staff Geologist

February 6, 2023

Date



1 Introduction

Terraphase Engineering, Inc. (Terraphase) has prepared this *Site Characterization Report* (Report), on behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PESRM), to detail the results of the Site Assessment and Site Characterization activities at Tank Group 07 (the Site) which is located within the Former Philadelphia Energy Solutions refinery facility (Facility). The Facility, which is undergoing closure activities in preparation for redevelopment, is located at 3144 West Passyunk Avenue, Philadelphia, Pennsylvania (**Figure 1**). Remediation activities are being conducted at the Facility under the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) by both PESRM and Evergreen Resources Group, LLC (Evergreen)¹ in accordance with the 2012 Buyer-Seller Agreement and the 2020 First Amendment to that Agreement.

The Site Assessment and Site Characterization activities described in this Report were performed in accordance with the applicable provisions of The Storage Tank and Spill Prevention Act (Act 32), Title 25 of the Pennsylvania Code (25 PA Code) Chapter 245 (Subchapter D), and Terraphase’s (2021) *Aboveground Storage Tank Closure Work Plan* (Work Plan), which was approved by the Pennsylvania Department of Environmental Protection (PADEP) on April 23, 2021. As discussed in the Work Plan, closure of the above ground storage tanks (ASTs) under Act 32 is being pursued through a group closure process, in which ASTs in the same general area (e.g., tank farm) have been demolished, removed, investigated, and evaluated at about the same time. Demolition of the tanks has been proceeding in phases from the north to the south with eight Tank Groups in all.

Tank Group 07 (**Figure 2**) is located within a larger area of the Facility referred to as the Girard Point Refinery. Evergreen is currently engaged in characterization and remediation work at the Facility under the Pennsylvania One Cleanup Program under the oversight of the PADEP and the United States Environmental Protection Agency (USEPA) (eFACTS PF No. 757108). In its associated documentation, Evergreen has identified the Tank Group 07 portions of the Girard Point Refinery as Area of Interest (AOI) 6. The specific ASTs addressed in this Report are shown on **Figure 3** and listed in **Table 1**.

This Report was prepared in accordance with Act 32 and 25 PA Code Chapter 245 (Subchapter D) and provides a summary of the Site Assessment and Site Characterization activities that were performed following the identification of potential releases to the environment during the demolition and removal of the Tank Group 07 ASTs. It also demonstrates that adequate characterization has been performed to evaluate whether remedial action is warranted and indicates that PESRM will pursue closure under the Site-Specific Standard (SSS).

Section 2 provides the site setting and includes a description of the Site and operational/usage history of the ASTs and information regarding site topography, geology, and hydrogeology. Section 3 includes a summary of current and reasonably anticipated future land and groundwater use at and in the vicinity of

¹ Evergreen Resources Management Operations, a series of Evergreen Resources Group, LLC, is managing the legacy remedial work for Philadelphia Refinery Operations, a series of Evergreen Resources Group, LLC (“Evergreen”) and Sunoco (R&M), LLC. For clarity, Sunoco, Inc. n/k/a ETC Sunoco Holdings LLC, Sunoco, Inc. (R&M) f/k/a Sunoco (R&M), LLC n/k/a Energy Transfer (R&M), LLC effective 4/19/2021 and Evergreen shall be referred to collectively as “Evergreen” in this Report.



the Site and the selected standards. Section 4 includes a summary of known past releases to the environment in the area and subsequent investigation and remedial activities to address these releases. Section 5 discusses the tank infrastructure and removal. Sections 6 and 7 discuss the Site Assessment and Site Characterization, respectively. Section 8 presents a summary of the Risk Assessment conclusions performed for the Tank Group. An Ecological Screening Evaluation is presented in Section 9. A summary of the Report and its conclusions are presented in Section 10.



2 Site Setting

The Facility, a former 1,300-acre refinery, is currently undergoing decommissioning to support redevelopment. The Site² is approximately 21 acres in size and is located within the Girard Point Refinery, an area that is also referred to as AOI 6 by Evergreen as part of their One Cleanup Program effort. The Site is located north of the Platt Bridge, between Lanier Street and the Schuylkill River. Prior to demolition, Tank Group 07 consisted of six separate areas containing tanks located in the central portion of the Girard Point Refinery. The areas are separated by facility buildings, large piping structures, and plant access roadways. Except for the asphalt roadways and parking areas that pass through the portions of Tank Group 07, and the tank foundations themselves, the area is not covered by hardscape.

The ASTs addressed in this Report are listed in **Table 1**. Nine other ASTs, not subject to this closure effort, were previously located within Tank Group 07.

Figure 3 provides a layout of Tank Group 07.

2.1 Operational History/Usage of the Tanks

The Facility operated as a petroleum refinery between 1860 and 2019. The refinery ceased operations in 2019. The demolition and decommissioning of the subject ASTs began in September 2021. Prior to demolition, the primary products held within these tanks were: benzene (GP R 790, GP R 791, GP R 798, and GP R 799), fresh caustic (GP R 1088), cumene (GP R 792 and GP R 793), distillate, main frac bottoms (GP R 494), recovered oil (GP U 767), tetraethylene glycol (TEG) (GP R 794), and UDEX Feed (GP R 1116 and GP R 1117). Additional details regarding the size, contents, and construction of the tanks are provided in **Table 1**.

2.2 Topography

Topography at the Site is generally flat except for containment berms constructed around the tank areas to provide containment in the event of a release. Regional topography slopes gently to the west towards the Schuylkill River, the nearest water body to the Site. The ground surface elevation at the Site is approximately 7 feet (ft) above mean sea level.³

2.3 Regional Geology and Hydrogeology

The Facility is located within the Atlantic Coastal Plain Physiographic Province of Pennsylvania. The Atlantic Coastal Plain is a physiographic province that is defined as having a flat topography, underlain by unconsolidated sediments that thicken to the southeast. The Coastal Plain deposits are sand, gravel, silt, and clay which drape over crystalline igneous and metamorphic rocks. In general, the resulting sediments are approximately 250 ft thick along the Delaware River. These sediments unconformably

² Tank Group 07 consists of a tank farm referred to by the Facility as the North Tank Farm.

³ North American Vertical Datum of 1988.



overlie much older, very complexly deformed rocks of the Piedmont physiographic province. The Coastal Plain deposits in the vicinity of the Facility consist of anthropogenic fill underlain by quaternary deposits.

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. Below the fill material, sediments consist of gray, muddy deposits with occasional sand, gravel, and organic-rich lenses. These sediments were deposited in floodplain, channel, and marsh environments through the Holocene. The most recent deposits are poorly consolidated and below the phreatic surface of the unconfined aquifer as a result of their relatively young geologic age and position along the Schuylkill River (tributaries and creeks). Below the Holocene deposits is a Pleistocene glacial outwash deposit, commonly referred to as the “Trenton Gravel” along the Delaware River valley. Cretaceous-age sand and clay units making up the Potomac-Raritan-Magothy aquifer system underly the Pleistocene deposits.

The sedimentary record near the Site consists of a complex series of water-bearing sand units which can comprise one or more hydrostatic units. Previous investigations conducted at the Facility have identified two saturated zones, including an unconfined shallow groundwater unit (occurring within the Holocene and Trenton Gravel deposits) and a deep groundwater unit known as the Farrington Sand, which is part of the Potomac-Raritan-Magothy aquifer system. The deeper groundwater unit is separated by a clay unit; as such, the deeper groundwater has been classified as a semi-confined aquifer. Groundwater is first encountered generally at the Facility at a depth approximately 0.5 to 6 ft below ground surface (bgs; GHD 2017a). **Appendix A** provides select figures from the *Remedial Investigation Report*, AOI 6 (AOI 6 RIR; GHD 2017a) and the *Sitewide Fate and Transport Remedial Investigation Report* (Sitewide Fate and Transport RIR, Stantec 2022) for reference including Figure 8 from the AOI 6 RIR which provides a detailed cross section of the subsurface in this area.

2.4 Local Geology and Hydrogeology

During the Site Assessment and Site Characterization, soil at the Site was primarily investigated within the upper 5 ft, although Site Characterization monitoring wells were advanced to a maximum depth of 13 ft. Anthropogenic fill up to 15 ft thick was observed in soil cores collected from most of the soil borings installed in Tank Group 07. Soil beneath the fill layer generally consists of brown to gray sand, clay, and silt. During Site Assessment soil sampling, saturated soil was not encountered from 0-5 ft bgs. Due to seasonal change in groundwater elevations, saturated soils were encountered during Site Characterization sampling as shallow as 0.5 feet bgs.

Historically, unconfined aquifer groundwater has been first encountered in Tank Group 07 at a depth of approximately 0.5 to 6 ft bgs (GHD 2017a). During Site Characterization activities, groundwater was encountered between approximately 0.5 and 6 ft bgs.

Groundwater at the Girard Point Refinery has historically been interpreted to flow toward the Schuylkill River. Based on Figure 14 of the AOI 6 RIR (GHD 2017a) and Figure 3-29 of the Sitewide Fate and Transport RIR (Stantec 2022) included in **Appendix A**, unconfined aquifer groundwater flow within Tank Group 07 appears to be southwest.



3 Selection of Standards

This section discusses the selection of remediation standards by PESRM for Tank Group 07. Related, this section also discusses planned land and groundwater use at the Site and describes derivation of risk-based screening levels (RBSLs) that are used to streamline investigation decisions during the Site Characterization.

3.1 Land and Groundwater Use

As noted in the parcel map included in **Appendix B** and as captured in the conceptual imagery developed by Hilco Redevelopment Partners (<https://www.thebellwetherdistrict.com/>), the area encompassing Tank Group 07 is being redeveloped into a state-of-the-art, multimodal industrial park and life sciences campus with ancillary rail infrastructure, energy infrastructure, marine capabilities, and commercial uses. Current and reasonably anticipated future land use in the area of Tank Group 07 is non-residential. Following redevelopment, much of the area is also expected to be covered by hardscape (e.g., building pads, drive aisles, parking lots, roadways) or other features that will function as barriers to direct contact exposure.

As discussed with PADEP, vapor intrusion is not considered in evaluating the adequacy of sampling performed during Site Characterization. However, the risk assessment described in Section 8 has evaluated the existing Site Assessment and Site Characterization data with consideration for current and reasonably expected future exposure scenarios (including vapor intrusion) and has identified areas of the Tank Group where site-related conditions could pose an unacceptable risk that would warrant risk management action (i.e., remediation, establishment of institutional or engineering controls). Once redevelopment plans have been finalized, additional investigation and/or evaluation of vapor intrusion exposure will be conducted to further evaluate whether conditions could pose an unacceptable risk to future building occupants such that risk management action (e.g., remediation, vapor mitigation) is warranted. PESRM will conduct this additional VI evaluation outside of this tank closure work. The VI evaluation should not delay regulatory closure of the tanks. PESRM has an obligation to evaluate or mitigate the vapor intrusion pathway under the 2020 Buyer-Seller Agreement Amendment.

The unconfined aquifer is not used for a municipal or nearby communal potable water supply and future potable use of the unconfined aquifer is not reasonably expected, as documented by Evergreen (Stantec 2021 AOI 9 Second Remedial Investigation Report Addendum and Evergreen 2021 Public Involvement Remedial Investigation Report Response Letter to PADEP). While the risk assessment does not consider current off-facility groundwater to be a source of nonpotable water based upon the results of Evergreen's (2021) assessments, the risk assessment does assume that off-facility groundwater could be used in the future as a source of nonpotable water.

3.2 Selected Standard

PESRM has selected the SSS to attain closure for Tank Group 07. As described in Section 6, the comparison of the Site Assessment data against Non-Residential Statewide Health Standard (SHS) Medium Specific Concentrations (MSCs), in accordance with PADEP's (2022) *Site Assessment Sampling*



Requirements at Regulated Storage Tank System Closures and the Work Plan, was used to identify whether releases could have occurred from the ASTs in Tank Group 07. PESRM subsequently elected to seek closure of the tanks under the SSS. To support attainment of the SSS, a Site-Specific Human Health Risk Assessment (the Risk Assessment) has been conducted to evaluate the potential significance of identified releases in Tank Group 07 and determine whether constituent of potential concern (COPC) concentrations could pose unacceptable risk and/or hazard to human health, and whether such conditions would warrant management via remedial action to demonstrate attainment of the SSS. The outcome of the Risk Assessment is presented in Section 8 and described in detail in **Appendix C**.

3.3 Derivation of Risk-Based Screening Levels

As part of this Report, RBSLs were derived in accordance with PADEP and USEPA risk assessment guidance and are summarized in **Table 2**. The RBSLs were used to help to segregate soil and groundwater sampling data into those that indicate a higher potential for health significance from those that indicate a lower potential. In addition, COPC concentrations have been delineated to the site specific RBSLs. This delineation indicates that the Site has been adequately characterized for a site-specific risk assessment.

The RBSLs are developed with consideration for current and reasonably expected future land and groundwater use at and in the immediate vicinity of the Facility.

RBSLs are developed for the following exposure scenarios⁴:

Soil Exposure

- Routine worker exposure to COPCs in soil via direct contact⁵ and vapor intrusion
- Construction worker exposure to COPCs in soil via direct contact
- Migration of COPCs in soil to groundwater⁶

Groundwater Exposure

- Routine worker exposure to COPCs in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPCs in groundwater via direct contact
- Off-site resident exposure to COPCs in groundwater via vapor intrusion
- Exposure of all receptors to COPCs in groundwater via nonpotable groundwater use
- Migration of COPCs in groundwater to surface water

⁴ Exposure to COPCs in soil and groundwater by hypothetical future residents was not evaluated because residential use is not a current or reasonably expected future use and because residential use is prohibited at the Property by multiple mechanisms.

⁵ Includes incidental ingestion and dermal contact with COPCs in soil and inhalation of COPCs in soil-derived vapor and particulates.

⁶ Uses groundwater RBSL as target groundwater concentrations.



RBSLs are calculated for each of the COPCs that have been included in the soil and groundwater sampling performed by PESRM. A list of these COPCs is provided in **Table 2**.

The general assumptions used in the derivation of the RBSLs are summarized in the Risk Assessment (**Appendix B of Appendix C**). Human health-based RBSLs are calculated at a target cancer risk level of 1×10^{-5} and a target noncancer hazard quotient of 0.1. The target cancer risk level and target noncancer hazard quotient is used with consideration for the risk management goals established in Section 250.402(b) for attainment of the Site-Specific Standard (i.e., a cumulative excess cancer risk greater than 1×10^{-4} and a noncancer hazard index greater than 1⁷). For efficiency, the RBSLs are developed in a manner that allows them to be used site-wide to complete Site Characterization at each area (e.g., Tank Group).

The RBSLs are not cleanup standards. The identification of concentrations greater than RBSLs does not, on its own, indicate that an unacceptable risk to human health exists. Rather, concentrations greater than RBSLs indicate that additional evaluation is warranted to (1) determine if interim measures are necessary to abate an imminent hazard; (2) determine whether additional site characterization is needed to confirm the sources of contamination, identify the regulated substances involved and the extent of migration of those regulated substances in environmental media, and evaluate the fate and transport of these substances, if needed; (3) perform a site-specific risk assessment, if desired; and (4) as needed, provide sufficient information to allow for the development of a remedial action plan or remedy design.

⁷ As estimated from exposure to COPCs with the same target organ or target effect.



4 Known Past Releases to the Environment

The presence of constituents in soil above the RBSLs in the Tank Group 07 area may be associated with releases from ASTs or other potential sources unrelated to the ASTs. These releases include those identified historically (prior to Tank Group 07 Site Assessment and Site Characterization activities) by Evergreen or those identified recently but unrelated to tanks in Tank Group 07 by PESRM. This section provides a discussion of the past releases and potential other sources of contamination.

The AOI 6 RIR (GHD 2017a), prepared on behalf of Evergreen, notes historical investigations relating to past releases of petroleum products in the vicinity of Tank Group 07. In some cases, these releases have resulted in contamination of groundwater (including the identification of light non-aqueous phase liquid [LNAPL]) that is present or that has migrated to within the bounds of Tank Group 07.

The AOI 6 RIR identified three historical releases from previously closed ASTs within Tank Group 07 (Incident Nos. 45692 [GP R 81], 4844 [GP R 676], and 29122 [GP R 797]). The *Site Characterization Report/Remedial Action Completion report for Aboveground Storage Tanks T 81, 676, and 797* (GHD 2017b) was submitted for these historical releases, allowing for them to be addressed under Act 2. PADEP approved the AOI 6 RIR (GHD 2017a) in 2018. These release incidents will be closed following the approval of an Act 2 Final Report.

4.1 Pre-existing Contamination

Environmental sampling has been conducted at the Facility since as early as 1988. This section provides a summary of historical sampling results in and around Tank Group 07 and a comparison to RBSLs.

4.1.1 Soil

Historical sampling (prior to PESRM Site Assessment activities) in Tank Group 07 has included soil samples which have been analyzed for specific volatile organic compounds (VOCs), semi-volatile organic compounds, and metals. As discussed in Section 1.5 of the AOI 6 RIR, the list of constituents of concern (COCs) which are included in sampling performed by Evergreen as part of the site-wide approach for the Facility under the One Cleanup Program, are referred to as the Evergreen Petroleum Short List and Comprehensive List. The Comprehensive List, which encompasses the Petroleum Short List, is shown on **Table 3**.

As presented on **Table 4a**, the maximum detected concentrations of constituents in historical samples were compared to the RBSLs derived by Terraphase. An evaluation of the concentrations of constituents in historical samples compared to the RBSLs indicates the following:

- Lead and naphthalene have been detected historically in soil in the area at concentrations greater than the Routine Worker Direct Contact RBSLs.
- Benzene, 1,2,4-trimethylbenzene (1,2,4-TMB), xylenes (total), naphthalene, and lead have been detected historically in soil in the area at concentrations greater than the Construction Worker Direct Contact RBSLs.



- Lead and naphthalene have been detected historically in soil in the area at concentrations greater than the soil Migration to Groundwater (MtGW) RBSLs.

Table 4a summarizes additional information for these historical soil sampling results including number of detections, range of detected concentrations, and ratios of the maximum detected concentrations to the RBSLs. **Figure 4a** presents the spatial distribution of historical soil concentrations above these RBSLs. **Appendix D** provides tables of these historical soil sampling results.

Historical sampling has identified concentrations of constituents exceeding RBSLs in soil in the vicinity of previously closed tank GP C2 797 (benzene, benzo(a)pyrene [B(a)P], cumene, naphthalene, toluene, and xylenes (total)). In addition, historical sampling identified concentrations of constituents near currently assessed tanks GP R 79A (naphthalene), GP R 1088 (lead), and GP R 790, GP R 791, GP R 792, GP R 793, GP R 796, GP R 798, and GP R 799 (benzene, B(a)P, cumene, naphthalene, toluene, and xylenes (total)).

With consideration for the closure of the Tank Group 07 ASTs, these sampling results have been included in evaluating whether the soil sampling data generated during the Site Assessment and Site Characterization indicate evidence of new releases to the environment from the tanks, or whether the nature and extent of contamination identified during the Site Assessment and Site Characterization is consistent with known historical soil quality.

4.1.2 Groundwater

More than 30 groundwater monitoring or recovery wells have been installed within and near Tank Group 07 as part of historical environmental sampling at the Facility. **Table 4b** summarizes additional information for these historical groundwater sampling results including number of detections, range of detected concentrations, and ratios of the maximum detected concentrations to the RBSLs. As discussed in the AOI 6 (GHD 2017a) and the Sitewide Fate and Transport (Stantec 2022) RIRs, of the list of site-related constituents identified in groundwater, benzene was chosen as the primary chemical (qualitative proxy) for other constituents because of its water solubility, potential to be mobile in groundwater, and persistence in groundwater at and near the Facility.

Figure 19 of the AOI 6 RIR (GHD 2017a) shows the distribution of benzene in groundwater near Tank Group 07. For expediency, a copy is included in **Appendix A**, and the figure has been amended to identify the location of Tank Group 07.

Figure 4b depicts the wells in Tank Group 07 with identified historical (prior to PESRM Site Characterization activities) dissolved phase groundwater contamination at concentrations greater than RBSLs. The estimated extent of LNAPL observed is also presented. As shown on Figure 19 of the AOI 6 RIR, a large dissolved-phase benzene plume exists beneath the central and southern portion of Tank Group 07, along with three smaller plumes to the north and the west. Since as early as 2001, LNAPL plumes have also been identified at and near Tank Group 07. Figure 17 of the AOI 6 RIR depicts the LNAPL identified during gauging conducted in May 2017. For mapping purposes, LNAPL has been generally characterized into the following categories: light, middle, and heavy petroleum distillates.

As part of remedial action, a LNAPL recovery system was installed in 2001 in the vicinity of Tank Group 07. The 27 Pump House Passive Remediation System, which is adjacent to the southeast of the



central portion of Tank Group 07, was operated by Evergreen until September 2010. The system consisted of a total fluids recovery system and was used to extract contaminated groundwater and LNAPL from a series of recovery wells. Recovered LNAPL was discharged to a holding tank and recovered groundwater was discharged to a nearby facility sewer line for onsite treatment. Following the system's shutdown in 2010, passive recovery via sorbent socks and bailers was conducted until January 2015.

Groundwater in the lower aquifer has been investigated but contamination has not been identified in Tank Group 07 at concentrations greater than the RBSLs.

These historical sampling results have been considered in evaluating Site Assessment and Site Characterization data for Tank Group 07.



5 Tank Infrastructure and Removal

In accordance with the Work Plan, Northstar Contracting Group, Inc. and its subcontractor, JD2 Environmental, Inc., a PADEP-certified Aboveground Field Constructed Storage Tank System Removal contractor, was retained by PESRM to perform tank demolition and handling, including (1) hazard recognition and abatement; (2) removal and handling of vapors, product, wastewaters, and accumulated sludges; (3) overseeing or verifying cleaning of the storage tank system; (4) dismantling the AST; and (5) removal of ancillary equipment and piping.

The demolition of the following ASTs began in September 2021 and was completed in July 2022:

- GP R 1117 (PADEP No. 005A)
- GP R 791 (PADEP No. 006A)
- GP R 798 (PADEP No. 007A)
- GP R 494 (PADEP No. 029A)
- GP R 1116 (PADEP No. 030A)
- GP R 1088 (PADEP No. 033A)
- GP R 790 (PADEP No. 034A)
- GP R 792 (PADEP No. 035A)
- GP R 793 (PADEP No. 036A)
- GP R 794 (PADEP No. 037A)
- GP R 799 (PADEP No. 039A)
- GP U 767 (PADEP No. 046A)

During the removal, it was determined that GP R 792, GP R 794, and GP R 1116 had double bottoms. Double bottoms are forms of secondary containment located under the tanks that allow for visual inspection and potential repair to any observed leaks. PESRM retained ENTACT to remove the double bottoms at the three tanks. Removal was completed in August 2022.

On behalf of PESRM, JD2 Environmental, Inc. submitted to PADEP the required tank registration amendments, copies of which are provided as **Appendix E**.

The Aboveground Storage Tank System Closure Report forms (2630-FM-BECB0514) are included as **Appendix F**.



6 Site Assessment

This section discusses the sample collection methods used and sample analyses performed during the Site Assessment. The soil sampling was completed by Ransom Consulting, LLC (Ransom) and their subcontractor TPI Environmental, LLC (TPI).

As discussed in the Work Plan, when no evidence of a release to the environment was identified during Tank Group 07 AST removal, ASTs were subject to Site Assessment sampling using a grid-based approach with additional samples biased toward the locations of pipe connections or other key infrastructure. Sampling was conducted during multiple mobilizations as the tanks were being demolished and the ground became available for sampling. The first mobilization was on July 18, 2022, and the last mobilization was completed on October 21, 2022, after the removal of double bottoms.

In total, 95 soil borings were installed and 108 soil samples were collected during the Site Assessment. **Figure 5a** shows the location of each of the Site Assessment soil borings.

6.1.1 Sample Collection Methods

Prior to the initiation of the sampling activities, the Pennsylvania One Call System (811 Dig Safe) was contacted to identify underground utilities at the Site. In addition, a review of available information provided by facility representatives regarding the presence/absence of underground utilities was used in the selection of sampling locations. Finally, a private locate was performed using geophysical and electromagnetic techniques to identify potential utilities or subsurface structures at proposed drilling locations.

Soil borings were completed using direct-push (i.e., Geoprobe) drilling or hand auger methods and advanced through the top 5 ft of soil. Continuous soil cores were collected, and field screened using a photoionization detector (PID) to identify potentially impacted zones. Soil sampling intervals were selected based on the results of field screening (i.e., staining, odors, and elevated PID readings). Where potentially impacted materials were not encountered, discrete samples were collected at a depth of 3.0-3.5 ft bgs consistent with the Confirmatory Sampling Protocol detailed in PADEP's (2017) *Closure Requirements for Aboveground Storage Tank Systems*. The approach is consistent with PADEP guidance as their language requires sampling "**at least one foot below underground product piping, two feet below product dispensers, remote fills or containment structures and aboveground product lines for ASTs, and three feet below the tank.**" Where fill was observed, samples of the fill were collected if it consisted of soil or soil-like material. Groundwater was not encountered during the Site Assessment.

Appendix G provides copies of the boring logs that describe the soil cores.

6.1.2 Sample Analyses

The analysis selected for each soil sample was based on the AST contents as prescribed by PADEP's Short List of Petroleum Products inventory (Table III-5 of the *Land Recycling Program Technical Guidance Manual* [January 2019]). As shown on **Table 1**, for these 12 ASTs, analytes included one or a combination of the following short lists, based on historical tank contents:



- **Short List 1.** *Leaded Gasoline, Aviation Gasoline and Jet Fuel:* benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-TMB, 1,3,5-TMB, 1,2-dichloroethane, 1,2-dibromoethane, and lead.
- **Short List 2.** *Unleaded Gasoline:* benzene, toluene, ethyl benzene, xylenes (total), cumene, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-trimethyl benzene (1,3,5-TMB).
- **Short List 3.** *Kerosene, Fuel Oil No. 1:* benzene, toluene, ethyl benzene, cumene, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-TMB.
- **Short List 4.** *Diesel Fuel and Fuel Oil No. 2:* benzene, toluene, ethyl benzene, cumene, MTBE, naphthalene, 1,2,4-TMB, and 1,3,5-TMB.
- **Short List 5.** *Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids:* benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene (B[a]A), chrysene, benzo(b)fluoranthene (B[b]F), benzo(a)pyrene (B[a]P), and benzo(g,h,i)perylene.
- **Short List 6.** *Waste Oil:* benzene, toluene, ethyl benzene, cumene, naphthalene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)pyrene, and lead.

VOCs were analyzed via USEPA Method 8260B. Samples for semi-volatile organic compounds were analyzed via Method 8270C. Samples for lead were analyzed via USEPA Method 6010B. Additionally, TEG was analyzed for one tank via USEPA Method 8015D and pH was analyzed for one tank containing Fresh Caustic via USEPA Method 9045D.

Laboratory analytical services were provided by Alpha Analytical, Inc. of Westborough, Massachusetts, which is a PADEP-certified laboratory. Additionally, laboratory analytical services were provided by SGS North America, Inc., a PADEP-certified laboratory located in Savannah, Georgia, for the limited set of TEG analyses. Soil samples submitted for analyses were placed directly into laboratory provided glassware and stored on ice in a cooler under appropriate chain of custody protocol.

6.1.3 Sample Results

Soil sampling results from the Site Assessment were compared to the following Non-residential SHS MSCs⁸ to help identify potential releases to the environment from the ASTs and their associated piping:

- Non-Res Soil Direct Contact MSCs for soil
- Non-Res Used Aquifer Soil-to-Groundwater MSCs

⁸ As described in Section 5.1.1, soil sampling intervals were based on the results of field screening (i.e., staining, odors, and elevated PID readings). Where potentially impacted materials were not encountered, discrete samples were collected from native soil at a depth of 3.0-3.5 ft bgs, in accordance with PADEP's (2017) *Closure Requirements for Aboveground Storage Tank Systems*. Since only subsurface (>2 ft bgs) soil samples were collected from some locations during the Site Assessment, the comparison of the resulting concentrations to MSCs conservatively disregarded the surface/subsurface soil designation reflected in the Non-residential Soil DC MSCs (i.e., results were compared to the Non-Res DC MSCs for surface soil). This approach was used to evaluate potential releases from tanks within Tank Group 07.



Table 5 identifies the Site Assessment sampling locations where constituents were identified at concentrations greater than the applicable MSCs. Site Assessment results were screened against Non-Residential SHS MSCs, as detailed in the Work Plan. This screening evaluation was conducted to determine if releases could have occurred from the regulated storage tank system being assessed. If concentrations exceeding the MSCs are identified, it is assumed that a release has occurred from the associated storage tank system, and the release was reported to the PADEP.

GP R 494

Two samples (GPR494-01-SS01 and GPR494-08-SS01) collected in proximity to GP R 494 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituents identified are benzo(a)pyrene and lead.

GP R 790

Six samples (GPR790-01-SS01, GPR790-02-SS01, GPR790-03-SS01, GPR790-05-SS01, GPR790-06-SS01, and GPR790-07-SS01) collected in proximity to GP R 790 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is benzene.

GP R 791

Eight samples (GPR791-01-SS01, GPR791-02-SS01, GPR791-03-SS01, GPR791-04-SS01, GPR791-05-SS01, GPR791-06-SS01, GPR791-07-SS01, and GPR791-08-SS01) collected in proximity to GP R 791 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is benzene.

GP R 792

Five samples (GPR792-02-SS01, GPR792-03-SS01, GPR792-04-SS01, GPR792-05-SS01, and GPR792-06-SS01) collected in proximity to GP R 792 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is cumene.

GP R 793

Four samples (GPR793-01-SS01, GPR793-02-SS01, GPR793-03-SS01, and GPR793-04-SS01) collected in proximity to GP R 793 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is cumene.

GP R 794

Seven samples (GPR794-01-SS01, GPR794-02-SS01, GPR794-04-SS01, GPR794-05-SS01, GPR794-06-SS01, GPR794-07-SS01, and GPR794-08-SS01) collected in proximity to GP R 794 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituents identified are benzene, cumene, ethyl benzene, and toluene.

GP R 798

Six samples (GPR798-01-SS01, GPR798-02-SS01, GPR798-04-SS01, GPR798-05-SS01, GPR798-06-SS01, and GPR798-07-SS01) collected in proximity to GP R 798 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is benzene.



GP R 799

Seven samples (GPR799-01-SS01, GPR799-02-SS01, GPR799-03-SS01, GPR799-04-SS01, GPR799-05-SS01, GPR799-06-SS01, and GPR799-07-SS01) collected in proximity to GP R 799 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is benzene.

GP U 767

One sample (GPU767-06-SS01) collected in proximity to GP U 767 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is lead.

GP R 1088

None of the Site Assessment soil samples collected in proximity to GP R 1088 exhibited concentrations greater than the applicable MSCs.

GP R 1116

Two samples (GPR1116-03-SS01 and GPR1116-08-SS01) collected in proximity to GP R 1116 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituents identified are benzene and lead.

GP R 1117

Three samples (GPR1117-05-SS01, GPR1117-06-SS01, and GPR1117-07-SS01) collected in proximity to GP R 1117 and its associated piping exhibited concentrations greater than one or more applicable MSCs. The constituent identified is lead.

Based upon the results, no evidence of a release from GP R 1088 was identified. The Site Assessment outcome for GP R 1088 is “No Obvious Contamination – Sample Results Meet Action Levels”.

Based upon the results of soil samples collected during the Site Assessment and a comparison to generic MSCs, potential releases of regulated substances to the environment from GP R 494, GP R 790, GP R 791, GP R 792, GP R 793, GP R 794, GP R 798, GP R 799, GP U 767, GP R 1116, and GP R 1117 were identified. The Site Assessment outcome category for this AST is “No Obvious Contamination – Sample Results Do Not Meet Action Levels”.

The initial identification of concentrations in soil above applicable MSCs resulted in notifying PADEP of a release to the environment on August 10, 2022. A second notification to PADEP occurred on August 25, 2022; both notifications were made based on Site Assessment soil analytical results. The PADEP assigned the releases in Tank Group 07 to Incident No. 57973. Copies of the notification documents are included in **Appendix H**.

Following the identification of releases in Tank Group 07, PESRM elected to seek closure of the tanks under the SSS. Site Assessment results were subsequently screened against the RBSLs. **Table 6** lists the COPCs (if any) identified in soil at concentrations greater than the RBSLs in the vicinity of each tank in Tank Group 07 during Site Assessment and Site Characterization soil sampling. The spatial distribution of the COPCs identified during the Site Assessment and their concentrations relative to RBSLs are shown



on **Figure 6. Appendix I** provides the soil analytical results from the Site Assessment. Copies of the laboratory reports are included as **Appendix J**.



7 Site Characterization

Based on the results of Site Assessment sampling in Tank Group 07 (Section 6), a Site Characterization plan was developed. The objective of the Site Characterization was to delineate the horizontal and vertical extent of the potential releases until sufficient data were available to determine the need for interim or remedial measures via a site-specific risk assessment.

This section discusses how the Site Characterization plan was developed, the methods used during the sampling, and the evaluation of the results following characterization.

PESRM's Site Characterization plan for Tank Group 07 included the installation of an additional 15 soil borings and the collection of 27 additional soil samples. In addition, the plan included the installation of eight groundwater monitoring wells with two ensuing groundwater sampling events.

7.1 Site Characterization Soil Sampling

The Site Characterization scope for soil included the installation of an additional 15 soil borings and the collection of 27 additional soil samples. Several samples were collected at shallower (e.g., 1-1.5 ft bgs and 1.5-2 ft bgs) and deeper soil intervals (e.g., 2.5-3 ft bgs, 3-3.5 ft bgs, 3.5-4 ft bgs, 4-4.5 ft bgs, and 4.5-5 ft bgs) to vertically characterize the extent of COPC concentrations in soil, as required by 25 PA Code § 245.309(c)(9). The sample collection protocols, and the sampling analyses used during the Site Characterization were consistent with those used during the Site Assessment. The sampling was completed by Terraphase and TPI in conjunction with monitoring well installation activities. The Site Characterization soil sample locations are depicted on **Figure 5b**.

Releases to soil from the ASTs and associated soil contamination would be confined to the secondary containment berms. As a result, the horizontal extent of soil contamination associated with the ASTs is limited to an extent no greater than the berms (except for where piping traverses through the berms). Where space existed between locations of identified soil contamination and the berms, horizontal step out sampling was considered to delineate soil contamination horizontally to within the bermed containment areas.

The Site Assessment sampling methodology included PID field screening of soil during the installation of the soil borings. This allowed the field team to identify the interval with the greatest potential VOC concentrations. If samples were collected at a depth greater than 0-0.5 ft bgs, it was either because PID readings were greater than those observed from 0-0.5 ft bgs, or PID readings indicated no evidence of VOCs and samples were then collected from 3.0-3.5 ft bgs per PADEP (2017). For these situations, shallow soil delineation sampling was unnecessary. Instead, the Site Characterization conservatively assumes that the concentrations observed in these subsurface samples also exist at the surface (i.e., 0-0.5 ft bgs). Samples were collected from the depth corresponding to the highest field screening indication of contamination between the Site Assessment sample depth and the water table. Historical soil sampling results were also used to help support Site Characterization decision-making.

Site Characterization soil sampling was conducted between December 21, 2022 and January 3, 2023.

Appendix G contains copies of the boring logs that describe the soil cores.



7.2 Site Characterization Groundwater Sampling

In addition to soil characterization, eight groundwater monitoring wells (TG07-MW-01, TG07-MW-02, TG07-MW-03, TG07-MW-04, TG07-MW-05, TG07-MW-06, TG07-MW-07, and TG07-MW-08) were installed in the vicinity of tank GP R 494, GP R 1116, GP R 1117, GP R 798, GP R 790, GP R 791, GP R 794, and GP U 767, as depicted in **Figure 5c**. The wells were installed to fully characterize the extent of contamination identified in the vicinity of the tank, as required by 25 PA Code § 245.309(c)(10).

The locations of the monitoring wells were selected with three objectives in mind: (1) to evaluate groundwater in the vicinity of each tank with a reported release, (2) to bias monitoring well locations toward areas where higher concentrations have been detected in soil, and (3) to obtain spatial coverage across the Tank Group.

Terraphase and TPI installed the wells using 4 ½-inch direct push drill casing to 12 feet bgs (TG07-MW-01, TG07-MW-04, TG07-MW-05, TG07-MW-06, TG07-MW-07, and TG07-MW-08) or 13 feet bgs (TG07-MW-02, TG07-MW-03). The monitoring wells were constructed with 10-feet of 2-inch diameter Schedule 40 PVC pre-packed well screens with 0.010-inch slotted screen. A #1 sand filter pack was installed to fill the remaining annular space around the pre-packed screen to 1-foot above the screened interval. A #00 fine sand seal was placed above the pack and the remaining annular space was filled with hydrated bentonite chips. Monitoring well construction logs are provided in **Appendix G**.

During drilling in Tank Group 07, Terraphase identified indications of the potentiometric surface (i.e., saturated soil, standing water in borehole) as shallow as 0.5 ft bgs. The wells were constructed with the minimum amount of vertical riser, to capture the potentiometric surface within the screened interval and while also preventing surface infiltration from entering the monitoring well.

The wells were installed and developed on December 21 and 22, 2022. The well development was conducted by over pumping to remove multiple well volumes with a submersible pump. The submersible pump was surged up and down along the well screen to loosen sediment from the formation into the well. Well development continued until the developed water was clear and free of sediment. Water produced by development of all wells was containerized and treated at the on-site wastewater treatment plant.

Prior to groundwater sample collection, Terraphase collected groundwater level and LNAPL thickness measurements from wells TG07-MW-01, TG07-MW-02, TG07-MW-03, TG07-MW-04, TG07-MW-05, TG07-MW-06, TG07-MW-07, and TG07-MW-08 and existing monitoring wells B-45, B-148 and B-150 using an electronic oil/water interface probe. The results of the gauging are provided in **Table 7**. Groundwater samples were collected from wells TG07-MW-01 through TG07-MW-05, TG07-MW-07, and TG07-MW-08. A LNAPL characterization sample was collected from TG07-MW-06.

Terraphase conducted a groundwater sampling event via low-flow groundwater sampling techniques. Sampling was conducted 2 weeks following well development, on January 4 through 6, 2023. A second round of sampling at these wells is planned for February 2023, the results of which will be presented and evaluated in a forthcoming Site Characterization Report addendum.

The groundwater samples collected from the wells were analyzed for Shortlist 1-6 parameters. The LNAPL characterization sample collected from TG07-MW-06 was analyzed for PIANO VOCs (8260B, VOCs



by GC/MS), PAHs/Biomarkers (8270D-SIM), Organic Lead (8270D-SIM), Density (ASTM D1475), and Saturated Hydrocarbons (8015D by GC-FID).

7.3 Site Characterization Results

Table 8 presents a comparison of the maximum detected COPC soil concentrations across the Site to the applicable RBSLs and reflects both Site Assessment and Site Characterization sampling results. **Table 9** presents the groundwater sample results from the wells sampled during the January 2023 characterization event and compares the concentrations to the RBSLs.

With consideration for soil and groundwater, a comparison to RBSLs indicates the following:

Soil

- Routine Worker Direct Contact Exceedances: benzene, cumene, 1,2,4-TMB, xylenes, B(a)P, and naphthalene
- Construction Worker Direct Contact Exceedances: benzene, cumene, toluene, 1,2,4-TMB, 1,3,5-TMB, xylenes, B(a)P, and naphthalene
- Soil MtGW Exceedances: benzene, cumene, 1,2,4-TMB, xylenes, and naphthalene

Groundwater

- Resident Nonpotable Groundwater Use Exceedances: benzene and toluene
- Construction Worker Direct Contact Exceedances: benzene
- Groundwater Migration-to-Surface Water (MtSW) Exceedances: benzene and cumene

Figure 6 depicts the spatial distribution of the comprehensive soil sampling data (i.e., Historical, Site Assessment, and Site Characterization) that have been generated in Tank Group 07 relative to RBSLs. **Figures 7a through 7h** show the spatial distribution benzene, cumene, toluene, 1,2,4-TMB, 1,3,5-TMB, xylenes, B(a)P, and naphthalene relative to their respective RBSLs in soil. **Figure 8** presents the spatial distribution of Site Characterization groundwater data relative to RBSLs. **Figures 9a through 9c** show the spatial distribution of benzene, cumene, and toluene relative to their respective RBSLs in groundwater.

Appendix I provides the comprehensive soil analytical results from the Site Assessment and Site Characterization. Laboratory reports are provided in **Appendix J**.

7.3.1 Soil Characterization Results

The results of soil sampling have indicated that COPCs have been adequately characterized with respect to the RBSLs. Delineation of COPCs in soil at concentrations above the RBSLs using soil sampling data or tank containment berms is detailed below.

Benzene

As shown on **Table 8**, benzene was detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (63 milligrams per kilogram [mg/kg]), the Construction Worker



Direct Contact RBSL (8.7 mg/kg), and the Soil MtGW RBSL (98 mg/kg). The concentrations in soil ranged from non-detect to 12,000 mg/kg.

Horizontal delineation of the benzene concentrations exceeding the RBSLs in the vicinity of tanks GP R 798 and GP R 799 is provided by samples collected from borings GPR798-03, GPR799-01, GPR799-08, GPR799-05, GPR798-05, and tank containment berms to the north and west. Vertical delineation of benzene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

Horizontal delineation of the benzene concentrations exceeding the RBSLs in the vicinity of tanks GP R 790, GP R 791, and GP R 794 is provided by samples collected from borings GPR790-03, GPR791-02, GPR791-09, GPR794-09, GPR794-10, GPR790-08, and tank containment berms to the south, east, and west. Vertical delineation of benzene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

Horizontal delineation of the benzene concentrations exceeding the RBSLs at boring GPR1116-08 (sampled from 1.5-2.0 ft bgs) is provided by samples collected from borings GPR1116-02, GPR1116-09, GPR1116-11, and GPR1116-01. Vertical delineation of benzene concentrations exceeding the RBSLs is provided by a deeper sample collected at boring GPR1116-08 (sampled from 3.0-3.5 ft bgs).

Figure 7a provides an additional illustration of the spatial distribution of benzene in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

Cumene

As shown on **Table 8**, cumene was detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (1,000 mg/kg), the Construction Worker Direct Contact RBSL (87 mg/kg), and the Soil MtGW RBSL (1,000 mg/kg). The concentrations in soil ranged from non-detect to 15,000 mg/kg.

Horizontal delineation of the cumene concentrations exceeding the RBSLs in the vicinity of tanks GP R 792, GP R 793, and GP R 794 is provided by samples collected from borings GPR791-09, GPR794-09, GPR794-10, GPR790-08, and tank containment berms to the north, south, east, and west. Vertical delineation of cumene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

The cumene concentration exceeding the RBSLs in a sample collected from boring GPR799-08 is unrelated to a release from GP R 799 (primary product benzene) or its associated piping. The delineation described above also indicates that the exceedance is unrelated to releases from any other tank system within Tank Group 07. Nonetheless, this exceedance is horizontally delineated by a sample collected from boring GPR799-03 and Evergreen samples collected from borings AOI6-BH-16-026, 1732_1733-01, and AOI6 BH-12-114. Vertical delineation of cumene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil at this boring.

Figure 7b provides an additional illustration of the spatial distribution of cumene in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.



Toluene

As shown on **Table 8**, toluene was detected in soil in the area at a concentration greater than the Construction Worker Direct Contact RBSL (650 mg/kg). The concentrations in soil ranged from non-detect to 6,200 mg/kg.

Horizontal delineation of the toluene concentrations exceeding the RBSL in the vicinity of tank GP R 794 is provided by samples collected from borings GPR790-05, GPR791-04, GPR794-09, GPR794-03, GPR794-07, GPR794-10, and tank containment berms to the south, east, and west. Vertical delineation of toluene concentrations exceeding the RBSL could not be achieved prior to encountering saturated soil in this area.

Figure 7c provides an additional illustration of the spatial distribution of toluene in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

1,2,4-TMB

As shown on **Table 8**, 1,2,4-TMB was detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (180 mg/kg), the Construction Worker Direct Contact RBSL (70 mg/kg), and the Soil MtGW RBSL (250 mg/kg). The concentrations in soil ranged from non-detect to 330 mg/kg.

Horizontal delineation of the 1,2,4-TMB concentrations exceeding the RBSLs in the vicinity of tank GP R 794 is provided by samples collected from borings GPR792-03, GPR794-02, GPR794-07, GPR794-10, and tank containment berms to the south and west. Vertical delineation of 1,2,4-TMB concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

Figure 7d provides an additional illustration of the spatial distribution of 1,2,4-TMB in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

1,3,5-TMB

As shown on **Table 8**, 1,3,5-TMB was detected in soil in the area at a concentration greater than the Construction Worker Direct Contact RBSL (99 mg/kg). The concentrations in soil ranged from non-detect to 140 mg/kg.

Horizontal delineation of the 1,3,5-TMB concentrations exceeding the RBSL at boring GPR794-08 is provided by samples collected from borings GPR794-04, GPR794-07, GPR794-10, and tank containment berms to the south and west. Vertical delineation of 1,3,5-TMB concentrations exceeding the RBSL could not be achieved prior to encountering saturated soil in this area.

Figure 7e provides an additional illustration of the spatial distribution of 1,3,5-TMB in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

Xylenes

As shown on **Table 8**, xylenes were detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (240 mg/kg), the Construction Worker Direct Contact RBSL



(51 mg/kg), and the Soil MtGW RBSL (340 mg/kg). The concentrations in soil ranged from non-detect to 560 mg/kg.

Horizontal delineation of the xylenes concentrations exceeding the RBSLs in the vicinity of tank GP R 794 is provided by samples collected from borings GPR791-04, GPR794-09, GPR794-03, GPR794-07, GPR794-10, and tank containment berms to the north, south, east, and west. Vertical delineation of xylenes concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

The xylenes concentration exceeding the RBSLs in a sample collected from boring GPR790-05 is unrelated to a release from GP R 790 (primary product benzene) or its associated piping. The xylenes concentrations identified have been attributed to a release from GP R 794. The description above indicates that the xylenes concentrations exceeding the RBSLs have been delineated.

Figure 7f provides an additional illustration of the spatial distribution of xylenes in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

B(a)P

As shown on **Table 8**, B(a)P was detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (43 mg/kg) and the Construction Worker Direct Contact RBSL (7.7 mg/kg). The concentrations in soil ranged from non-detect to 54 mg/kg.

Horizontal delineation of the B(a)P concentrations exceeding the RBSLs in the vicinity of tank GP R 494 is provided by samples collected from borings GPR494-03, GPR494-01, GPR494-04, GPR494-06, GPR494-09, GPR494-07 and tank containment berms to the north, south, east, and west. Vertical delineation of B(a)P concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

Figure 7g provides an additional illustration of the spatial distribution of B(a)P in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

Naphthalene

As shown on **Table 8**, naphthalene was detected in soil in the area at a concentration greater than the Routine Worker Direct Contact RBSL (41 mg/kg), the Construction Worker Direct Contact RBSL (6 mg/kg), and the Soil MtGW RBSL (27 mg/kg). The concentrations in soil ranged from non-detect to 52 mg/kg.

Horizontal delineation of the naphthalene concentrations exceeding the RBSLs in the vicinity of tank GP R 794 is provided by samples collected from borings GPR791-04, GPR794-01, GPR794-10, and tank containment berms to the north, south, and west. Vertical delineation of naphthalene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

The naphthalene concentration exceeding the RBSLs in a sample collected from boring GPR790-05 is unrelated to a release from GP R 790 (primary product benzene) or its associated piping. The naphthalene concentrations identified have been attributed to a release from GP R 794. The description above indicates that the xylenes concentrations exceeding the RBSLs have been delineated.



Horizontal delineation of the naphthalene concentrations exceeding the RBSLs at boring GPR1117-03 is provided by samples collected from borings GPR1117-04, GPR1116-15, GPR1117-02, and the tank containment berm to the north. Vertical delineation of naphthalene concentrations exceeding the RBSLs could not be achieved prior to encountering saturated soil in this area.

Figure 7h provides an additional illustration of the spatial distribution of naphthalene in soil relative to the applicable RBSLs. Tables with the soil analytical results are provided in **Appendix I**.

7.3.2 Groundwater Characterization Results

Terraphase gauged 11 monitoring well locations in the vicinity of Tank Group 07 and measured the depth-to-water and depth-to-product from the top of inner casing. The results of the gauging activities are presented in **Table 7**. LNAPL-corrected depth-to-water measurements and groundwater elevations are also presented in **Table 7**, and the interpreted potentiometric surface is shown in **Figure 10**. The groundwater flow direction in Tank Group 07 is interpreted to be to the west/southwest. Also, during well gauging, measurable LNAPL was confirmed in four of the 11 monitoring wells (B-148, B-150, TG07-MW-06, and TG07-MW-07). The measured LNAPL thicknesses are presented in **Table 7** and **Figure 11**. A LNAPL characterization sample was collected from TG07-MW-06. The minimal LNAPL was purged from well TG07-MW-07 and a groundwater sample was collected low-flow sampling techniques instead.

The results of groundwater sampling have indicated that COPCs have been adequately characterized with respect to the RBSLs. Delineation of COPCs in groundwater at concentrations above the RBSLs using groundwater sampling data is detailed below. Fate and transport analysis of groundwater concentrations is presented in the Risk Assessment (**Appendix C**).

Benzene

As shown on **Table 9**, benzene was detected in groundwater in the area at a concentration greater than the Resident Nonpotable Groundwater Use RBSL (0.30 milligrams per liter [mg/L]), the Construction Worker Direct Contact RBSL (4 mg/L), and the Groundwater MtsW RBSL (130 mg/L). The concentrations in groundwater ranged from non-detect to 240 mg/L.

Local groundwater flow in the vicinity of the GP R 790-series tank area is toward the Schuylkill River to the southwest. Horizontal delineation of the benzene concentrations exceeding the RBSLs in the downgradient direction is provided by the groundwater sample collected from TG07-MW-08 and groundwater samples collected by Evergreen from wells B-172 and B-157. The monitoring wells are shown on **Figure 9a** and provide an illustration of the spatial distribution of benzene in groundwater relative to the applicable RBSLs. Tables with the groundwater analytical results are provided in **Appendix I**.

Cumene

As shown on **Table 9**, cumene was detected in groundwater in the area at a concentration greater than the Groundwater MtsW RBSL (2.6 mg/L). The concentrations in groundwater ranged from 0.00034 mg/L to 7.2 mg/L.

Local groundwater flow in the vicinity of the GP R 790-series tank area and GP U 767 is toward the Schuylkill River to the southwest. Horizontal delineation of the cumene concentrations exceeding the



RBSL in the downgradient direction is provided by groundwater samples collected by Evergreen from wells B-172, B-156, B-176, and B-157.

The monitoring wells are shown on **Figure 9b** and provide an illustration of the spatial distribution of cumene in groundwater relative to the applicable RBSLs. Tables with the groundwater analytical results are provided in **Appendix I**.

Toluene

As shown on **Table 9**, toluene was detected in groundwater in the area at a concentration greater than the Resident Nonpotable Groundwater Use RBSL (25 mg/L). The concentrations in groundwater ranged from non-detect to 0.58 mg/L to 27 mg/L.

Local groundwater flow in the vicinity of the GP R 790-series tank area is toward the Schuylkill River to the southwest. Horizontal delineation of the toluene concentrations exceeding the RBSLs in the downgradient direction is provided by the groundwater sample collected from TG07-MW-08 and groundwater samples collected by Evergreen from wells B-172, B-156, and B-157. The monitoring wells are shown on **Figure 9c** and provide an illustration of the spatial distribution of benzene in groundwater relative to the applicable RBSLs. Tables with the groundwater analytical results are provided in **Appendix I**.

LNAPL Characterization Results

On December 4, 2023, a LNAPL characterization sample was collected from TG07-MW-06. The results of the LNAPL sampling are currently pending.

Horizontal delineation of LNAPL in the vicinity of the GP R 790-series tanks is provided by wells TG07-MW-04, TG07-MW-02, B-163, B-145, B-126, B-157, B-155, and B-154.

7.3.3 Vapor Intrusion

At this time, because there is no current vapor intrusion exposure in this area, and because future assessment will be conducted and exposure pathways will be mitigated as necessary, vapor intrusion exposure in the Tank Group 07 area is not a current or reasonably expected future exposure scenario and it was not considered in determining the need for additional Site Characterization sampling. However, Site Assessment and Site Characterization data were evaluated for potential future vapor intrusion exposure scenarios as part of the risk assessment in Section 8.

7.4 Data Quality Assurance, Quality Control, and Usability

While the Site Assessment and Characterization sampling data were not subject to formal data validation, elements were included to help assess data quality and usability of the results to support the project objectives. This included the collection of quality assurance/quality control samples, general quality control checks on the field and laboratory information, and an assessment of the impact of elevated reporting limits due to sample-specific interferences.



7.4.1 Quality Assurance/Quality Control Samples

During the Site Assessment/Characterization field activities, one trip blank sample per sample cooler and approximately 1 field blank per 10 soil samples was submitted to the analytical laboratory to evaluate potential cross-contamination during sample container shipment and storage. Results of the quality assurance and quality control sample analyses are provided in **Appendix I**. COPCs were not detected in blank samples at concentrations greater than the laboratory reporting limits. As such, there is no concern associated with laboratory cross-contamination and/or sampling-related cross-contamination for samples collected from the Site.

Approximately one field duplicate sample per every 20 soil samples was also collected to evaluate the variance in the sampling/analysis. Relative percent differences (RPDs) for duplicate pairs were calculated and ranged from 0 to 199 percent with an average of 89 percent. Overall, RPDs <50 percent generally represent the typical level of variability. Reasons for a higher RPDs can include sample heterogeneity or samples with high concentrations. Given that the predominant soil type sampled is anthropogenic fill some additional variability is expected and reasonable.

7.4.2 General Quality Control Checks

General quality control checks were also performed on the field information and laboratory analytical deliverables. This included checking and reviewing laboratory logins and completed chains of custody, confirming that the requested analyte lists were reported, and that the sample nomenclature conformed to the proposed sampling scope of work. In some cases, multiple analyses were reported by the laboratory and a general review of elements such as surrogate recoveries, qualifiers, analytical limits, and laboratory narratives were performed to identify which results would be used for a given sample. A log of these general checks is provided in **Appendix I** along with the methodology used to select between multiple results when provided by the analytical laboratory.



8 Risk Assessment

The site-specific risk assessment report (**Appendix C**) was prepared to document the methodology and results of a site-specific human health risk assessment performed in accordance with 25 Pa. Code § 250.409, to support a demonstration that conditions at the Site meet the tank closure performance standard in accordance with the Storage Tank and Spill Prevention Act (Act 32).

Based on the review of the soil and groundwater concentrations in comparison to the RBSLs and the spatial distribution of concentrations greater than these levels, the soil and groundwater sampling performed adequately defines the horizontal and vertical extent of COPCs to support a site-specific risk assessment.

Using soil and groundwater data collected in accordance with the Work Plan and *Site Characterization Sampling and Analysis Plan – Tank Group 07* submitted to PADEP on December 5, 2022, and the methodologies as described in Section 5 of the Risk Assessment, cumulative cancer risk and noncancer HI estimates for the exposure of current and reasonably expected future receptor populations (summarized in **Table 4 of the Risk Assessment**) to COPCs in soil and groundwater were calculated.

As discussed in Section 5.3 of the Risk Assessment, the Risk Assessment identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion) and construction workers (via direct contact) from exposure to COCs in soil in the area of Tank Group 07. It also identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion), maintenance workers (via direct contact), and construction workers (via direct contact) from exposure to COCs in groundwater in the area of Tank Group 07.

The following discusses these results by environmental media and locations on the Site that would warrant consideration for risk management action.

8.1 Soil

As presented on **Table 7 of the Risk Assessment**, locations with soil COPC concentrations that could result in cumulative cancer risk and/or HI estimates for potential routine workers via vapor intrusion from soil that are above the risk management goals include GPR1116-07, GPR1117-03, GPR790-01, GPR790-02, GPR790-05, GPR791-01, GPR791-03, GPR791-04, GPR791-06, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR792-07, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR793-05, GPR793-06, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-07, GPR794-08, GPR798-04, and GPR799-08 (**Figure 12**). These unacceptable cancer risk and/or HI estimates are predominately driven by benzene, cumene, toluene, 1,2,4-TMB, 1,3,5-TMB, xylenes (total), and naphthalene.

As presented on **Table 7 of the Risk Assessment**, locations with soil COPC concentrations that could result in HI estimates above the risk management goal for potential construction workers via soil direct contact soil include GPR790-01, GPR790-05, GPR791-01, GPR791-04, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-08, and GPR798-04. These unacceptable HI



estimates are predominately driven by benzene, cumene, toluene, 1,2,4-TMB, xylenes (total), B(a)P, and naphthalene.

8.2 Groundwater

As presented on **Table 9 of the Risk Assessment**, locations with groundwater COPC concentrations that could result in cumulative cancer risk and/or HI estimates above the risk management goals for potential routine workers via vapor intrusion from groundwater, maintenance worker groundwater direct contact, and construction worker groundwater direct contact include TG07-MW-07, B-149, B-150, B-154, B-155, B-177, and B-179 (**Figure 13**). These unacceptable cancer risk and/or HI estimates are predominately driven by benzene.

8.3 Conclusion

Exposure of routine workers to COCs via soil vapor intrusion and of construction workers to COCs via soil direct contact may warrant risk management action. Exposure of routine workers to COCs via groundwater vapor intrusion and of maintenance and construction workers to COCs via groundwater direct contact may warrant risk management. All other exposure scenarios do not warrant risk management.

As discussed in Section 7.3.3, potentially unacceptable vapor intrusion exposures will be managed separately following additional characterization/evaluation and eventually through pathway elimination, and therefore, no further risk management action for this exposure pathway is proposed. To facilitate remedial action planning for all other exposure pathways, SSS for each of the COCs were developed. These SSS, if achieved in the Tank Group 07 area, would achieve acceptable risk/HI for each receptor exposure scenario under current and reasonably expected future land/groundwater use. The development of the SSS is further detailed in Section 6 of the Risk Assessment.

The overall SSS that would achieve an acceptable risk/HI for receptor exposure to soil in the area are as follows:

- Benzene: 130 mg/kg
- Cumene: 680 mg/kg
- Toluene: 1,200 mg/kg
- 1,2,4-TMB: 36 mg/kg
- Xylenes (total): 110 mg/kg
- B(a)P: 3.9 mg/kg
- Naphthalene: 4.4 mg/kg

The overall SSS that would achieve an acceptable risk/HI for groundwater is:

- Benzene: 11 mg/L



9 Ecological Screening Evaluation

The following describes the ecological screening evaluation that was performed for the Site. This evaluation was conducted in accordance with 25 PA Code § 250.311, as specified in 25 PA Code § 245.310(28). The regulatory framework for conducting an ecological screening evaluation under the Site-Specific Standard is outlined in Section III.I and summarized in the Ecological Screening Flow Chart provided in Figure III-11 of PADEP’s Land Recycling Program Technical Guidance Manual (2021). Under the Site-Specific standard, PADEP generally follows the USEPA Ecological Risk Assessment Guidance for Superfund (USEPA 1997). The USEPA ecological risk assessment process is comprised of eight steps.

The Initial Screening phase of the process consists of Steps 1 and 2, as follows:

- Step 1: Fundamental Components (Screening-level Problem Formulation and Ecological Effects Evaluation).
- Step 2: Preliminary Exposure Estimate and Risk Assessment.

As indicated on Figure III-11 the Technical Guidance Manual, after completion of the Initial Screen (Steps 1 and 2), the qualified investigator decides whether there exists substantial risk of ecological harm to species or habitats of concern. If not, then, no further ecological evaluation would be warranted.

Under Step 1 of the Initial Screen, a preliminary evaluation is performed to determine whether there is potential for impact on species or habitats of concern. In order to evaluate this, Terraphase first conducted an assessment to determine whether species or habitats of concern are present at the site. If species or habitats of concern are not identified, the completion of Step 2 and any subsequent steps in the ecological risk assessment process are not warranted. The evaluation of whether species or habitats of concern are present at the site consisted of the following:

- A search of PADEP’s Pennsylvania Natural Diversity Inventory (PNDI) database.
- Site reconnaissance.

The PNDI search was performed for the Site and also a conservative study area that consisted of the Site and areas within a 2,500 foot radius of the site. The results of the PNDI search for the Site indicated no threatened and endangered species and/or special concern species and resources are present. The results of the PNDI search for the study area indicated that further review by the PA Game Commission, The PA Department of Conservation and Natural Resources (DCNR), and the PA Fish and Boat Commission was warranted. Accordingly, Terraphase submitted a request for further review to the three entities. Based on further review by the PA Game Commission, DCNR, and PA Fish and Boat Commission, no potential impacts to species or habitats of concern were identified within the study area. The results of the PNDI searches and subsequent correspondence with the PA Fish and Boat Commission are provided as **Appendix K**.

Because species or habitats of concern were not identified, the completion of Step 2 and any subsequent steps in the ecological risk assessment process are not warranted. As such, no further ecological screening is required.



10 Summary and Conclusions

Terraphase has prepared this Report, on behalf of PESRM, to detail the results of the Site Assessment and Site Characterization activities and to provide the supporting information demonstrating that adequate characterization has been performed for a reliable determination of the need for remedial action based on the selected standard.

The Site Assessment and Site Characterization activities described in this Report were performed in accordance with the applicable provisions of Act 32, 25 PA Code Chapter 245 (Subchapter D), and Terraphase’s Work Plan (2021). The specific ASTs addressed in this Report include:

- GP R 1117 (PADEP No. 005A)
- GP R 791 (PADEP No. 006A)
- GP R 798 (PADEP No. 007A)
- GP R 494 (PADEP No. 029A)
- GP R 1116 (PADEP No. 030A)
- GP R 1088 (PADEP No. 033A)
- GP R 790 (PADEP No. 034A)
- GP R 792 (PADEP No. 035A)
- GP R 793 (PADEP No. 036A)
- GP R 794 (PADEP No. 037A)
- GP R 799 (PADEP No. 039A)
- GP U 767 (PADEP No. 046A)

Visual observations of the ASTs in Tank Group 07 revealed no indications of release. Based upon the results, no evidence of a release from GP R 1088 was identified. The Site Assessment outcome for GP R 1088 is “No Obvious Contamination – Sample Results Meet Action Levels”.

Based upon the results of soil samples collected during the Site Assessment and a comparison to generic MSCs, potential releases of regulated substances to the environment from GP R 494, GP R 790, GP R 791, GP R 792, GP R 793, GP R 794, GP R 798, GP R 799, GP U 767, GP R 1116, and GP R 1117 were identified. The Site Assessment outcome category for these ASTs is “No Obvious Contamination – Sample Results Do Not Meet Action Levels”. Notifications of release were submitted to the PADEP on August 10, 2022 and August 25, 2022. PADEP assigned the releases in Tank Group 07 to Incident No. 57973. The notifications indicated that unknown amounts of petroleum-related substances were potentially released in Tank Group 07 from these ASTs.

Site Characterization soil and groundwater sampling were subsequently performed in Tank Group 07. The results of the investigations identified soil and groundwater COPCs at concentrations greater than site-specific RBSLs. The results of the sampling have indicated that COPCs have been adequately characterized with respect to the RBSLs.

The potential significance of COPC concentrations were evaluated via a site-specific risk assessment. The risk assessment demonstrates that exposure of routine workers to COCs via soil vapor intrusion and of construction workers to COCs via soil direct contact may warrant risk management action. Exposure of routine workers to COCs via groundwater vapor intrusion and of maintenance and construction workers to COCs via groundwater direct contact may warrant risk management. All other exposure scenarios do not warrant risk management.



As discussed in Section 7.3.3, potentially unacceptable vapor intrusion exposures will be managed separately following additional characterization/evaluation and eventually through pathway elimination, and therefore, no further risk management action for this exposure pathway is proposed. To facilitate remedial action planning for all other exposure pathways, SSS for each of the COCs were developed. These SSS, if achieved in the Tank Group 07 area, would achieve acceptable risk/HI for each receptor exposure scenario under current and reasonably expected future land/groundwater use. The development of the SSS is further detailed in Section 6 of the Risk Assessment.

The overall SSS that would achieve an acceptable risk/HI for receptor exposure to soil in the area are as follows:

- Benzene: 130 mg/kg
- Cumene: 680 mg/kg
- Toluene: 1,200 mg/kg
- 1,2,4-TMB: 36 mg/kg
- Xylenes (total): 110 mg/kg
- B(a)P: 3.9 mg/kg
- Naphthalene: 4.4 mg/kg

The overall SSS that would achieve an acceptable risk/HI for groundwater is:

- Benzene: 11 mg/L

Upon approval of this Site Characterization Report, PESRM will prepare and submit a Remedial Action Plan (RAP) for Tank Group 07. As described in Section 4, soil and groundwater in and around Tank Group 07 has been impacted by historical releases to the environment. PESRM is aware that Evergreen is in the process of conducting remediation pilot tests in the area west of tanks 790-799. PESRM plans to coordinate with Evergreen regarding responsibility for any necessary actions to address unacceptable risks to receptors in this area of the Facility. The forthcoming RAP will describe whether PESRM or Evergreen will be responsible for ongoing and future risk management actions in Tank Group 07.

11 References

- Evergreen. 2021. *Letter to Ms. Lisa Strobridge. RE: PADEP Comments – Public Involvement Remedial Investigation Report*. eFACTS PF No. 780190. August 28.
- GHD. 2017a. *Remedial Investigation Report, AOI 6*. November 17.
- . 2017b. *Site Characterization Report/Remedial Action Completion report for Aboveground Storage Tanks T 81, 676, and 797*. November 21.
- Pennsylvania Department of Environmental Protection (PADEP). 2021. *Closure Requirements for Aboveground Storage Tank Systems*. April 10.
- . 2021. *Land Recycling Program Technical Guidance Manual*. March 27.
- . 2022. *Site Assessment Sampling Requirements at Regulated Storage Tank System Closures*. February 7.
- Stantec. 2022. *Sitewide Fate and Transport Remedial Investigation Report*. June 30.
- Terraphase Engineering Inc. (Terraphase). 2021. *Aboveground Storage Tank Closure Work Plan*. March.
- . 2022. *Site Characterization Sampling and Analysis Plan – Tank Group 07*. December.



Tables

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Table 1

Aboveground Storage Tank Details

Philadelphia Energy Systems Refinery and Marketing, Philadelphia, PA

Facility	Tank Group	State Regulation Number	Tank Number	Design Capacity (gal)	Primary Product	Proposed Analyte List ^x	Regulatory Status	Facility ID	Status Modification Date	Tank Type	Double Bottom	Diameter (ft)	Height (ft)	Remaining Liquid (gal)	GPS Survey Complete	Demo Complete	Storage Tanks Reg./Permit App Form Submitted	Release Notification	Incident No.	Int. Remedial/Corrective Action Required
Girard Point	7	005A	GP R 1117	1,016,400	Udex Feed	Short List 1-5	R	51-33624	10/4/2021	EFR	N	60	48		Y	Y	11/1/2021	8/10/2022	57973	
Girard Point	7	006A	GP R 791	84,000	Benzene	Benzene	R	51-33624	2/21/2022	IFR	N	25	24		Y	Y	2/28/2022	8/25/2022	57973	
Girard Point	7	007A	GP R 798	84,000	Benzene	Benzene	R	51-33624	2/21/2022	IFR	N	25	24		Y	Y	2/28/2022	8/10/2022	57973	
Girard Point	7	029A	GP R 494	1,260,000	Main Frac Bottoms	Short List 1-5	R	51-33624	4/14/2022	Cone Roof	N	85	30		Y	Y	5/5/2022	8/25/2022	57973	
Girard Point	7	030A	GP R 1116	1,016,400	Udex Feed	Short List 1-5	R	51-33624	10/4/2021	EFR	Y, Removed	60	48		Y	Y	11/1/2021	8/10/2022	57973	
Girard Point	7	033A	GP R 1088	26,418	Caustic, Fresh	pH	R	51-33624	7/8/2022	Dome Roof	N	15	20		Y	Y	7/13/2022			
Girard Point	7	034A	GP R 790	84,000	Benzene	Benzene	R	51-33624	2/21/2022	IFR	N	25	24		Y	Y	2/28/2022	8/25/2022	57973	
Girard Point	7	035A	GP R 792	105,000	Cumene	Cumene	R	51-33624	2/21/2022	Cone Roof	Y, Removed	25	30		Y	Y	2/28/2022	8/25/2022	57973	
Girard Point	7	036A	GP R 793	105,000	Cumene	Cumene	R	51-33624	2/21/2022	Cone Roof	N	25	30		Y	Y	2/28/2022	8/25/2022	57973	
Girard Point	7	037A	GP R 794	84,000	Tetraethylene Glycol	TEG, Short List 1-5	R	51-33624	2/21/2022	IFR	Y, Removed	25	24		Y	Y	2/28/2022	8/25/2022	57973	
Girard Point	7	039A	GP R 799	84,000	Benzene	Benzene	R	51-33624	2/21/2022	IFR	N	25	24		Y	Y	2/28/2022	8/10/2022	57973	
Girard Point	7	046A	GP U 767	42,000	Recovered Oil	Short List 1-6	R	51-33624	7/8/2022	IFR	N	20	21		Y	Y	7/13/2022	8/25/2022	57973	

Abbreviations:

EFR -- External Floating Roof

IRF -- Internal Floating Roof

TEG -- Tetraethylene Glycol

Table 2

Site-Specific Risk Based Screening Levels (Target Risk of 1x10⁻⁵ and HQ of 0.1)

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Chem Group	Chemical	CASRN	Soil				Groundwater					
			Routine Worker Direct Contact (mg/kg)	Routine Worker Vapor Intrusion (mg/kg)	Construction Worker Direct Contact (mg/kg)	Soil MtGW (mg/kg)	Nonpotable Groundwater Use (mg/L)	Routine Worker Volatilization to Outdoor Air (mg/L)	Routine Worker Vapor Intrusion (mg/L)	Construction Worker Direct Contact (mg/L)	Off-Site Resident Vapor Intrusion (mg/L)	Groundwater MTSW (mg/L)
VOC	Benzene	71-43-2	6.3E+01	4.6E-01	8.7E+00	9.8E+01	3.0E-01	5.5E+02	3.8E+00	4.0E+00	2.5E-01	1.3E+02
VOC	Cumene	98-82-8	1.0E+03	6.1E+00	8.7E+01	1.0E+03	3.7E+01	9.1E+03	6.3E+01	3.0E+01	4.0E+00	2.6E+00
VOC	1,2-Dibromoethane	106-93-4	1.2E+00	7.1E-03	1.8E+00	3.2E+00	1.7E-02	1.6E+01	1.1E-01	9.1E-01	7.9E-03	NSW
VOC	1,2-Dichloroethane	107-06-2	1.6E+01	1.1E-01	8.1E+00	3.3E+01	3.3E-01	1.7E+02	1.2E+00	4.9E+00	8.2E-02	3.1E+03
VOC	Ethyl Benzene	100-41-4	2.3E+03	1.5E+01	1.3E+03	8.2E+02	2.0E+00	2.2E+04	1.5E+02	4.0E+01	9.7E+00	1.3E+01
VOC	Methyl tert-butyl ether	1634-04-4	2.4E+03	1.6E+01	3.9E+02	5.9E+03	2.1E+01	2.9E+04	2.1E+02	1.9E+02	1.5E+01	1.1E+04
VOC	Toluene	108-88-3	8.0E+03	7.6E+01	6.5E+02	9.8E+03	2.5E+01	1.0E+05	7.0E+02	2.0E+02	4.5E+01	5.2E+01
VOC	1,2,4-Trimethylbenzene	95-63-6	1.8E+02	9.2E-01	7.0E+01	2.5E+02	8.7E+00	1.4E+03	9.7E+00	1.5E+01	6.3E-01	3.3E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	2.2E+02	9.2E-01	9.9E+01	2.4E+02	8.8E+00	1.3E+03	9.1E+00	1.5E+01	5.9E-01	7.1E+01
VOC	Xylenes (total)	1330-20-7	2.4E+02	1.5E+00	5.1E+01	3.4E+02	3.7E+00	1.9E+03	1.3E+01	1.7E+01	8.6E-01	2.1E+02
SVOC	Acenaphthene	83-32-9	9.3E+03	WIT	9.2E+03	NA	5.7E+01	WIT	WIT	3.9E+03	WIT	9.0E+00
SVOC	Anthracene	120-12-7	4.6E+04	WIT	4.6E+04	NA	2.4E+02	WIT	WIT	1.9E+04	WIT	4.0E+01
SVOC	Benzo(a)anthracene	56-55-3	4.3E+02	NV	3.2E+03	NA	1.0E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Benzo(a)pyrene	50-32-8	4.3E+01	NV	7.7E+00	NA	1.0E-02	NV	NV	5.8E+00	NV	1.3E-03
SVOC	Benzo(b)fluoranthene	205-99-2	4.3E+02	NV	3.2E+03	NA	1.6E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	4.6E+03	NV	1.4E+04	NA	4.4E+01	NV	NV	5.8E+03	NV	1.2E-02
SVOC	Benzo(k)fluoranthene	207-08-9	4.3E+03	NV	3.2E+04	NA	9.9E-01	NV	NV	1.4E+04	NV	1.3E-01
SVOC	Chrysene	218-01-9	4.3E+04	NV	3.2E+05	NA	1.6E+01	NV	NV	1.4E+05	NV	1.3E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	4.3E+01	NV	3.2E+02	NA	9.8E-03	NV	NV	1.4E+02	NV	1.3E-03
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	2.0E-01	NV	1.3E+00	2.0E+00	3.9E-05	NV	NV	5.5E-01	NV	NSW
SVOC	Ethanol	64-17-5	1.0E+06	NV	1.0E+06	1.0E+06	1.0E+04	NV	NV	8.3E+05	NV	NSW
SVOC	Fluorene	86-73-7	6.2E+03	WIT	1.8E+04	NA	9.7E+01	WIT	WIT	7.8E+03	WIT	7.0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.3E+02	NV	3.2E+03	NA	1.0E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Naphthalene	91-20-3	4.1E+01	5.4E-01	6.0E+00	2.7E+01	3.9E-01	1.2E+02	8.8E-01	2.8E-01	6.7E-02	4.3E+01
SVOC	Phenanthrene	85-01-8	4.6E+03	WIT	1.4E+04	NA	7.3E+01	WIT	WIT	5.8E+03	WIT	1.0E+00
SVOC	Pyrene	129-00-0	4.6E+03	NV	1.4E+04	NA	5.0E+01	NV	NV	5.8E+03	NV	3.0E+00
SVOC	Tetraethylene Glycol	112-60-7	3.5E+05	NV	9.6E+04	1.2E+05	2.9E+02	NV	NV	3.9E+04	NV	1.9E+05
PCB	PCBs (total)	1336-36-3	3.0E+00	NV	2.3E+00	NA	1.5E-02	NV	NV	9.7E-01	NV	6.4E-04
INORG	Antimony	7440-36-0	1.3E+02	NV	2.3E+01	2.0E+01	2.2E-02	NV	NV	1.4E+00	NV	6.4E+01
INORG	Arsenic	7440-38-2	7.1E+01	NV	1.0E+02	1.2E+01	2.1E-02	NV	NV	5.3E+01	NV	1.4E+00
INORG	Chromium III	16065-83-1	4.6E+05	NV	2.9E+04	1.0E+06	1.1E+01	NV	NV	5.3E+02	NV	7.4E+01
INORG	Chromium VI	18540-29-9	1.8E+02	NV	2.8E+02	1.5E+00	3.9E-03	NV	NV	1.7E+00	NV	1.1E+01
INORG	Cyanide (total)	57-12-5	1.5E+01	8.6E-01	8.8E+00	9.9E+00	3.0E-01	2.4E+01	2.4E-01	2.6E-01	2.5E-02	4.0E+01
INORG	Lead	7439-92-1	2.5E+03	NV	2.5E+03	4.5E+04	IE	NV	NV	IE	NV	2.5E+00
INORG	Nickel	7440-02-0	6.2E+03	NV	7.0E+02	1.7E+03	1.3E+00	NV	NV	8.6E+01	NV	5.2E+01
INORG	Vanadium	7440-62-2	1.6E+03	NV	3.5E+02	2.8E+03	1.4E-01	NV	NV	6.9E+00	NV	1.0E+02

Abbreviations:

Chem Group - chemical group

INORG - metals

SVOC - semi-volatile organic compounds

VOC - volatile organic compounds

MtGW - migration to groundwater

MtSW - migration to surface water

NV - not volatile

WIT - without inhalation toxicity data

NA - not applicable: target groundwater concentration times DAF is greater than constituent's solubility.

IE - inadequate exposure

NSW - no surface water quality criteria available

Table 3**Evergreen Comprehensive List, Constituents of Concern (COC)**

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Chem Group	Chemical	CASRN
VOC	Benzene	71-43-2
VOC	sec-Butylbenzene	135-98-8
VOC	tert-Butylbenzene	98-06-6
VOC	Cumene	98-82-8
VOC	Cyclohexane	110-82-7
VOC	1,2-Dibromoethane	106-93-4
VOC	1,2-Dichloroethane	107-06-2
VOC	Ethyl Benzene	100-41-4
VOC	n-Hexane	110-54-3
VOC	Methyl tert-butyl ether	1634-04-4
VOC	Toluene	108-88-3
VOC	1,2,4-Trimethylbenzene	95-63-6
VOC	1,3,5-Trimethylbenzene	108-67-8
VOC	Xylenes (total)	1330-20-7
SVOC	Acenaphthene	83-32-9
SVOC	Anthracene	120-12-7
SVOC	Benzo(a)anthracene	56-55-3
SVOC	Benzo(a)pyrene	50-32-8
SVOC	Benzo(b)fluoranthene	205-99-2
SVOC	Benzo(g,h,i)perylene	191-24-2
SVOC	Benzo(k)fluoranthene	207-08-9
SVOC	1,1-Biphenyl	92-52-4
SVOC	Chrysene	218-01-9
SVOC	Dibenz(a,h)anthracene	53-70-3
SVOC	2,4-Dimethylphenol	105-67-9
SVOC	2,4-Dinitrophenol	51-28-5
SVOC	Fluoranthene	206-44-0
SVOC	Fluorene	86-73-7
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5
SVOC	2-Methylnaphthalene	91-57-6
SVOC	2-Methylphenol	95-48-7
SVOC	3-Methylphenol	108-39-4
SVOC	4-Methylphenol	106-44-5
SVOC	Naphthalene	91-20-3
SVOC	4-Nitrophenol	100-02-7
SVOC	Phenanthrene	85-01-8
SVOC	Phenol	108-95-2
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7
SVOC	Diethylphthalate	84-66-2
SVOC	Di-n-butylphthalate	84-74-2
SVOC	Pyrene	129-00-0
SVOC	Pyridine	110-86-1
SVOC	1-Benzazine	91-22-5
INORG	Cobalt	7440-48-4
INORG	Lead	7439-92-1
INORG	Nickel	7440-02-0
INORG	Vanadium	7440-62-2
INORG	Zinc	7440-66-6

Table 4a

Soil Results Compared to Risk Based Screening Levels

Tank Group 07 (Historical)

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Chem Group	Chemical	CASRN	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Routine Worker Direct Contact (mg/kg)	Ratio of Max Detect to Routine Worker Direct Contact	Construction Worker Direct Contact (mg/kg)	Ratio of Max Detect to Construction Worker Direct Contact	Soil MtGW Screening Level (mg/kg)	Ratio of Max Detect to Soil MtGW
SOIL	VOC	Benzene	71-43-2	101	64	0.00040	150	1900	63	29	8.7	210	98	19
SOIL	VOC	sec-Butylbenzene	135-98-8	6	1	1.8	1.8	1.8						
SOIL	VOC	Cumene	98-82-8	88	57	0.0010	630	8500	1000	8.5	87	98	1000	8.5
SOIL	VOC	1,2-Dibromoethane	106-93-4	83	1	0.13	0.13	0.13	1.2	0.11	1.8	0.072	3.2	0.041
SOIL	VOC	Ethyl Benzene	100-41-4	88	29	0.0010	13	80	2300	0.035	1300	0.062	820	0.10
SOIL	VOC	Methyl tert-butyl ether	1634-04-4	80	1	0.00054	0.00054	0.00054	2400	0.00000023	390	0.0000014	5900	0.00000092
SOIL	VOC	Toluene	108-88-3	88	49	0.00040	250	2100	8000	0.26	650	3.2	9800	0.21
SOIL	VOC	1,2,4-Trimethylbenzene	95-63-6	72	26	0.00055	4.2	50	180	0.28	70	0.71	250	0.20
SOIL	VOC	1,3,5-Trimethylbenzene	108-67-8	72	19	0.0041	2.9	18	220	0.082	99	0.18	240	0.075
SOIL	VOC	Xylenes (total)	1330-20-7	88	50	0.00044	36	380	240	1.6	51	7.5	340	1.1
SOIL	SVOC	Acenaphthene	83-32-9	6	3	0.0050	0.50	1.5	9300	0.00016	9200	0.00016		
SOIL	SVOC	Anthracene	120-12-7	84	66	0.0040	1.0	8.0	46000	0.00017	46000	0.00017		
SOIL	SVOC	Benzo(a)anthracene	56-55-3	84	79	0.0080	1.0	13	430	0.029	3200	0.0039		
SOIL	SVOC	Benzo(a)pyrene	50-32-8	84	79	0.0090	1.0	14	43	0.33	7.7	1.8		
SOIL	SVOC	Benzo(b)fluoranthene	205-99-2	84	77	0.014	1.2	14	430	0.032	3200	0.0043		
SOIL	SVOC	Benzo(g,h,i)perylene	191-24-2	84	77	0.0090	0.70	5.3	4600	0.0012	14000	0.00038		
SOIL	SVOC	Benzo(k)fluoranthene	207-08-9	6	6	0.011	0.038	0.083	4300	0.000019	32000	0.0000026		
SOIL	SVOC	1,1-Biphenyl	92-52-4	6	1	1.0	1.0	1.0						
SOIL	SVOC	Chrysene	218-01-9	84	80	0.010	1.4	15	43000	0.00035	320000	0.000047		
SOIL	SVOC	Dibenz(a,h)anthracene	53-70-3	6	6	0.0074	0.03	0.088	43	0.0020	320	0.00028		
SOIL	SVOC	Fluoranthene	206-44-0	6	6	0.013	0.10	0.39						
SOIL	SVOC	Fluorene	86-73-7	92	62	0.0050	2.2	35	6200	0.0056	18000	0.0019		
SOIL	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	6	6	0.014	0.070	0.16	430	0.00037	3200	0.000050		
SOIL	SVOC	2-Methylnaphthalene	91-57-6	6	6	0.0046	2.2	13						
SOIL	SVOC	Naphthalene	91-20-3	97	61	0.0060	1.7	18	41	0.44	6.0	3.0	27	0.67
SOIL	SVOC	Phenanthrene	85-01-8	84	82	0.0060	3.4	38	4600	0.0083	14000	0.0027		
SOIL	SVOC	Pyrene	129-00-0	84	80	0.015	1.9	18	4600	0.0039	14000	0.0013		
Soil	PFAS	Perfluorononanoic acid	375-95-1	5	2	0.00076	0.0018	0.0029						
Soil	PFAS	Perfluorooctane Sulfonic Acid	1763-23-1	5	4	0.00033	0.0039	0.014						
Soil	PFAS	Perfluorooctanoic Acid	335-67-1	5	2	0.00048	0.00079	0.0011						
SOIL	INORG	Cobalt	7440-48-4	6	6	3.7	5.8	9.7						
SOIL	INORG	Lead	7439-92-1	88	88	2.8	270	7500	2520	3.0	2520	3.0	45000	0.17
SOIL	INORG	Nickel	7440-02-0	6	6	15	54	150	6200	0.024	700	0.21	1700	0.088
SOIL	INORG	Vanadium	7440-62-2	6	6	35	170	320	1600	0.20	350	0.92	2800	0.11
SOIL	INORG	Zinc	7440-66-6	6	6	25	120	310						

Notes:

Only constituents detected are shown.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the criteria for Xylenes (total).

Ratios of concentration to the RBSLs greater than 1 are shaded in bold.

Chem Group - chemical group; INORG - metals; PFAS - Per- and Polyfluoroalkyl Substances; SVOC - semi-volatile organic compounds; VOC - volatile organic compounds; PFAS - Per- and Polyfluoroalkyl Substances

Table 4b

Groundwater Compared to Risk Based Screening Levels

Tank Group 07 (Historical)

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Analyzed	Detected	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Nonpotable Groundwater Use (mg/L)	Ratio of Max Detect to Nonpotable Groundwater Use	Routine Worker Volatilization to Outdoor Air (mg/L)	Ratio of Max Detect to Routine Worker Volatilization to Outdoor Air	Routine Worker Vapor Intrusion (mg/L)	Ratio of Max Detect to Routine Worker Vapor Intrusion	Construction Worker Direct Contact (mg/L)	Ratio of Max Detect to Construction Worker Direct Contact	Groundwater Migration to Surface Water (mg/L)	Ratio of Max Detect to Groundwater Migration to Surface Water
Groundwater	unconfined	VOC	Benzene	71-43-2	T	140	89	0.00031	68	610	0.30	2000	550	1.1	3.8	160	4.0	150	130	4.7
Groundwater	unconfined	VOC	Cumene	98-82-8	T	140	98	0.00028	1.0	13	37	0.36	9100	0.0015	63	0.21	30	0.44	2.6	5.1
Groundwater	unconfined	VOC	1,2-Dibromoethane	106-93-4	T	134	3	0.000051	0.000069	0.000089	0.017	0.0052	16	0.000056	0.11	0.00081	0.91	0.00010		
Groundwater	unconfined	VOC	1,2-Dichloroethane	107-06-2	T	134	1	0.14	0.14	0.14	0.33	0.42	170	0.00082	1.2	0.12	4.9	0.029	3100	0.000045
Groundwater	unconfined	VOC	Ethyl Benzene	100-41-4	T	140	58	0.00020	0.19	0.95	2.0	0.48	22000	0.000043	150	0.0064	40	0.024	13	0.073
Groundwater	unconfined	VOC	Methyl tert-butyl ether	1634-04-4	T	140	10	0.00020	0.0020	0.0085	21	0.00040	29000	0.0000029	210	0.000040	190	0.000045	11000	0.0000077
Groundwater	unconfined	VOC	tert Butyl alcohol	75-65-0	T	18	2	0.0058	0.043	0.080										
Groundwater	unconfined	VOC	Toluene	108-88-3	T	140	67	0.00039	8.7	62	25	2.5	100000	0.00062	700	0.089	200	0.31	52	1.2
Groundwater	unconfined	VOC	1,2,4-Trimethylbenzene	95-63-6	T	104	50	0.00023	0.10	1.2	8.7	0.14	1400	0.00088	9.7	0.13	15	0.082	33	0.037
Groundwater	unconfined	VOC	1,3,5-Trimethylbenzene	108-67-8	T	104	38	0.00070	0.040	0.36	8.8	0.041	1300	0.00028	9.1	0.040	15	0.024	71	0.0051
Groundwater	unconfined	VOC	Xylenes (total)	1330-20-7	T	140	76	0.00050	0.65	3.9	3.7	1.1	1900	0.0021	13	0.30	17	0.23	210	0.019
Groundwater	unconfined	SVOC	Anthracene	120-12-7	T	100	84	0.000044	0.0029	0.025	240	0.00010					19000	0.000013	40	0.00062
Groundwater	unconfined	SVOC	Benzo(a)anthracene	56-55-3	T	100	71	0.000013	0.0016	0.066	0.10	0.66					1400	0.000047	0.013	5.1
Groundwater	unconfined	SVOC	Benzo(a)pyrene	50-32-8	T	100	58	0.000015	0.0025	0.12	0.010	12					5.8	0.020	0.0013	88
Groundwater	unconfined	SVOC	Benzo(b)fluoranthene	205-99-2	T	100	59	0.000020	0.0033	0.16	0.16	1.0					1400	0.00012	0.013	12
Groundwater	unconfined	SVOC	Benzo(g,h,i)perylene	191-24-2	T	100	43	0.000016	0.0030	0.12	44	0.0027					5800	0.000020	0.012	9.8
Groundwater	unconfined	SVOC	Chrysene	218-01-9	T	131	73	0.000017	0.0072	0.30	16	0.019					140000	0.0000021	1.3	0.23
Groundwater	unconfined	SVOC	Fluorene	86-73-7	T	130	105	0.000018	0.012	0.051	97	0.00053					7800	0.000065	7.0	0.0073
Groundwater	unconfined	SVOC	Naphthalene	91-20-3	T	137	74	0.000064	0.064	0.57	0.39	1.5	120	0.0048	0.88	0.65	0.28	2.0	43	0.013
Groundwater	unconfined	SVOC	Phenanthrene	85-01-8	T	131	97	0.000036	0.016	0.20	73	0.0027					5800	0.000034	1.0	0.20
Groundwater	unconfined	SVOC	Pyrene	129-00-0	T	131	98	0.000035	0.010	0.40	50	0.0080					5800	0.000069	3.0	0.13
Groundwater	unconfined	INORG	Lead	7439-92-1	D	101	31	0.000073	0.0023	0.034									2.5	0.014
Groundwater	unconfined	INORG	Lead	7439-92-1	T	30	2	0.0015	0.0091	0.017									2.5	0.0066
Groundwater	NA	PFAS	Perfluorobutane Sulfonate	375-73-5	T	4	1	0.000015	0.000015	0.000015										
Groundwater	NA	PFAS	Perfluoroheptanoic acid	375-85-9	T	4	4	0.0000037	0.000043	0.00014										
Groundwater	NA	PFAS	Perfluorohexanesulfonic acid	355-46-4	T	4	3	0.0000036	0.000012	0.000019										
Groundwater	NA	PFAS	Perfluorononanoic acid	375-95-1	T	4	4	0.0000045	0.000037	0.000081										
Groundwater	NA	PFAS	Perfluorooctane Sulfonic Acid	1763-23-1	T	4	4	0.0000017	0.0000070	0.000010										
Groundwater	NA	PFAS	Perfluorooctanoic Acid	335-67-1	T	4	4	0.000012	0.000058	0.00018										
Groundwater	lower aquifer	VOC	Benzene	71-43-2	T	13	1	0.14	0.14	0.14	0.30	0.47	550	0.00026	3.8	0.037	4.0	0.035	130	0.0011
Groundwater	lower aquifer	VOC	Cumene	98-82-8	T	13	1	0.00070	0.00070	0.00070	37	0.00019	9100	0.00000077	63	0.00011	30	0.00023	2.6	0.0003
Groundwater	lower aquifer	VOC	Methyl tert-butyl ether	1634-04-4	T	13	11	0.0014	0.0047	0.012	21	0.00057	29000	0.00000041	210	0.000057	190	0.000063	11000	0.0000011
Groundwater	lower aquifer	VOC	tert Butyl alcohol	75-65-0	T	4	4	0.56	0.65	0.73										
Groundwater	lower aquifer	VOC	Toluene	108-88-3	T	13	1	0.00072	0.00072	0.00072	25	0.00029	100000	0.000000072	700	0.0000010	200	0.0000036	52	0.000014
Groundwater	lower aquifer	SVOC	Anthracene	120-12-7	T	7	6	0.00011	0.00029	0.00042	240	0.000018					19000	0.00000022	40	0.000011
Groundwater	lower aquifer	SVOC	Benzo(a)anthracene	56-55-3	T	7	2	0.000044	0.00038	0.00072	0.10	0.0072					1400	0.00000051	0.013	0.055
Groundwater	lower aquifer	SVOC	Benzo(b)fluoranthene	205-99-2	T	7	1	0.00050	0.00050	0.00050	0.16	0.0031					1400	0.00000036	0.013	0.038
Groundwater	lower aquifer	SVOC	Chrysene	218-01-9	T	12	2	0.000034	0.00014	0.00024	16	0.000015					140000	0.000000017	1.3	0.00018
Groundwater	lower aquifer	SVOC	Fluorene	86-73-7	T	12	7	0.00023	0.0010	0.0023	97	0.000024					7800	0.00000029	7.0	0.00033
Groundwater	lower aquifer	SVOC	Naphthalene	91-20-3	T	12	4	0.000061	0.00017	0.00034	0.39	0.00087	120	0.000028	0.88	0.00039	0.28	0.0012	43	0.000079
Groundwater	lower aquifer	SVOC	Phenanthrene	85-01-8	T	12	7	0.00011	0.0010	0.0024	73	0.000033					5800	0.00000041	1.0	0.0024
Groundwater	lower aquifer	SVOC	Pyrene	129-00-0	T	12	8	0.00010	0.00046	0.0010	50	0.000020					5800	0.00000017	3.0	0.00033
Groundwater	lower aquifer	INORG	Arsenic	7440-38-2	D	7	1	0.0018	0.0018	0.0018	0.021	0.086					53	0.000034	1.4	0.0013
Groundwater	lower aquifer	INORG	Arsenic	7440-38-2	T	7	4	0.0013	0.0018	0.0023	0.021	0.11					53	0.000043	1.4	0.0016
Groundwater	lower aquifer	INORG	Lead	7439-92-1	D	11	2	0.00018	0.0027	0.0052									2.5	0.0021
Groundwater	lower aquifer	INORG	Lead	7439-92-1	T	9	2	0.00096	0.0037	0.0064									2.5	0.0026
Groundwater	lower aquifer	INORG	Manganese	7439-96-5	D	7	7	1.83	2.1	2.5										
Groundwater	lower aquifer	INORG	Manganese	7439-96-5	T	7	7	0.95	2.0	2.6										

Notes:
 Only chemicals detected in the area are shown.
 The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the criteria for Xylenes (total).
 Ratios of concentration to the RBSLs greater than 1 are shaded in bold.
 Chem Group - chemical group; INORG - metals; SVOC - semi-volatile organic compounds; VOC - volatile organic compounds; PFAS - Per- and Polyfluoroalkyl Substances
 Meas Basis - measured basis; T = total, D = dissolved

Table 5
Site Assessment Soil Sample MSC Exceedances
Tank Group 07 (Site Assessment)
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Location	Sample Name	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	CASRN	Conc (mg/kg)	Qual	Non-Res Direct Contact with Soil (mg/kg)	Ratio of Max Detect to Non-Res Direct Contact with Soil	Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW (mg/kg)	Ratio of Conc to Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW
Soil	GPR1116-03	GPR1116-03-SS01	N	4.5	5	07/18/22	INORG	Lead	7439-92-1	1360		1000	1.4	450	3.0
Soil	GPR1116-08	GPR1116-08-SS01	N	1.5	2	08/01/22	VOC	Benzene	71-43-2	28		280	0.10	0.50	56
Soil	GPR1117-05	GPR1117-05-SS01	N	4	4.5	07/18/22	INORG	Lead	7439-92-1	619		1000	0.62	450	1.4
Soil	GPR1117-06	GPR1117-06-SS01	N	4.5	5	07/18/22	INORG	Lead	7439-92-1	687		1000	0.69	450	1.5
Soil	GPR1117-07	GPR1117-07-SS01	N	4.5	5	07/18/22	INORG	Lead	7439-92-1	981		1000	0.98	450	2.2
Soil	GPR494-01	GPR494-01-SS01	N	4.5	5	08/02/22	INORG	Lead	7439-92-1	517		1000	0.52	450	1.1
Soil	GPR494-08	GPR494-08-SS01	N	3	3.5	08/02/22	SVOC	Benzo(a)pyrene	50-32-8	54		91	0.59	46	1.2
Soil	GPR790-01	GPR790-01-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	520		280	1.9	0.50	1040
Soil	GPR790-02	GPR790-02-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	130		280	0.46	0.50	260
Soil	GPR790-03	GPR790-03-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	2.8		280	0.010	0.50	5.6
Soil	GPR790-05	TG07-MW-05-4.0-4.5	N	4	4.5	12/21/22	VOC	Benzene	71-43-2	2300		280	8.2	0.50	4600
Soil	GPR790-05	TG07-MW-05-4.0-4.5	N	4	4.5	12/21/22	VOC	Toluene	108-88-3	350		10000	0.035	100	3.5
Soil	GPR790-05	GPR790-05-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	3000		280	11	0.50	6000
Soil	GPR790-05	TG07-MW-05-4.5-5.0	N	4.5	5	12/21/22	VOC	Benzene	71-43-2	1700		280	6.1	0.50	3400
Soil	GPR790-05	TG07-MW-05-4.5-5.0	N	4.5	5	12/21/22	VOC	Toluene	108-88-3	230		10000	0.023	100	2.3
Soil	GPR790-06	GPR790-06-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	4.6		280	0.016	0.50	9.2
Soil	GPR790-07	GPR790-07-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	34		280	0.12	0.50	68
Soil	GPR791-01	GPR791-01-SS01	N	4.5	5	08/01/22	VOC	Benzene	71-43-2	1200		280	4.3	0.50	2400
Soil	GPR791-02	GPR791-02-SS01	N	3.5	4	08/01/22	VOC	Benzene	71-43-2	4.0	J	280	0.014	0.50	8.0
Soil	GPR791-03	GPR791-03-SS01	N	4	4.5	08/01/22	VOC	Benzene	71-43-2	160		280	0.57	0.50	320
Soil	GPR791-04	GPR791-04-SS01	N	3	3.5	08/01/22	VOC	Benzene	71-43-2	1300		280	4.6	0.50	2600
Soil	GPR791-04	TG07-MW-06-4.0-4.5	N	4	4.5	12/22/22	VOC	Benzene	71-43-2	170		280	0.61	0.50	340
Soil	GPR791-04	TG07-MW-06-4.0-4.5	N	4	4.5	12/22/22	VOC	Cumene	98-82-8	3400		10000	0.34	2500	1.4
Soil	GPR791-04	TG07-MW-06-4.5-5.0	N	4.5	5	12/22/22	VOC	Benzene	71-43-2	140		280	0.50	0.50	280
Soil	GPR791-05	GPR791-05-SS01	N	3	3.5	08/01/22	VOC	Benzene	71-43-2	10		280	0.035	0.50	20
Soil	GPR791-06	GPR791-06-SS01	N	3	3.5	08/01/22	VOC	Benzene	71-43-2	380		280	1.4	0.50	760
Soil	GPR791-07	GPR791-07-SS01	N	3	3.5	08/01/22	VOC	Benzene	71-43-2	13		280	0.046	0.50	26
Soil	GPR791-08	GPR791-08-SS01	N	4	4.5	08/01/22	VOC	Benzene	71-43-2	7.1		280	0.025	0.50	14
Soil	GPR792-02	DUP-49	FD	4.5	5	08/02/22	VOC	Cumene	98-82-8	4700		10000	0.47	2500	1.9
Soil	GPR792-02	GPR792-02-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	4700		10000	0.47	2500	1.9
Soil	GPR792-03	GPR792-03-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	12000		10000	1.2	2500	4.8
Soil	GPR792-04	GPR792-04-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	5000		10000	0.50	2500	2.0
Soil	GPR792-05	GPR792-05-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	8900		10000	0.89	2500	3.6
Soil	GPR792-06	GPR792-06-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	4600		10000	0.46	2500	1.8
Soil	GPR793-01	GPR793-01-SS01	N	4	4.5	08/02/22	VOC	Cumene	98-82-8	5500		10000	0.55	2500	2.2
Soil	GPR793-02	GPR793-02-SS01	N	4	4.5	08/02/22	VOC	Cumene	98-82-8	11000		10000	1.1	2500	4.4
Soil	GPR793-03	GPR793-03-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	15000		10000	1.5	2500	6.0
Soil	GPR793-04	GPR793-04-SS01	N	4.5	5	08/02/22	VOC	Cumene	98-82-8	14000		10000	1.4	2500	5.6
Soil	GPR794-01	GPR794-01-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	2200		280	7.9	0.50	4400
Soil	GPR794-01	GPR794-01-SS01	N	4.5	5	08/03/22	VOC	Cumene	98-82-8	4000		10000	0.40	2500	1.6
Soil	GPR794-01	GPR794-01-SS01	N	4.5	5	08/03/22	VOC	Ethyl Benzene	100-41-4	74		880	0.084	70	1.1
Soil	GPR794-01	GPR794-01-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	3400		10000	0.34	100	34
Soil	GPR794-02	GPR794-02-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	2800		280	10	0.50	5600
Soil	GPR794-02	GPR794-02-SS01	N	4.5	5	08/03/22	VOC	Cumene	98-82-8	3000		10000	0.30	2500	1.2
Soil	GPR794-02	GPR794-02-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	1200		10000	0.12	100	12

Table 5
Site Assessment Soil Sample MSC Exceedances
Tank Group 07 (Site Assessment)
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Location	Sample Name	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	CASRN	Conc (mg/kg)	Qual	Non-Res Direct Contact with Soil (mg/kg)	Ratio of Max Detect to Non-Res Direct Contact with Soil	Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW (mg/kg)	Ratio of Conc to Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW
Soil	GPR794-04	GPR794-04-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	7800		280	28	0.50	15600
Soil	GPR794-04	GPR794-04-SS01	N	4.5	5	08/03/22	VOC	Cumene	98-82-8	12000		10000	1.2	2500	4.8
Soil	GPR794-04	GPR794-04-SS01	N	4.5	5	08/03/22	VOC	Ethyl Benzene	100-41-4	120		880	0.14	70	1.7
Soil	GPR794-04	GPR794-04-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	6100		10000	0.61	100	61
Soil	GPR794-05	GPR794-05-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	2600		280	9.3	0.50	5200
Soil	GPR794-05	GPR794-05-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	1800		10000	0.18	100	18
Soil	GPR794-06	GPR794-06-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	2000		280	7.1	0.50	4000
Soil	GPR794-06	GPR794-06-SS01	N	4.5	5	08/03/22	VOC	Cumene	98-82-8	4800		10000	0.48	2500	1.9
Soil	GPR794-06	GPR794-06-SS01	N	4.5	5	08/03/22	VOC	Ethyl Benzene	100-41-4	110		880	0.13	70	1.6
Soil	GPR794-06	GPR794-06-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	4300		10000	0.43	100	43
Soil	GPR794-07	GPR794-07-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	130		280	0.46	0.50	260
Soil	GPR794-08	TG07-MW-07-4.0-4.5	N	4	4.5	12/21/22	VOC	Benzene	71-43-2	2500		280	8.9	0.50	5000
Soil	GPR794-08	TG07-MW-07-4.0-4.5	N	4	4.5	12/21/22	VOC	Toluene	108-88-3	240		10000	0.024	100	2.4
Soil	GPR794-08	TG07-MW-07-4.0-4.5	N	4	4.5	12/21/22	SVOC	Naphthalene	91-20-3	36		66	0.55	25	1.4
Soil	GPR794-08	GPR794-08-SS01	N	4.5	5	08/03/22	VOC	Benzene	71-43-2	12000		280	43	0.50	24000
Soil	GPR794-08	GPR794-08-SS01	N	4.5	5	08/03/22	VOC	Cumene	98-82-8	7600		10000	0.76	2500	3.0
Soil	GPR794-08	GPR794-08-SS01	N	4.5	5	08/03/22	VOC	Ethyl Benzene	100-41-4	120		880	0.14	70	1.7
Soil	GPR794-08	GPR794-08-SS01	N	4.5	5	08/03/22	VOC	Toluene	108-88-3	6200		10000	0.62	100	62
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	VOC	Benzene	71-43-2	3700		280	13	0.50	7400
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	VOC	Ethyl Benzene	100-41-4	93		880	0.11	70	1.3
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	VOC	Toluene	108-88-3	540		10000	0.054	100	5.4
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	VOC	1,2,4-Trimethylbenzene	95-63-6	330		4700	0.070	300	1.1
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	VOC	1,3,5-Trimethylbenzene	108-67-8	140		4700	0.030	93	1.5
Soil	GPR794-08	TG07-MW-07-4.5-5.0	N	4.5	5	12/21/22	SVOC	Naphthalene	91-20-3	52		66	0.79	25	2.1
Soil	GPR794-09	GPR794-09-1.5-2.0	N	1.5	2	01/03/23	VOC	Benzene	71-43-2	1.0		280	0.0036	0.50	2.0
Soil	GPR794-09	GPR794-09-2.0-2.5D	FD	2	2.5	01/03/23	VOC	Benzene	71-43-2	1.1		280	0.0039	0.50	2.2
Soil	GPR794-09	GPR794-09-2.0-2.5	N	2	2.5	01/03/23	VOC	Benzene	71-43-2	2.6		280	0.0093	0.50	5.2
Soil	GPR798-01	GPR798-01-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	3.4		280	0.012	0.50	6.8
Soil	GPR798-02	GPR798-02-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	6.2		280	0.022	0.50	12
Soil	GPR798-04	TG07-MW-04-1.5-2.0	N	1.5	2	01/03/23	VOC	Benzene	71-43-2	440		280	1.6	0.50	880
Soil	GPR798-04	TG07-MW-04-2.0-2.5	N	2	2.5	01/03/23	VOC	Benzene	71-43-2	170		280	0.61	0.50	340
Soil	GPR798-04	DUP-47	FD	4.5	5	07/18/22	VOC	Benzene	71-43-2	5900		280	21	0.50	11800
Soil	GPR798-04	GPR798-04-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	14		280	0.050	0.50	28
Soil	GPR798-05	GPR798-05-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	1.4		280	0.0050	0.50	2.8
Soil	GPR798-06	GPR798-06-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	2.2		280	0.0079	0.50	4.4
Soil	GPR798-07	GPR798-07-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	7.8		280	0.028	0.50	16
Soil	GPR799-01	GPR799-01-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	2.2		280	0.0079	0.50	4.4
Soil	GPR799-02	GPR799-02-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	1.6		280	0.0057	0.50	3.2
Soil	GPR799-03	GPR-799-03R-3.0-3.5	N	3	3.5	12/21/22	VOC	Benzene	71-43-2	2.6		280	0.0093	0.50	5.2
Soil	GPR799-03	GPR-799-03R-3.5-4.0	N	3.5	4	12/21/22	VOC	Benzene	71-43-2	1.2		280	0.0043	0.50	2.4
Soil	GPR799-03	GPR799-03-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	16		280	0.057	0.50	32
Soil	GPR799-04	GPR799-04-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	22		280	0.079	0.50	44
Soil	GPR799-05	GPR799-05-SS01	N	4	4.5	07/18/22	VOC	Benzene	71-43-2	2.7		280	0.010	0.50	5.4
Soil	GPR799-06	GPR799-06-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	1.3		280	0.0046	0.50	2.6
Soil	GPR799-07	GPR799-07-SS01	N	4.5	5	07/18/22	VOC	Benzene	71-43-2	0.71		280	0.0025	0.50	1.4

Table 5
Site Assessment Soil Sample MSC Exceedances
Tank Group 07 (Site Assessment)
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Location	Sample Name	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	CASRN	Conc (mg/kg)	Qual	Non-Res Direct Contact with Soil (mg/kg)	Ratio of Max Detect to Non-Res Direct Contact with Soil	Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW (mg/kg)	Ratio of Conc to Non-Res Used Aquifer (TDS ≤ 2500) Soil-to-GW
Soil	GPR799-08	GPR799-08-3.0-3.5	N	3	3.5	01/03/23	VOC	Benzene	71-43-2	0.77		280	0.0028	0.50	1.5
Soil	GPU767-06	GPU767-06-SS01	N	3	3.5	08/15/22	INORG	Lead	7439-92-1	688		1000	0.69	450	1.5

Notes:
The Non-Residential Direct Contact MSC for Soil is the lower of the Non-Residential Direct Contact MSCs for Surface Soil (0-2 ft) and Subsurface Soil (2-15 ft).
Ratios of concentration to the screening level greater than 1 are shaded in bold.
Chem Group - chemical group; VOCs - volatile organic compounds; SVOCs - semi-volatile organic compounds; INORG - metals

Table 6**COPCs Identified in Soil in Proximity to Tank Group 07 ASTs**

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

GP R 1088	GP R 1116	GP R 1117	GP R 494
None	Benzene	Naphthalene	Benzo(a)pyrene
GP R 790	GP R 791	GP R 792	GP R 793
Benzene	Benzene	Cumene	Cumene
GP R 794	GP R 798	GP R 799	GP U 767
Benzene Cumene Toluene 1,2,4-Trimethylbenzene Xylenes (total) Naphthalene	Benzene	Benzene	None

Table 7
Monitoring Well Gauging Summary
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location ID	TOIC (ft AMSL)	January 3, 2023					
		Depth to Product (ft below TOIC)	Depth to Water (ft below TOIC)	Historical LNAPL Density	Depth to Water (Corrected) (ft below TOIC)	Groundwater Elevation (ft AMSL)	Total LNAPL Thickness (ft)
B-45	5.10	--	2.54		2.54	2.56	--
B-148	7.22	5.96	5.97	0.87	5.96	1.26	0.01
B-150	7.80	2.90	5.55	0.87	3.25	4.55	2.65
TG07-MW-01	9.24	--	4.09		4.09	5.15	--
TG07-MW-02	10.11	--	3.84		3.84	6.27	--
TG07-MW-03	9.27	--	3.41		3.41	5.86	--
TG07-MW-04	11.84	--	7.06		7.06	4.78	--
TG07-MW-05	11.30	--	6.68		6.68	4.62	--
TG07-MW-06	12.33	8.07	8.86		8.23	4.10	0.79
TG07-MW-07	11.24	6.95	7.01		6.96	4.28	0.06
TG07-MW-08	10.07	--	8.12		8.12	1.95	--

Notes:

Corrected Depth to Water Levels factor historical LNAPL densities, where present.

Vertical Datum is NAVD 1988.

Table 8
Soil Compared to Risk Based Screening Levels
Tank Group 07 (Site Assessment; Site Characterization)
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Chem Group	Chemical	CASRN	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Routine Worker Direct Contact (mg/kg)	Ratio of Max Detect to Routine Worker Direct Contact	Construction Worker Direct Contact (mg/kg)	Ratio of Max Detect to Construction Worker Direct Contact	Soil MtGW Screening Level (mg/kg)	Ratio of Max Detect to Soil MtGW
Soil	VOC	Benzene	71-43-2	105	89	0.000070	600	12000	63	190	8.7	1400	98	120
Soil	VOC	Cumene	98-82-8	89	84	0.00028	1700	15000	1000	15	87	170	1000	15
Soil	VOC	Ethyl Benzene	100-41-4	75	53	0.00016	13	120	2300	0.052	1300	0.092	820	0.15
Soil	VOC	Toluene	108-88-3	75	49	0.00018	500	6200	8000	0.78	650	9.5	9800	0.63
Soil	VOC	1,2,4-Trimethylbenzene	95-63-6	75	56	0.00027	14	330	180	1.8	70	4.7	250	1.3
Soil	VOC	1,3,5-Trimethylbenzene	108-67-8	75	46	0.00010	7.5	140	220	0.64	99	1.4	240	0.58
Soil	VOC	Xylenes (total)	1330-20-7	75	58	0.00037	54	560	240	2.3	51	11	340	1.6
Soil	SVOC	Anthracene	120-12-7	48	35	0.039	1.7	23	46000	0.00050	46000	0.00050		
Soil	SVOC	Benzo(a)anthracene	56-55-3	48	42	0.027	3.5	71	430	0.17	3200	0.022		
Soil	SVOC	Benzo(a)pyrene	50-32-8	75	50	0.047	2.7	54	43	1.3	7.7	7.0		
Soil	SVOC	Benzo(b)fluoranthene	205-99-2	48	40	0.034	2.0	28	430	0.065	3200	0.0088		
Soil	SVOC	Benzo(g,h,i)perylene	191-24-2	48	37	0.025	1.4	18	4600	0.0039	14000	0.0013		
Soil	SVOC	Chrysene	218-01-9	48	43	0.024	6.7	170	43000	0.0040	320000	0.00053		
Soil	SVOC	Fluorene	86-73-7	48	40	0.024	1.6	11	6200	0.0018	18000	0.00061		
Soil	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	7	3	0.077	0.17	0.35	430	0.00081	3200	0.00011		
Soil	SVOC	Naphthalene	91-20-3	75	58	0.031	3.0	52	41	1.3	6.0	8.7	27	1.9
Soil	SVOC	Phenanthrene	85-01-8	48	42	0.037	8.7	110	4600	0.024	14000	0.0079		
Soil	SVOC	Pyrene	129-00-0	48	44	0.022	6.0	130	4600	0.028	14000	0.0093		
Soil	INORG	Lead	7439-92-1	48	48	3.7	210	1400	2520	0.54	2520	0.54	45000	0.030

Notes:

Only constituents detected are shown.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the criteria for Xylenes (total).

Ratios of concentration to the RBSLs greater than 1 are shaded in bold.

Chem Group - chemical group; INORG - metals; SVOC - semi-volatile organic compounds; VOC - volatile organic compounds

Table 9
Groundwater Compared to Risk Based Screening Levels
Tank Group 07 (Site Characterization)
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Analyzed	Detected	Min Detected (mg/L)	Mean Detected (mg/L)	Max Detected (mg/L)	Nonpotable Groundwater Use (mg/L)	Ratio of Max Detect to Nonpotable Groundwater Use	Construction Worker Direct Contact (mg/L)	Ratio of Max Detect to Construction Worker Direct Contact	Groundwater Migration to Surface Water (mg/L)	Ratio of Max Detect to Groundwater Migration to Surface Water
Groundwater	unconfined	VOC	Benzene	71-43-2	T	7	5	0.00036	50	240	0.30	800	4	60	130	1.8
Groundwater	unconfined	VOC	Cumene	98-82-8	T	7	7	0.00034	2.5	7.2	37	0.19	30	0.24	2.6	2.8
Groundwater	unconfined	VOC	Ethyl Benzene	100-41-4	T	7	4	0.00042	0.099	0.36	2.0	0.18	40	0.0090	13	0.028
Groundwater	unconfined	VOC	Methyl tert-butyl ether	1634-04-4	T	7	1	0.00036	0.00036	0.00036	21	0.000017	190	0.0000019	11000	0.00000033
Groundwater	unconfined	VOC	Toluene	108-88-3	T	7	5	0.00023	5.4	27	25	1.1	200	0.14	52	0.52
Groundwater	unconfined	VOC	1,2,4-Trimethylbenzene	95-63-6	T	7	6	0.00025	0.043	0.22	8.7	0.025	15	0.015	33	0.0067
Groundwater	unconfined	VOC	1,3,5-Trimethylbenzene	108-67-8	T	7	2	0.00024	0.00048	0.00072	8.8	0.000082	15	0.000048	71	0.000010
Groundwater	unconfined	VOC	Xylenes (total)	1330-20-7	T	7	5	0.0012	0.35	1.7	3.7	0.45	17	0.10	210	0.0080
Groundwater	unconfined	SVOC	Anthracene	120-12-7	T	7	7	0.000050	0.00023	0.00043	240	0.0000018	19000	0.00000023	40	0.000011
Groundwater	unconfined	SVOC	Benzo(a)anthracene	56-55-3	T	7	7	0.000040	0.00011	0.00018	0.10	0.0018	1400	0.00000013	0.013	0.014
Groundwater	unconfined	SVOC	Benzo(a)pyrene	50-32-8	T	7	6	0.000020	0.000048	0.000070	0.010	0.0070	5.8	0.000012	0.0013	0.054
Groundwater	unconfined	SVOC	Benzo(b)fluoranthene	205-99-2	T	7	6	0.000020	0.000043	0.000070	0.16	0.00044	1400	0.00000050	0.013	0.0054
Groundwater	unconfined	SVOC	Benzo(g,h,i)perylene	191-24-2	T	7	4	0.000010	0.000020	0.000040	44	0.00000091	5800	0.000000069	0.012	0.0033
Groundwater	unconfined	SVOC	Chrysene	218-01-9	T	7	5	0.000030	0.000064	0.00011	16	0.0000069	140000	0.0000000079	1.3	0.000085
Groundwater	unconfined	SVOC	Fluorene	86-73-7	T	7	7	0.00013	0.0022	0.0048	97	0.000049	7800	0.0000062	7.0	0.00069
Groundwater	unconfined	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	T	7	5	0.000010	0.000020	0.000040	0.10	0.00040	1400	0.00000029	0.013	0.0031
Groundwater	unconfined	SVOC	Naphthalene	91-20-3	T	7	5	0.00013	0.030	0.13	0.39	0.33	0.28	0.46	43	0.0030
Groundwater	unconfined	SVOC	Phenanthrene	85-01-8	T	7	7	0.00020	0.0020	0.0046	73	0.000063	5800	0.00000079	1.0	0.0046
Groundwater	unconfined	SVOC	Pyrene	129-00-0	T	7	7	0.00011	0.00034	0.00086	50	0.000017	5800	0.00000015	3.0	0.00029
Groundwater	unconfined	INORG	Lead	7439-92-1	D	7	2	0.00059	0.0043	0.0079					2.5	0.0032

Notes:

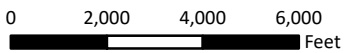
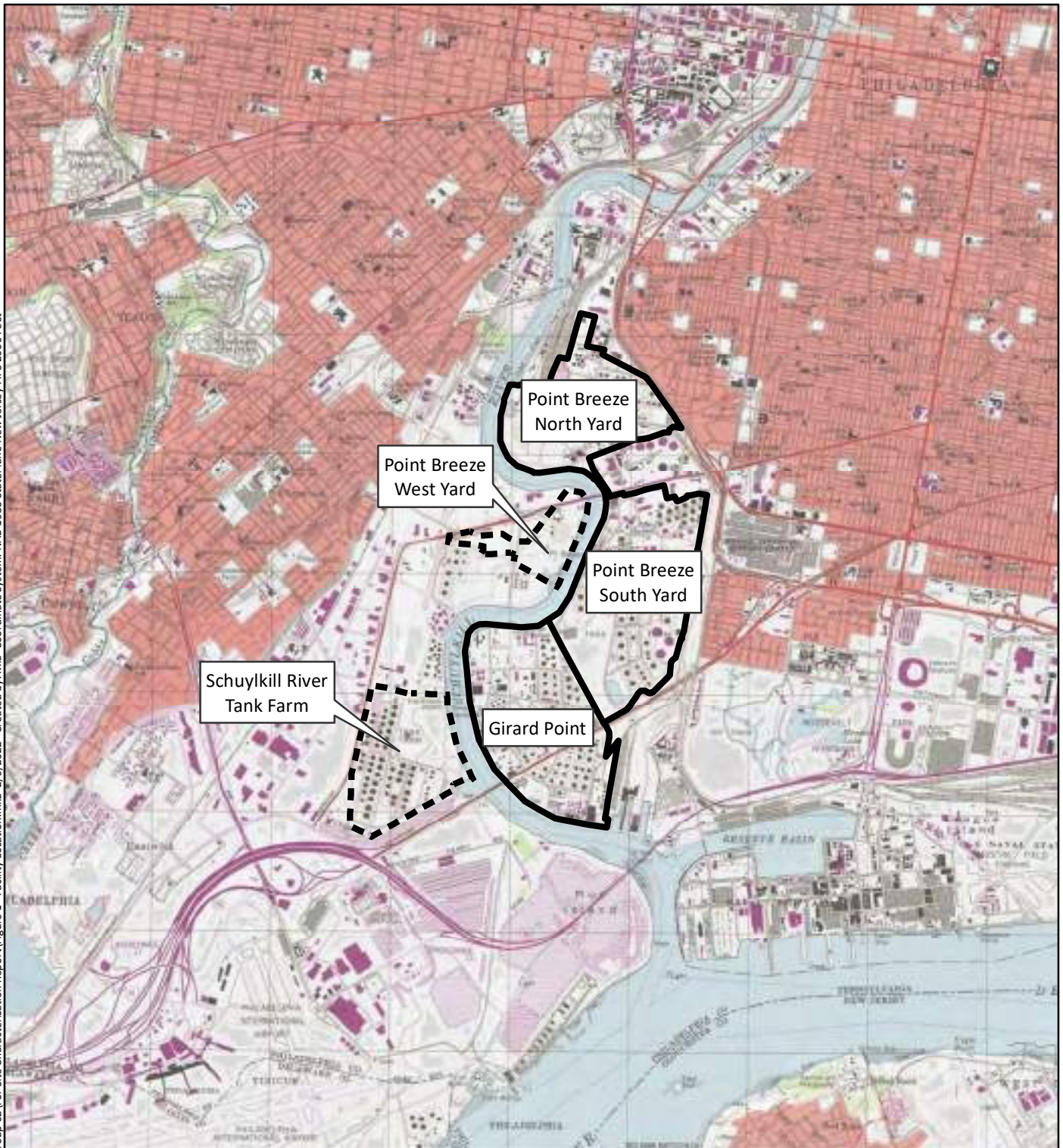
Only chemicals detected in the area are shown.
The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the criteria for Xylenes (total).
Ratios of concentration to the RBSLs greater than 1 are shaded in bold.
Chem Group - chemical group; INORG - metals; SVOC - semi-volatile organic compounds; VOC - volatile organic compounds
Meas Basis - measured basis; T = total, D = dissolved

Figures

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File: N:\GIS\Prj\044.001_PESRM-PE\MXDS\AST\Work\Tank Group 02\For Site Characterization Report\Figure 1 - Facility Location.mxd 2/9/2022. Created by: Mia Coordinate System: NAD 1983 StatePlane New Jersey FIPS 2900 Feet



1 inch = 4,000 feet



Legend

- Subject to AST Closure Plan
- Not Subject to AST Closure Plan

Base Map: USGS Philadelphia 1994 7.5 Minute Quadrangle.

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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

Facility Location

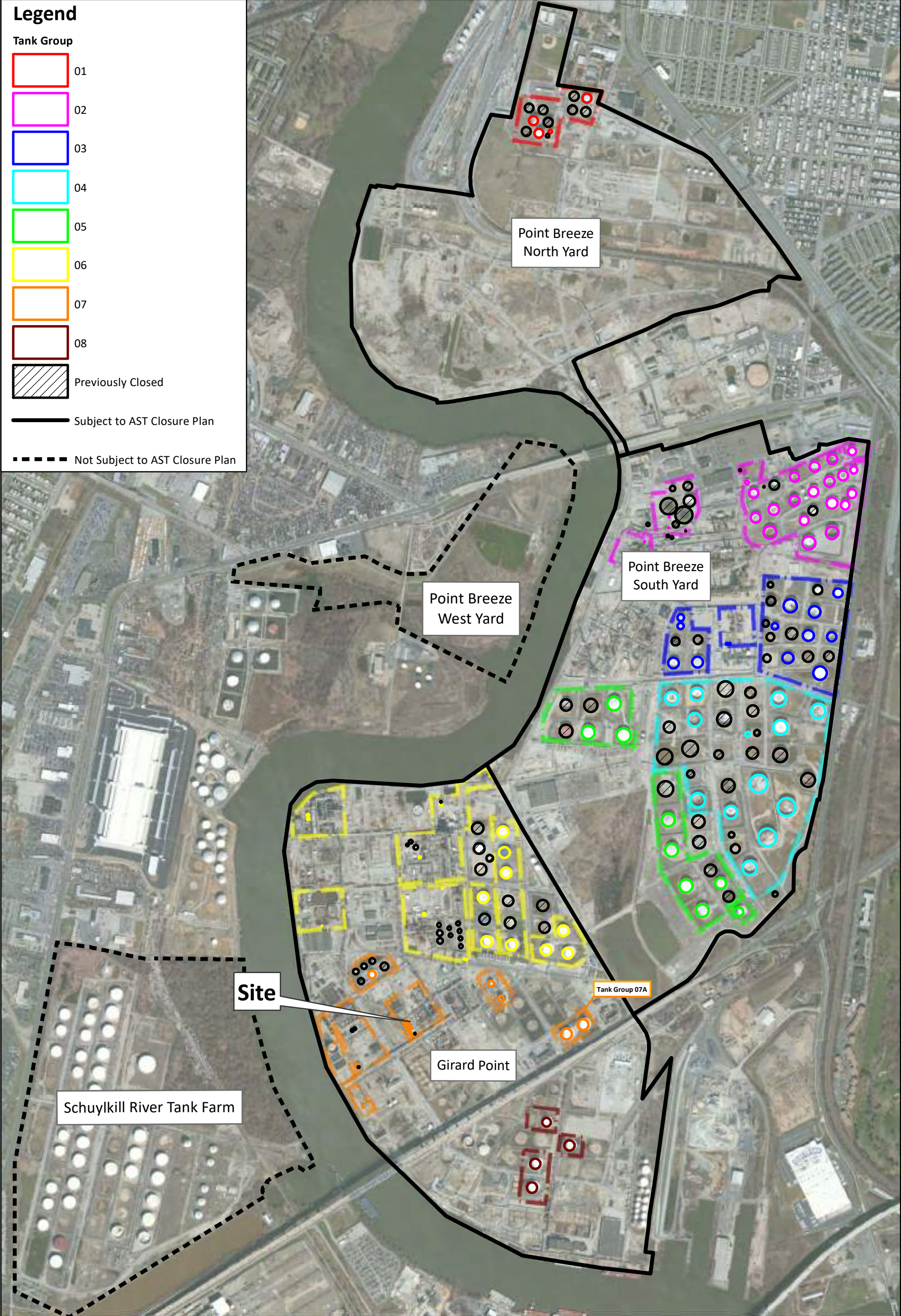
Figure 1

Legend

Tank Group

- 01
- 02
- 03
- 04
- 05
- 06
- 07
- 08
- Previously Closed

- Subject to AST Closure Plan
- Not Subject to AST Closure Plan



File: N:\GIS\PI\P044_001_PESRM-PES\WXDS\AST Work\Tank Group 07\For Site Characterization Report\Figure 2 - Site Location.mxd 2/5/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

0 500 1,000 1,500

Feet

1 inch = 1,000 feet

Notes: Aerial imagery source Maxar 10/19/2019

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CLIENT:	Philadelphia Energy Solutions Refining and Marketing LLC
PROJECT:	Aboveground Storage Tank Closure
PROJECT NUMBER:	P044.001.002

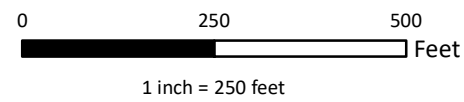
Site Location

Figure 2

File: N:\GIS\PI\P044.001_PESRM-PES\MXDS\AST\Work\Tank_Group_07\For_Site_Characterization_Report\Figure_3_Site_Layout_Map.mxd 1/23/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

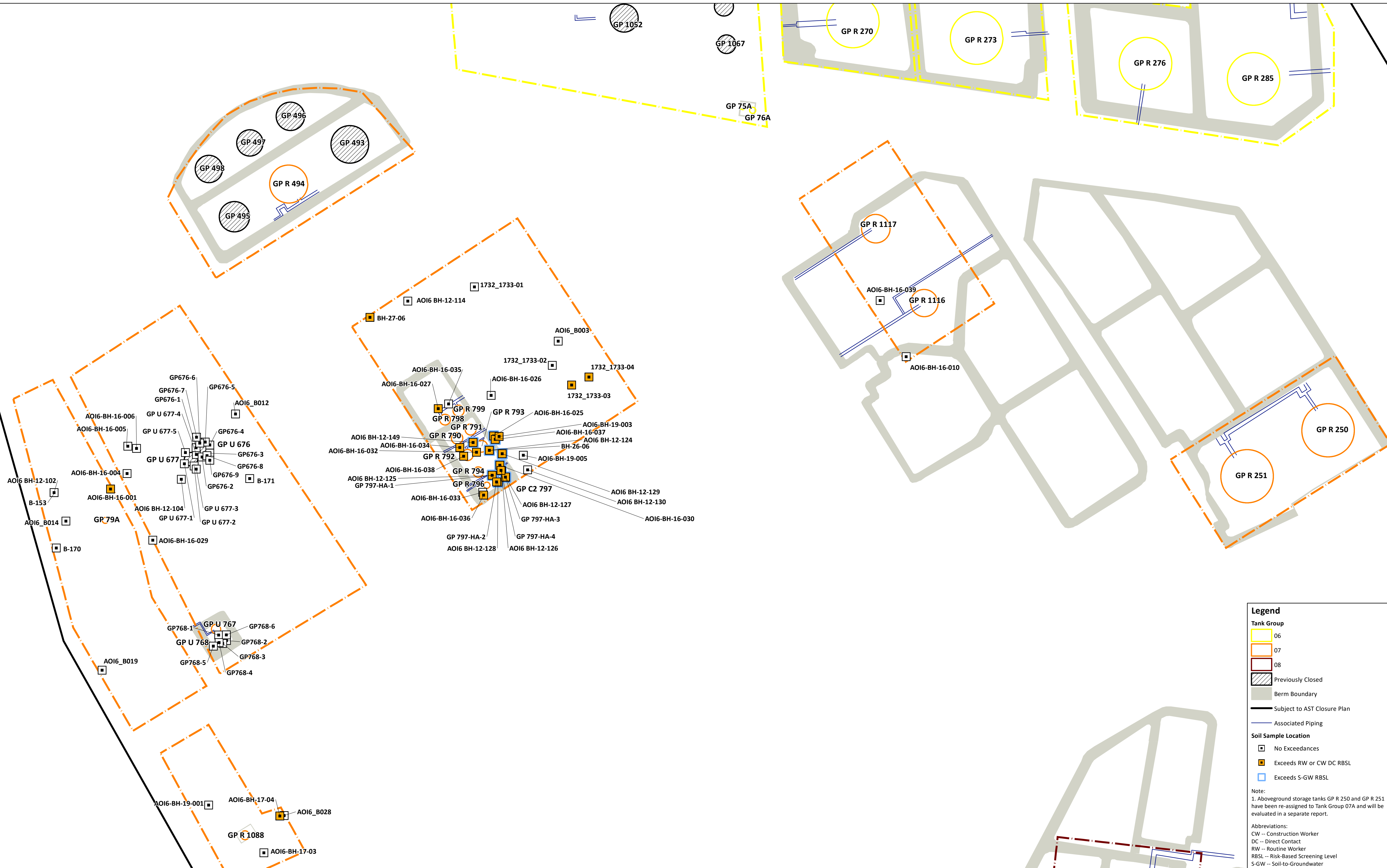


Notes:
 1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report
 2. Aerial imagery source Maxar 10/19/2019



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Layout Map Tank Group 07
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002	Figure 3	

File: N:\GIS\SP\0401_001_PESMA-PES\AOI6\AST\Work\Tank Group DT\For Site Characterization Report\Figure 4a - Historical Soil Sampling Results.mxd 1/21/2023 Created by: Mia_Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3709 Feet



Legend

Tank Group

- 06
- 07
- 08

Previously Closed

Berm Boundary

Subject to AST Closure Plan

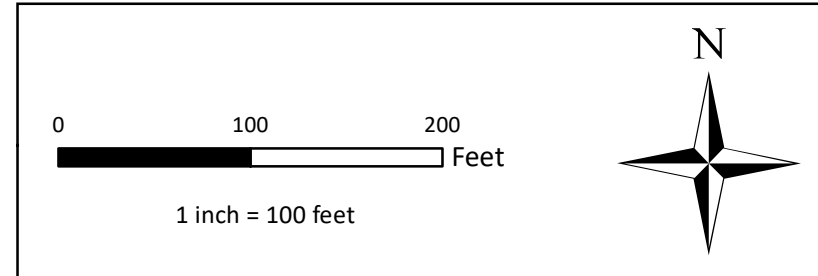
Associated Piping

Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Note:
1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:
 CW -- Construction Worker
 DC -- Direct Contact
 RW -- Routine Worker
 RBSL -- Risk-Based Screening Level
 S-GW -- Soil-to-Groundwater



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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

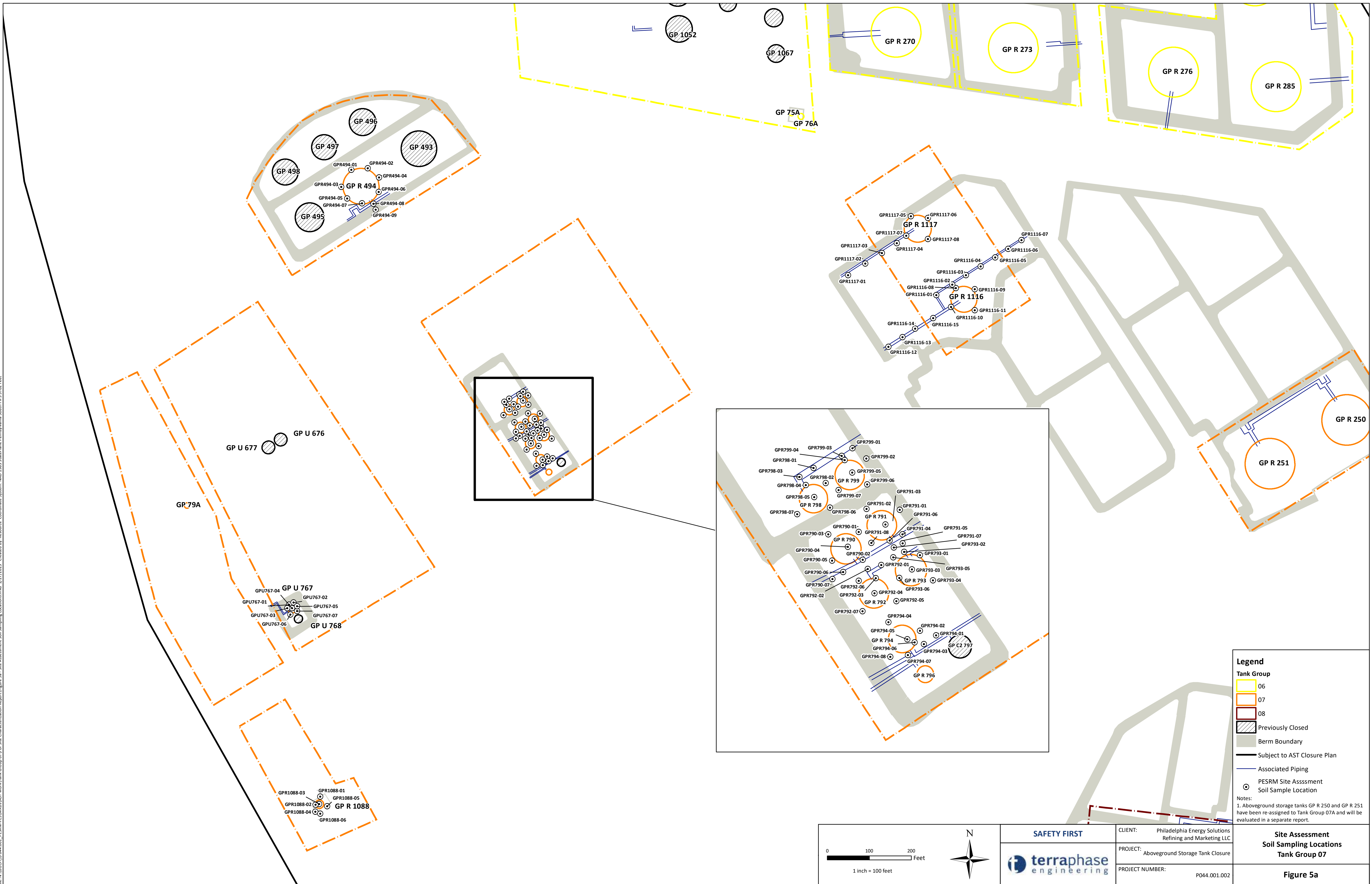
PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

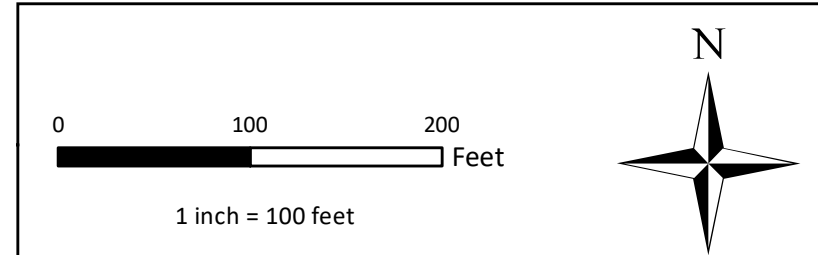
Historical Soil Sampling Results Tank Group 07

Figure 4a

File: \\VES\PI\044_001_PESRM\PI\044_001_PESRM\AST\Work\Tank Group 07\For Site Characterization Report\Figure 5a - Site Assessment Soil Sampling Locations.mxd 1/27/2023 Created by: Resource Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 5702 Feet

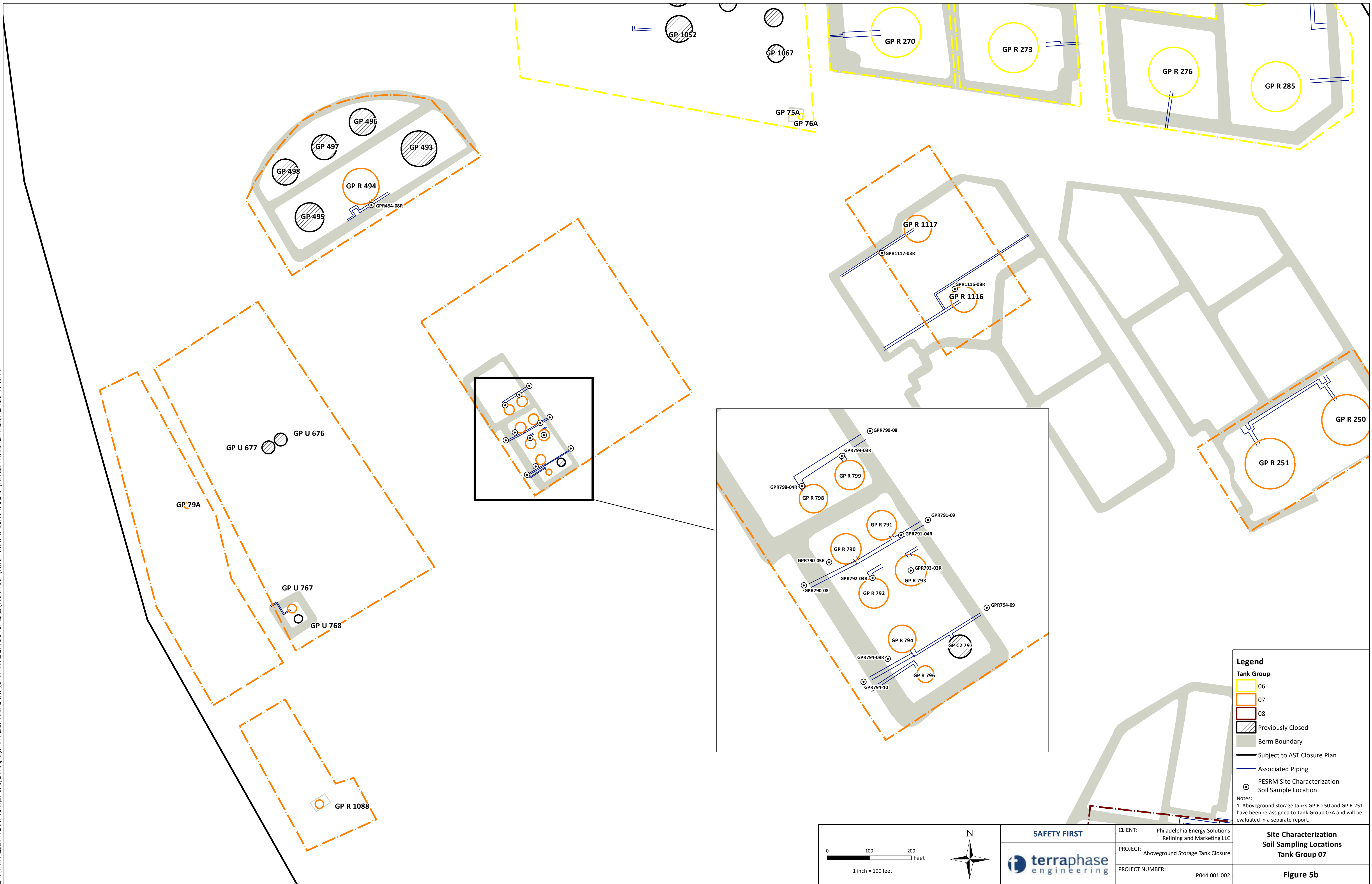


- Legend**
- Tank Group
 - 06
 - 07
 - 08
 - Previously Closed
 - Berm Boundary
 - Subject to AST Closure Plan
 - Associated Piping
 - PESRM Site Assessment Soil Sample Location
- Notes:
1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Assessment Soil Sampling Locations Tank Group 07 Figure 5a
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

File: \\VES\PI\044_001_PESRM-PES\WDA\AST Work\Tank Group 07 For Site Characterization Report\Figure 5b - Site Characterization Soil Sampling Locations.mxd 1/27/2023 Created by: Resource Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



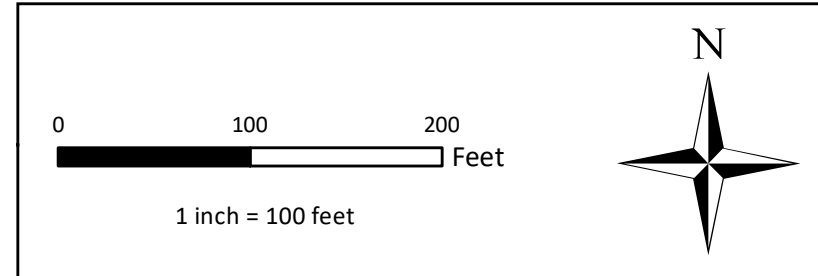
Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping
- PESRM Site Characterization Soil Sample Location

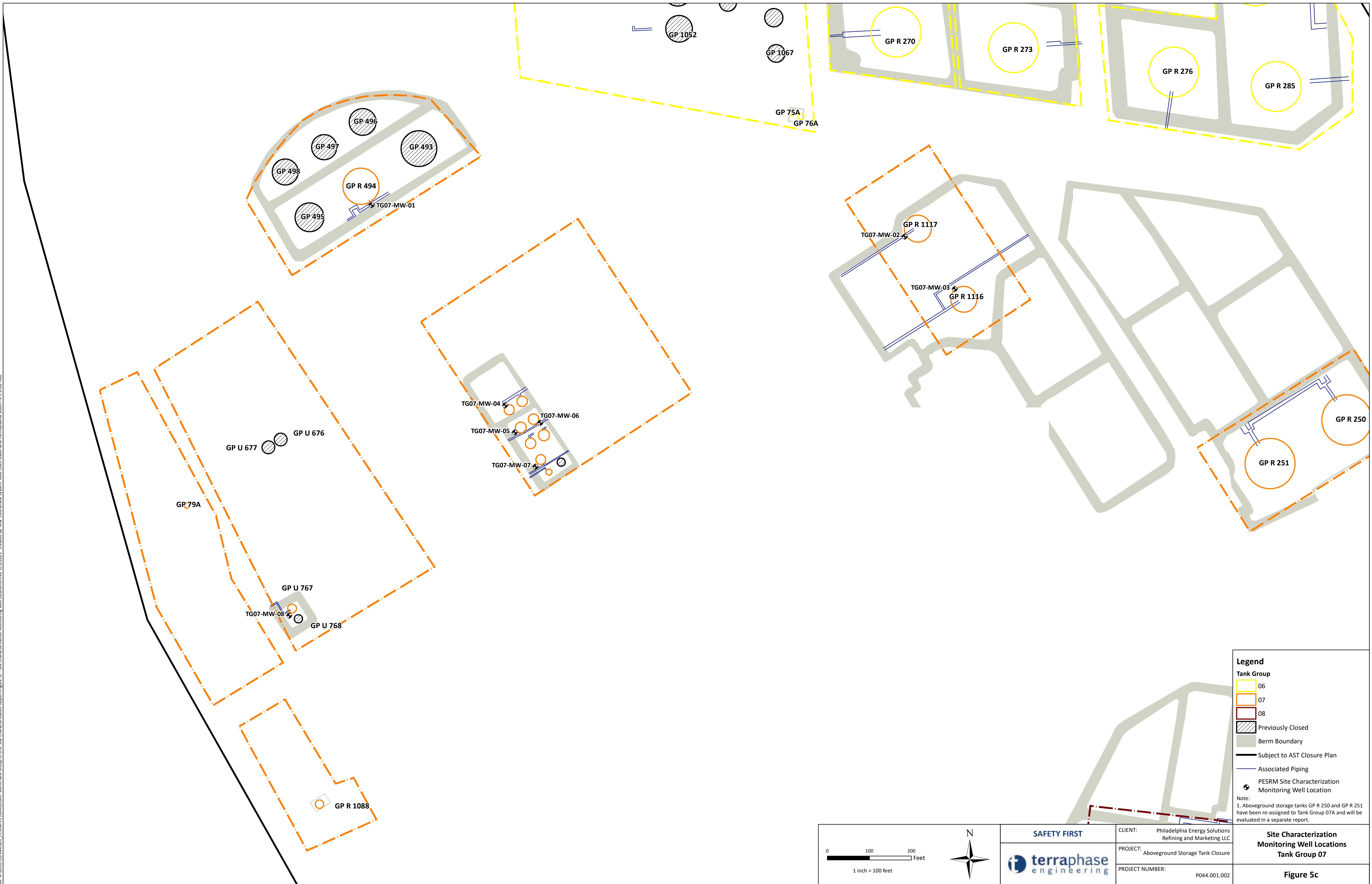
Notes:

1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Characterization Soil Sampling Locations Tank Group 07 Figure 5b
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

File: N:\GIS\Proj\044_001_PESRM\PE\W03\AST\Work\Tank_Group_07\Fig_5c_Site_Characterization_Monitoring_Well_Locations.mxd 2/7/2023 created by: Mia_Coordinate_System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping
- PESRM Site Characterization Monitoring Well Location

Note:
1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

0 100 200 Feet
1 inch = 100 feet

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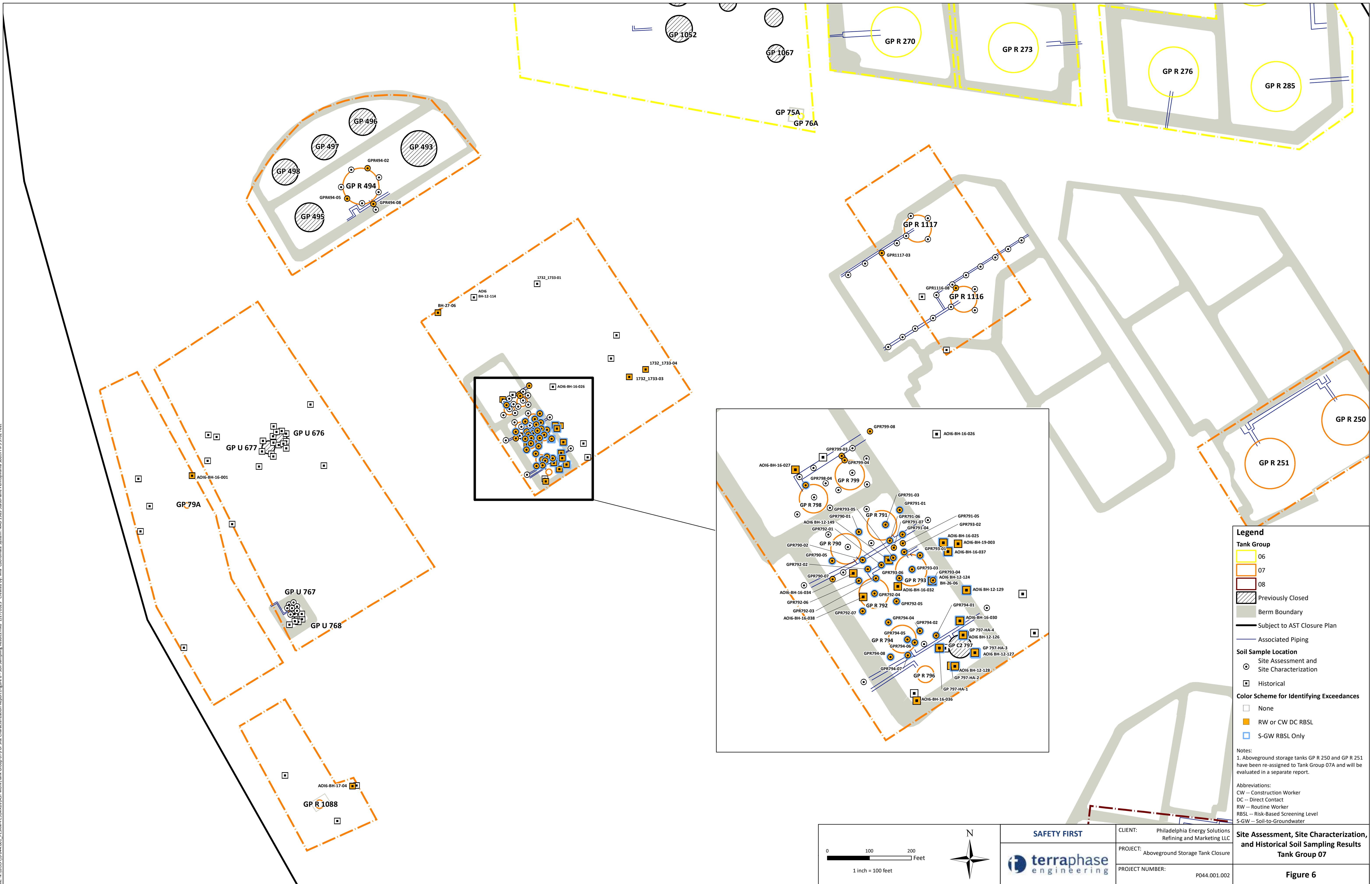
terraphase engineering

CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
PROJECT: Aboveground Storage Tank Closure
PROJECT NUMBER: P044.001.002

Site Characterization Monitoring Well Locations Tank Group 07

Figure 5c

File: N:\GIS\SP\0401_001_PESMA-RES\WDA\AST\Work\Tank_Group\DTFor_Site_Characterization_Report\Figure_6_Soil_Sampling_Results.mxd 1/27/2023 Created by: Mia_Coordinate_System: NAD_1983_StatePlane_Pennsylvania_South_FPS_3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

Soil Sample Location

- Site Assessment and Site Characterization
- Historical

Color Scheme for Identifying Exceedances

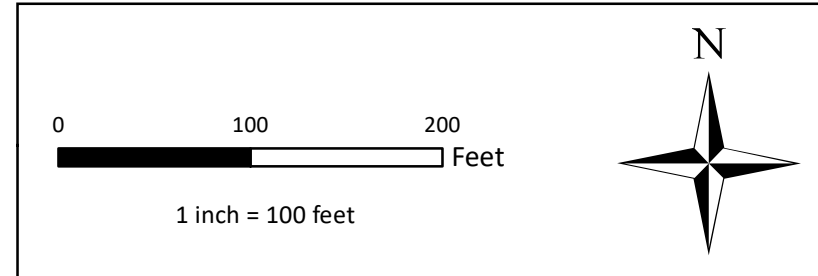
- None
- RW or CW DC RBSL
- S-GW RBSL Only

Notes:

1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:

- CW -- Construction Worker
- DC -- Direct Contact
- RW -- Routine Worker
- RBSL -- Risk-Based Screening Level
- S-GW -- Soil-to-Groundwater



SAFETY FIRST

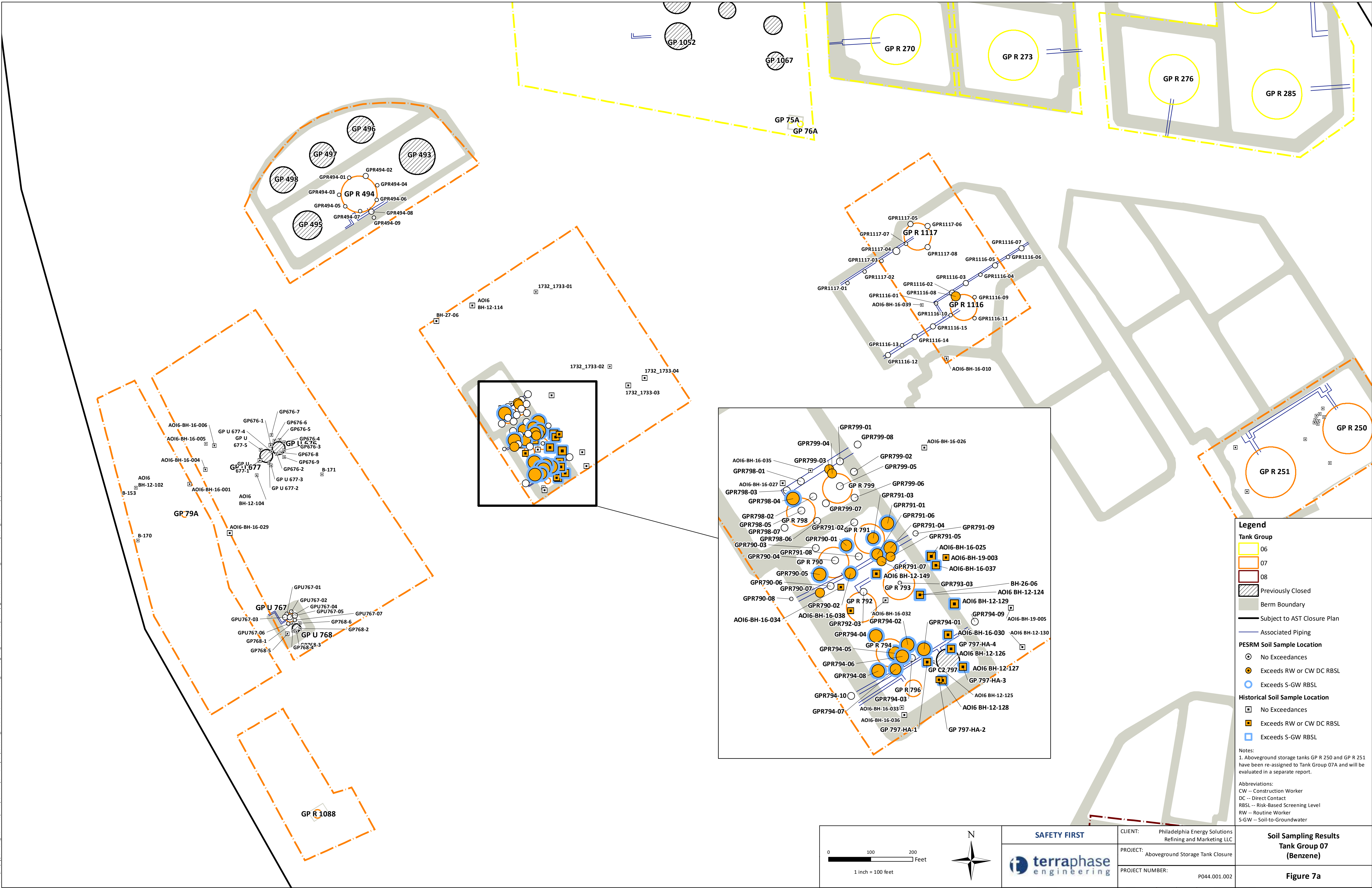
terraPhase engineering

CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
PROJECT: Aboveground Storage Tank Closure
PROJECT NUMBER: P044.001.002

Site Assessment, Site Characterization, and Historical Soil Sampling Results Tank Group 07

Figure 6

File: N:\GIS\Projects\04_001_PESRM-AST\Work\Tank_Group_07\20230111_Site_Characterization_-_RBSL_withSitegreen_MapsResults\Chem_Benz.mxd 2/3/2023 Created by: Resource_Coordinator System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

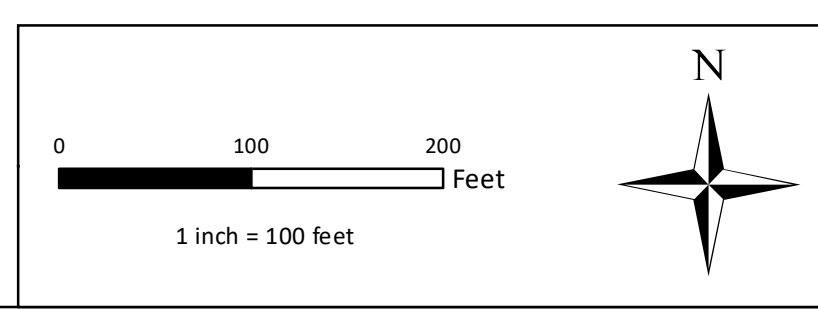
- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Historical Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Notes:
1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:
CW – Construction Worker
DC – Direct Contact
RBSL – Risk-Based Screening Level
RW – Routine Worker
S-GW – Soil-to-Groundwater



SAFETY FIRST

CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

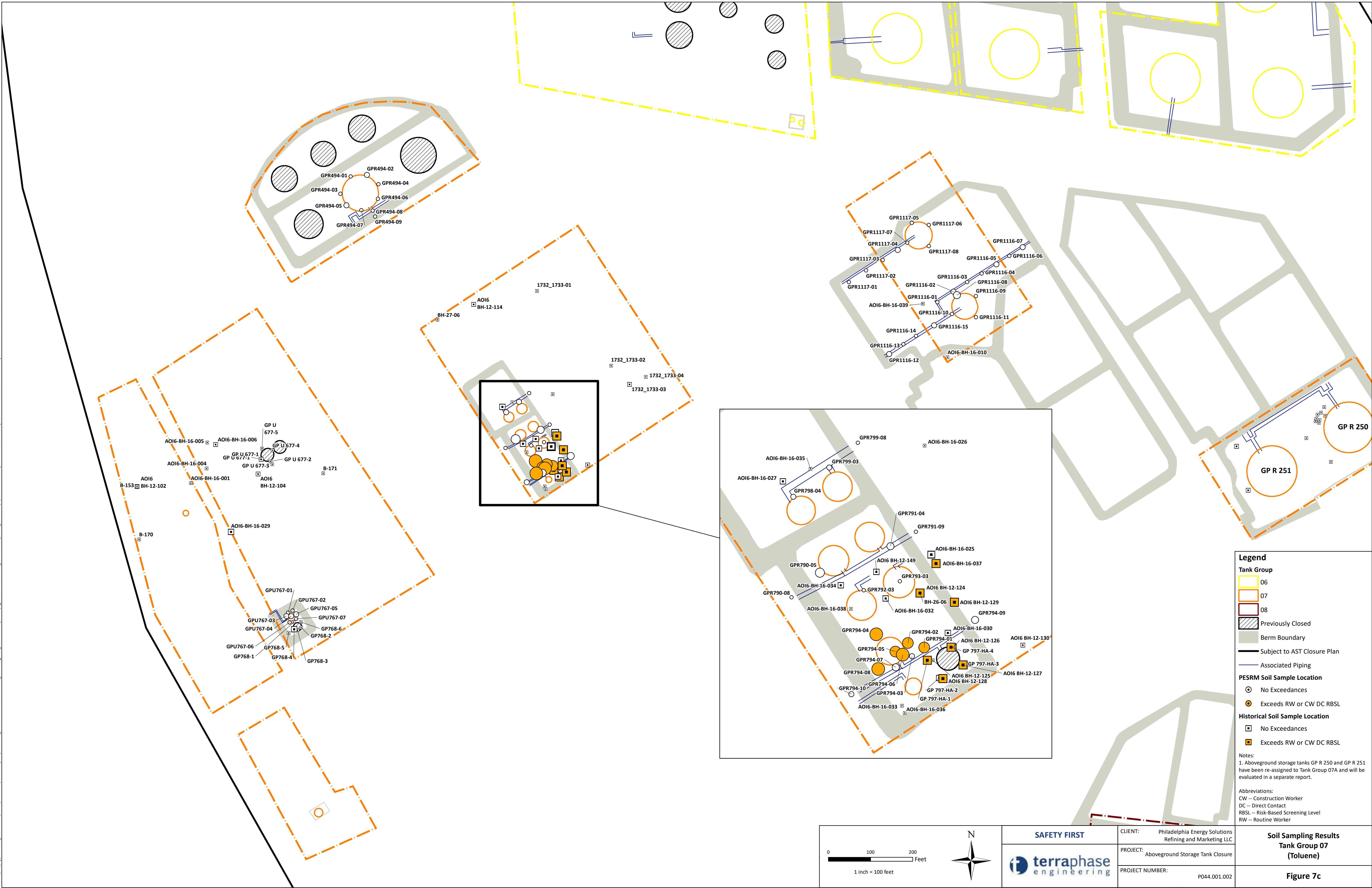
terraPhase engineering

Soil Sampling Results

Tank Group 07 (Benzene)

Figure 7a

File: N:\GIS\Projects\AST Work\Tank Group 07\20230111_Site Characterization - RBSL - with EPI\MapResults\Chem_Tol.mxd 2/2/2023 Created by: Rachel_Coordinates System: NAD 83 Spheroid: Pennsylvania South EPS: 3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

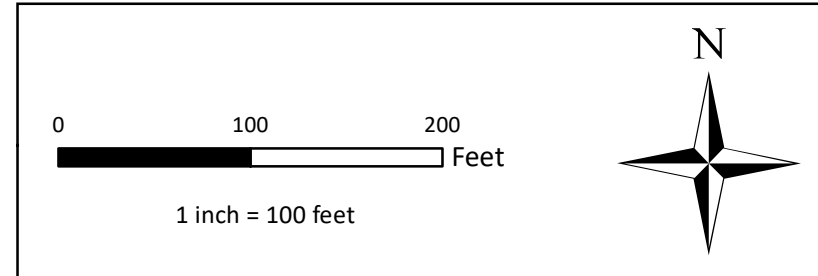
- No Exceedances
- Exceeds RW or CW DC RBSL

Historical Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL

Notes:
 1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:
 CW – Construction Worker
 DC – Direct Contact
 RBSL – Risk-Based Screening Level
 RW – Routine Worker



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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

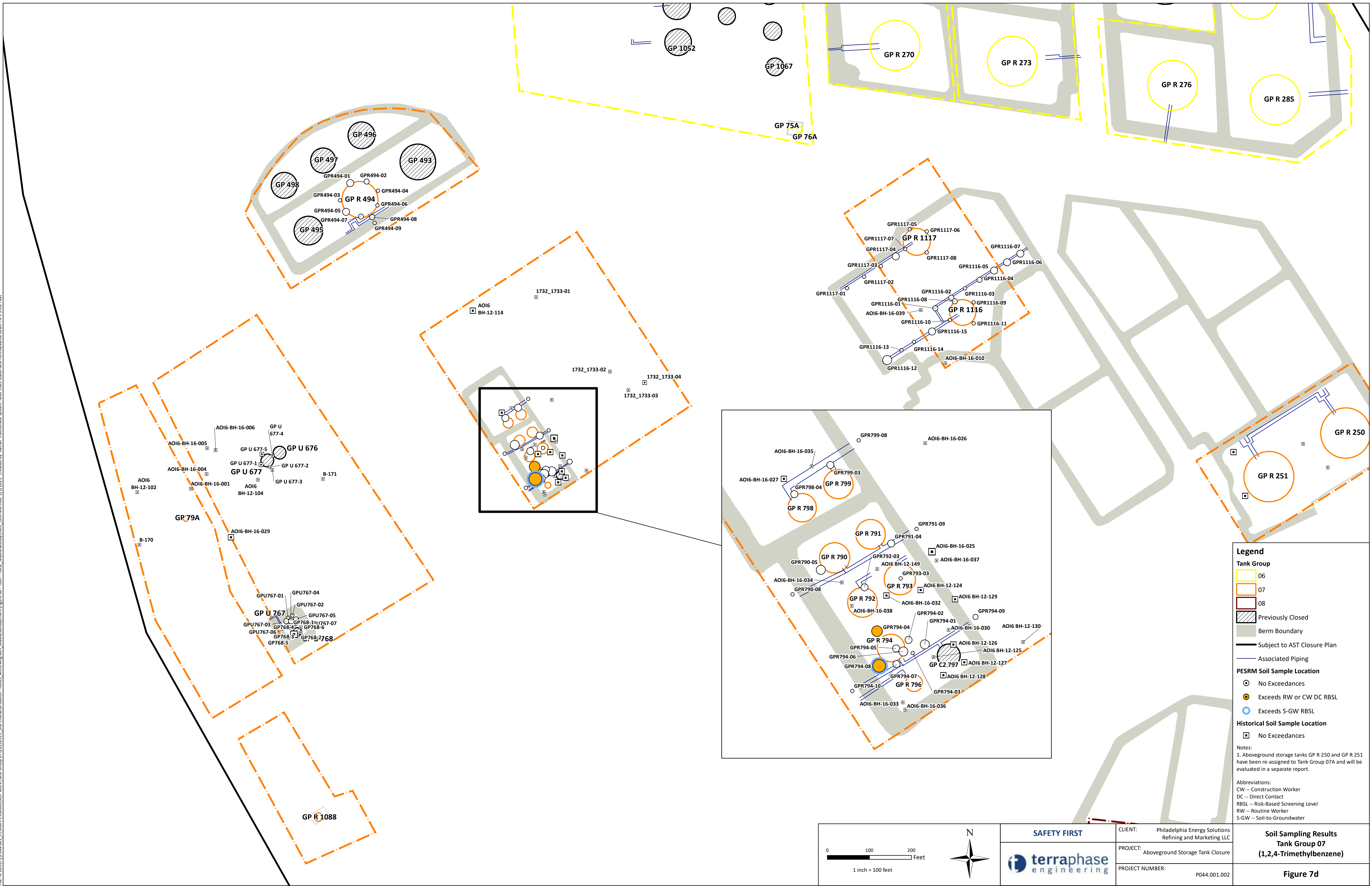
terra phase engineering

Soil Sampling Results

Tank Group 07 (Toluene)

Figure 7c

File: N:\GIS\Projects\1041_001_PESRM\PE\W03\AST\Work\Tank_Group_07\20230111_Site_Characterization_-_RBSL_withEnergren_MapsResults\Chem\124TMB.mxd 2/3/2023 Created by Rachel_Coordinato_South_FPS 3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Historical Soil Sample Location

- No Exceedances

Notes:

1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:

- CW – Construction Worker
- DC – Direct Contact
- RBSL – Risk-Based Screening Level
- RW – Routine Worker
- S-GW – Soil-to-Groundwater

SAFETY FIRST

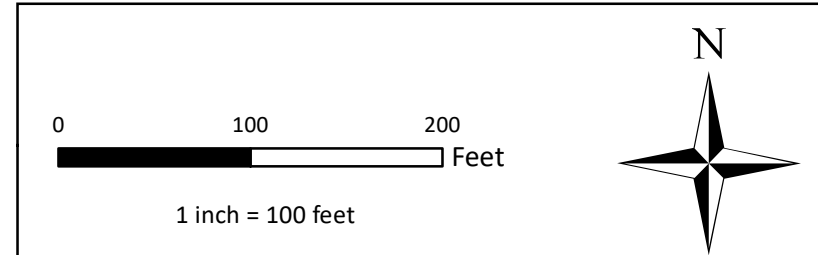
CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

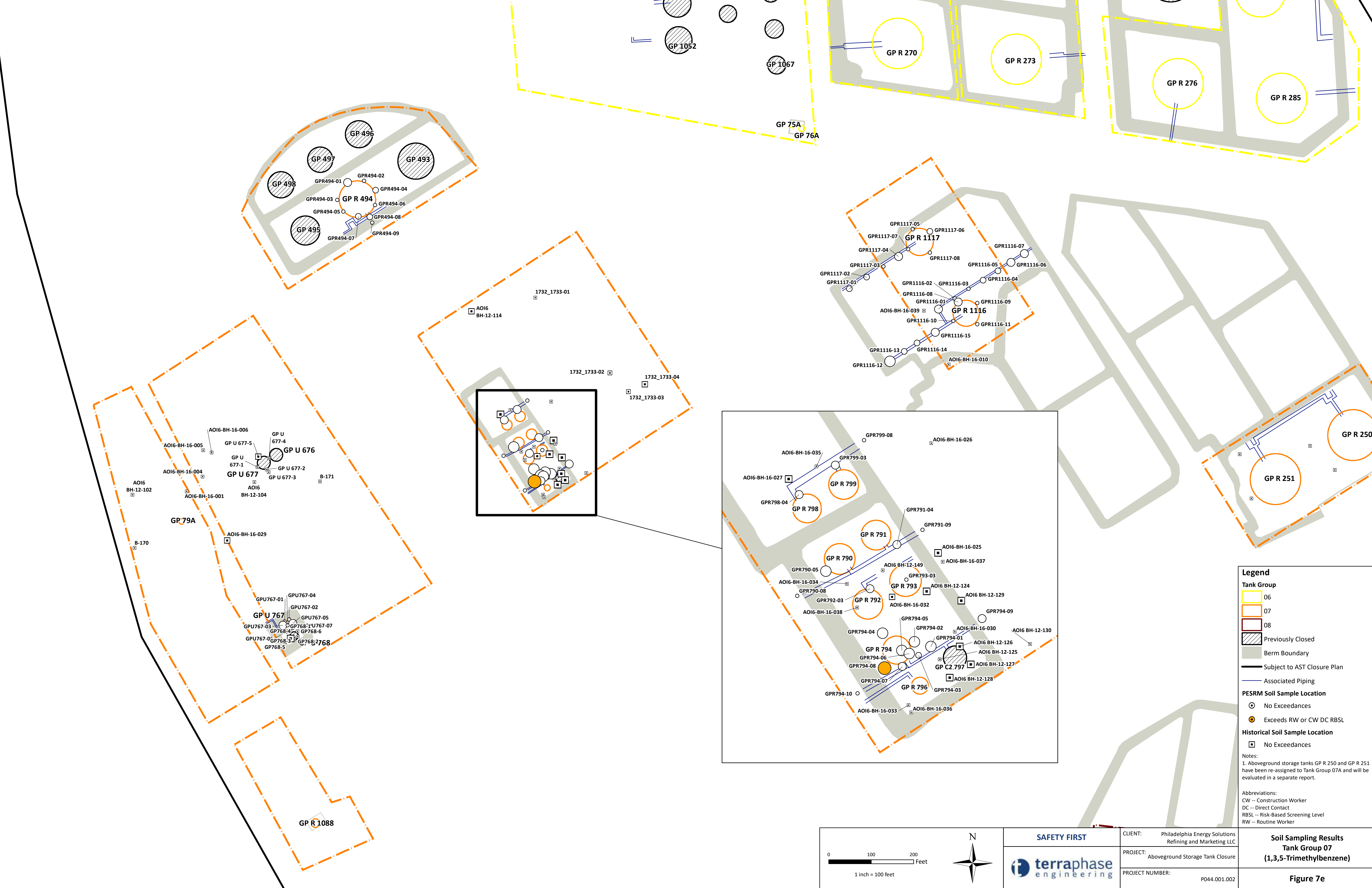
Soil Sampling Results Tank Group 07 (1,2,4-Trimethylbenzene)

Figure 7d



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Legend

- Tank Group
- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping
- PESRM Soil Sample Location**
- No Exceedances
- Exceeds RW or CW DC RBSL
- Historical Soil Sample Location**
- ▣ No Exceedances

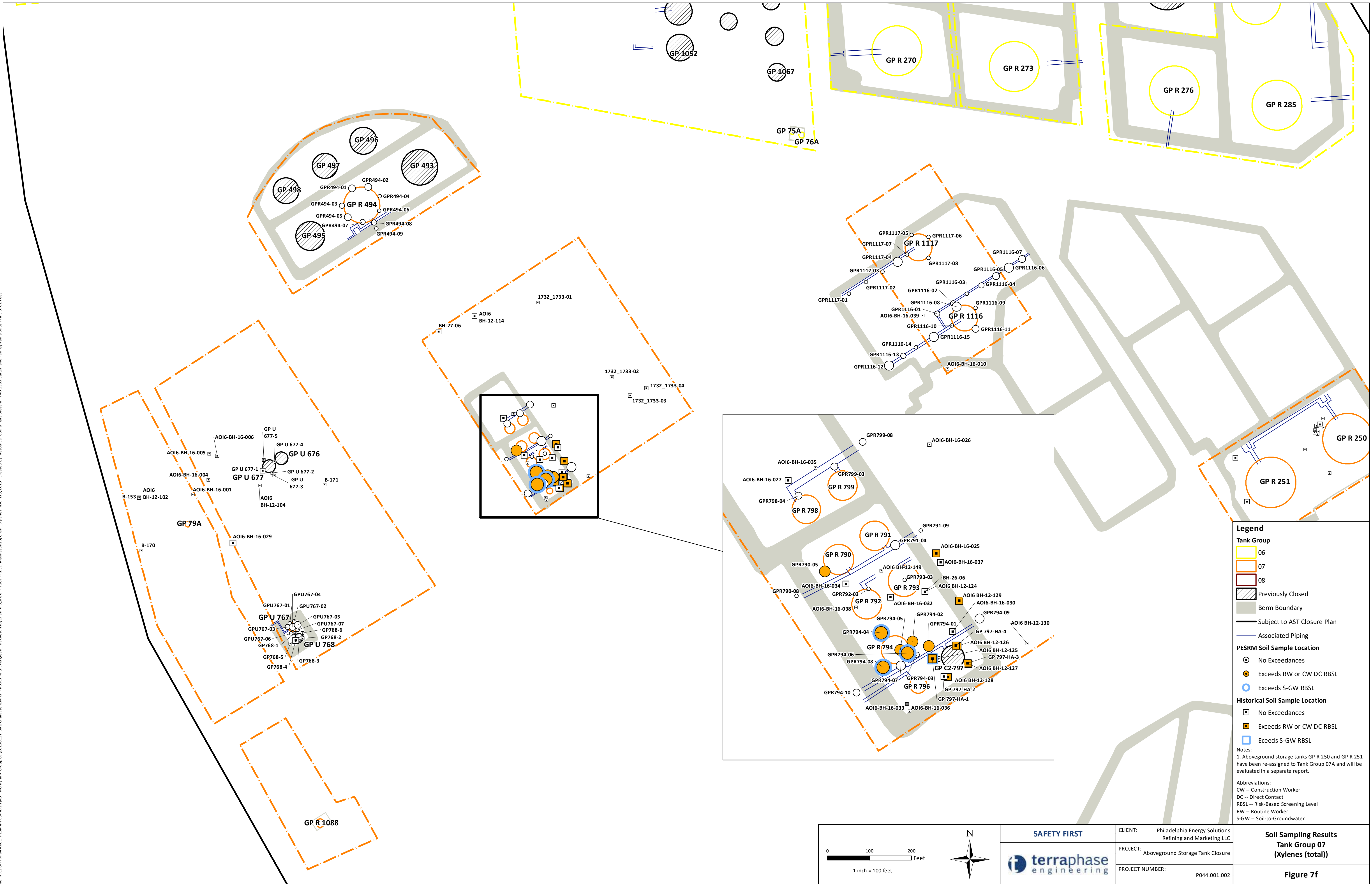
Notes:
1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:
CW -- Construction Worker
DC -- Direct Contact
RBSL -- Risk-Based Screening Level
RW -- Routine Worker

SAFETY FIRST	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Soil Sampling Results Tank Group 07 (1,3,5-Trimethylbenzene)
terrphase engineering	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

Figure 7e

File: N:\GIS\Projects\04_001_PESRM-PES\W02\AST_Work\Tank_Group_07\20230111_Site_Characterization_-_RBSL_withSitegreen_MapsResults\Chem_Xylene.mxd 2/7/2023 Created by: Resource_Coordinate_System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Historical Soil Sample Location

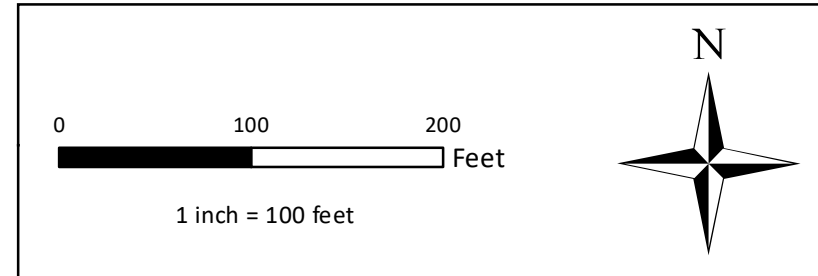
- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Notes:

1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:

CW -- Construction Worker
 DC -- Direct Contact
 RBSL -- Risk-Based Screening Level
 RW -- Routine Worker
 S-GW -- Soil-to-Groundwater

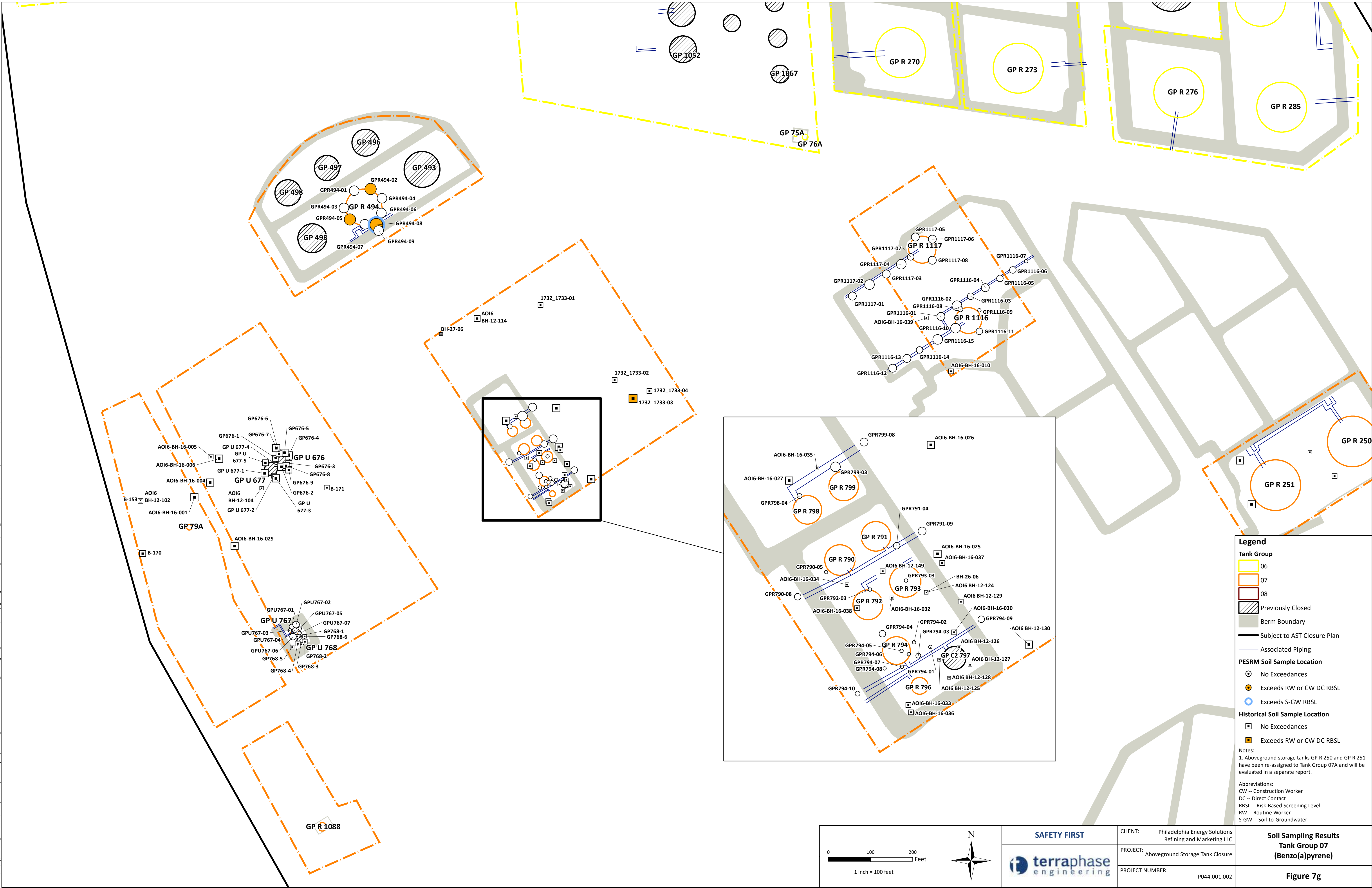


	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Soil Sampling Results
Tank Group 07
(Xylenes (total))

Figure 7f

File: N:\GIS\Projects\044_001_PESRM\AST\Work\Tank Group 07\20230111_Site Characterization - RBSL - with EPI\Map\MapResults\Chem_Burmod_2/3/2023_Created by: Rachel_Coordinato_System: MDO 1885 StatePlane Pennsylvania South FIPS 3302 Feet



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Historical Soil Sample Location

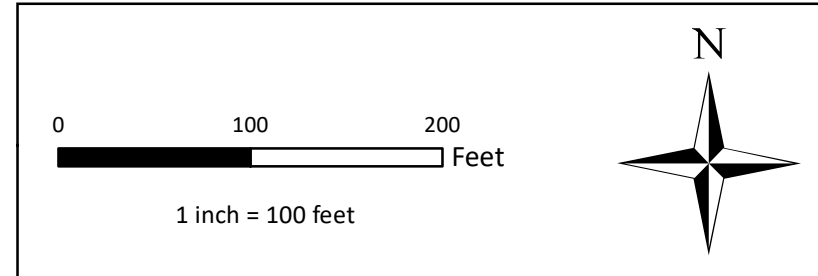
- No Exceedances
- Exceeds RW or CW DC RBSL

Notes:

1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:

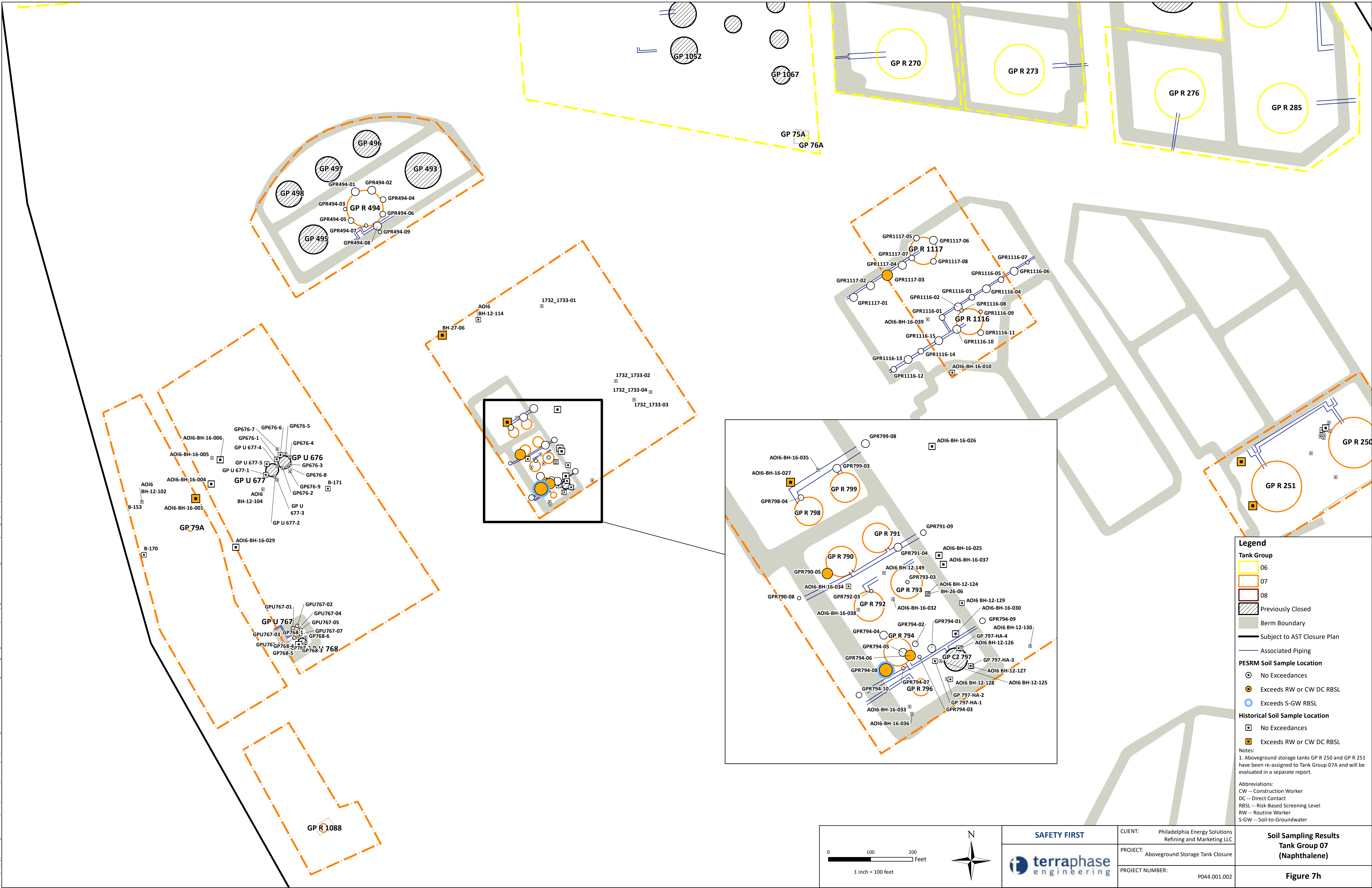
- CW – Construction Worker
- DC – Direct Contact
- RBSL – Risk-Based Screening Level
- RW – Routine Worker
- S-GW – Soil-to-Groundwater



	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Soil Sampling Results
Tank Group 07
(Benzo(a)pyrene)

Figure 7g



Legend

Tank Group

- 06
- 07
- 08
- Previously Closed
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping

PESRM Soil Sample Location

- No Exceedances
- Exceeds RW or CW DC RBSL
- Exceeds S-GW RBSL

Historical Soil Sample Location

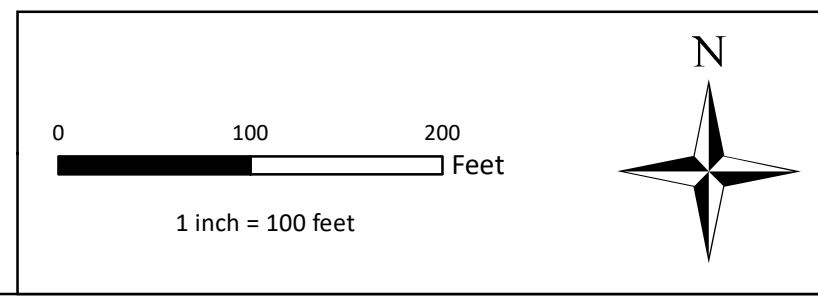
- No Exceedances
- Exceeds RW or CW DC RBSL

Notes:

- Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.

Abbreviations:

- CW - Construction Worker
- DC - Direct Contact
- RBSL - Risk-Based Screening Level
- RW - Routine Worker
- S-GW - Soil-to-Groundwater



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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

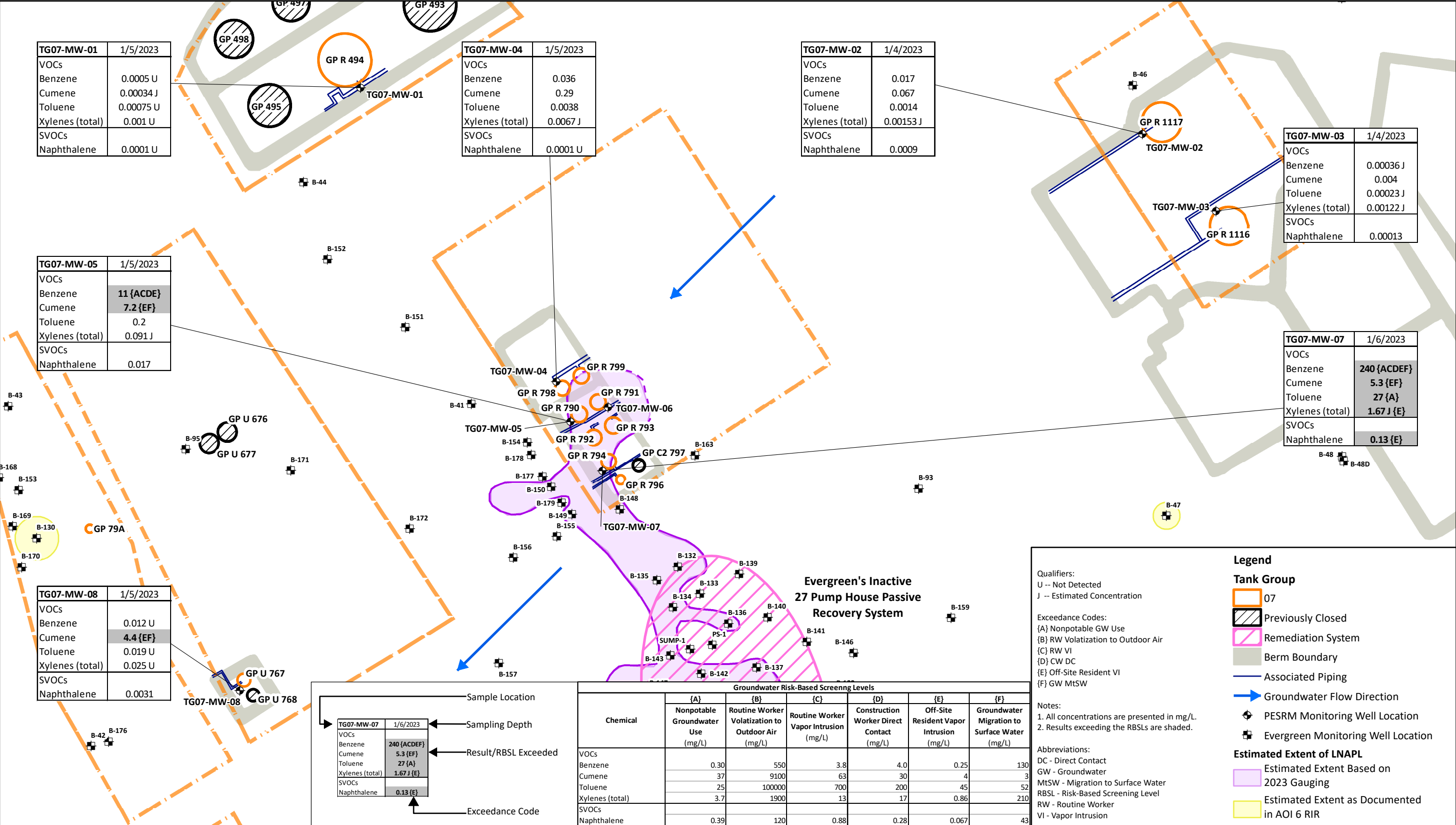
PROJECT NUMBER: P044.001.002

terraPhase engineering

Soil Sampling Results Tank Group 07 (Naphthalene)

Figure 7h

File: N:\GIS\PA\P044.001_PESRM-PES\MXDs\AST\Work\Tank Group 07\20230112_Databases_RBSL_GW\20230112_TG07-Databases_RBSL_GW.mxd 2/1/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



TG07-MW-01	1/5/2023
VOCs	
Benzene	0.0005 U
Cumene	0.00034 J
Toluene	0.00075 U
Xylenes (total)	0.001 U
SVOCs	
Naphthalene	0.0001 U

TG07-MW-04	1/5/2023
VOCs	
Benzene	0.036
Cumene	0.29
Toluene	0.0038
Xylenes (total)	0.0067 J
SVOCs	
Naphthalene	0.0001 U

TG07-MW-02	1/4/2023
VOCs	
Benzene	0.017
Cumene	0.067
Toluene	0.0014
Xylenes (total)	0.00153 J
SVOCs	
Naphthalene	0.0009

TG07-MW-03	1/4/2023
VOCs	
Benzene	0.00036 J
Cumene	0.004
Toluene	0.00023 J
Xylenes (total)	0.00122 J
SVOCs	
Naphthalene	0.00013

TG07-MW-05	1/5/2023
VOCs	
Benzene	11 {ACDE}
Cumene	7.2 {EF}
Toluene	0.2
Xylenes (total)	0.091 J
SVOCs	
Naphthalene	0.017

TG07-MW-07	1/6/2023
VOCs	
Benzene	240 {ACDEF}
Cumene	5.3 {EF}
Toluene	27 {A}
Xylenes (total)	1.67 J {E}
SVOCs	
Naphthalene	0.13 {E}

TG07-MW-08	1/5/2023
VOCs	
Benzene	0.012 U
Cumene	4.4 {EF}
Toluene	0.019 U
Xylenes (total)	0.025 U
SVOCs	
Naphthalene	0.0031

TG07-MW-07	1/6/2023
VOCs	
Benzene	240 {ACDEF}
Cumene	5.3 {EF}
Toluene	27 {A}
Xylenes (total)	1.67 J {E}
SVOCs	
Naphthalene	0.13 {E}

Chemical	Groundwater Risk-Based Screening Levels					
	{A}	{B}	{C}	{D}	{E}	{F}
	Nonpotable Groundwater Use (mg/L)	Routine Worker Volatilization to Outdoor Air (mg/L)	Routine Worker Vapor Intrusion (mg/L)	Construction Worker Direct Contact (mg/L)	Off-Site Resident Vapor Intrusion (mg/L)	Groundwater Migration to Surface Water (mg/L)
VOCs						
Benzene	0.30	550	3.8	4.0	0.25	130
Cumene	37	9100	63	30	4	3
Toluene	25	100000	700	200	45	52
Xylenes (total)	3.7	1900	13	17	0.86	210
SVOCs						
Naphthalene	0.39	120	0.88	0.28	0.067	43

Qualifiers:
 U -- Not Detected
 J -- Estimated Concentration

Exceedance Codes:
 {A} Nonpotable GW Use
 {B} RW Volatilization to Outdoor Air
 {C} RW VI
 {D} CW DC
 {E} Off-Site Resident VI
 {F} GW MtSW

Notes:
 1. All concentrations are presented in mg/L.
 2. Results exceeding the RBSLs are shaded.

Abbreviations:
 DC - Direct Contact
 GW - Groundwater
 MtSW - Migration to Surface Water
 RBSL - Risk-Based Screening Level
 RW - Routine Worker
 VI - Vapor Intrusion

Legend

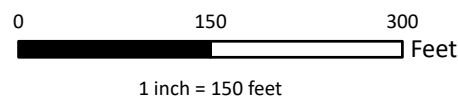
Tank Group

- 07
- Previously Closed
- Remediation System
- Berm Boundary
- Associated Piping
- Groundwater Flow Direction
- PESRM Monitoring Well Location
- Evergreen Monitoring Well Location

Estimated Extent of LNAPL

- Estimated Extent Based on 2023 Gauging
- Estimated Extent as Documented in AOI 6 RIR

Note:
 1. GW was not sampled in TG07-MW-06 due to the presence of LNAPL.



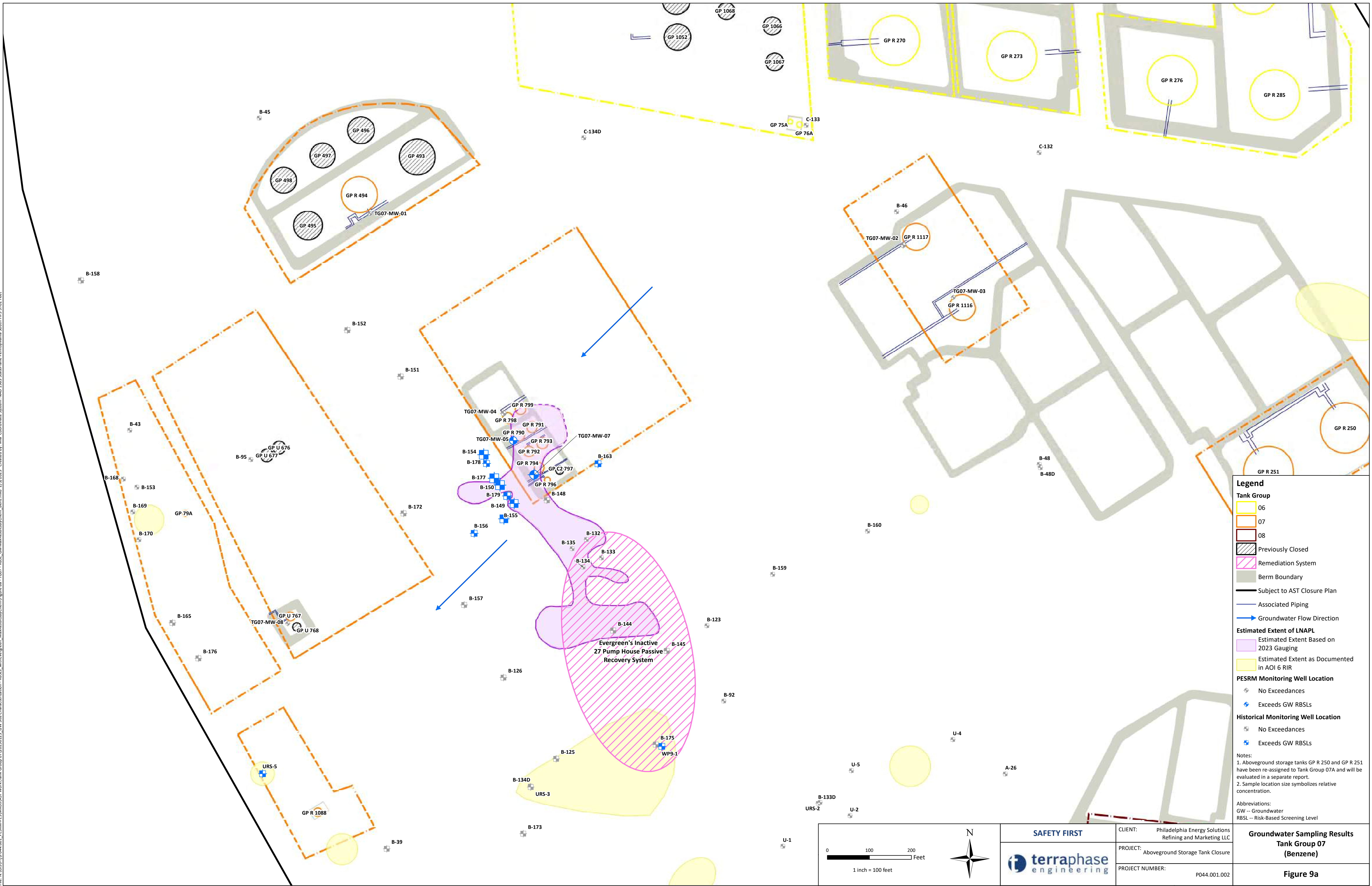
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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
 PROJECT: Aboveground Storage Tank Closure
 PROJECT NUMBER: P044.001.002

**Source Area
 Groundwater Results
 Tank Group 07**

Figure 8

File: N:\GIS\Projects\AST Work\Tank Group 07\20230123_GW Site Characterization - RBSL with Berms_Maps\Results\Chem_Benzene\Map_2/2/2023_Created by: Jola_Coordinate System: NAD 83 StatePlane Pennsylvania South FIPS 3702 Feet



Legend

- Tank Group
 - 06
 - 07
 - 08
- Previously Closed
- Remediation System
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping
- Groundwater Flow Direction

Estimated Extent of LNAPL

- Estimated Extent Based on 2023 Gauging
- Estimated Extent as Documented in AOI 6 RIR

PESRM Monitoring Well Location

- No Exceedances
- Exceeds GW RBLS

Historical Monitoring Well Location

- No Exceedances
- Exceeds GW RBLS

Notes:

- Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.
- Sample location size symbolizes relative concentration.

Abbreviations:

- GW -- Groundwater
- RBSL -- Risk-Based Screening Level

0 100 200 Feet

1 inch = 100 feet

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CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

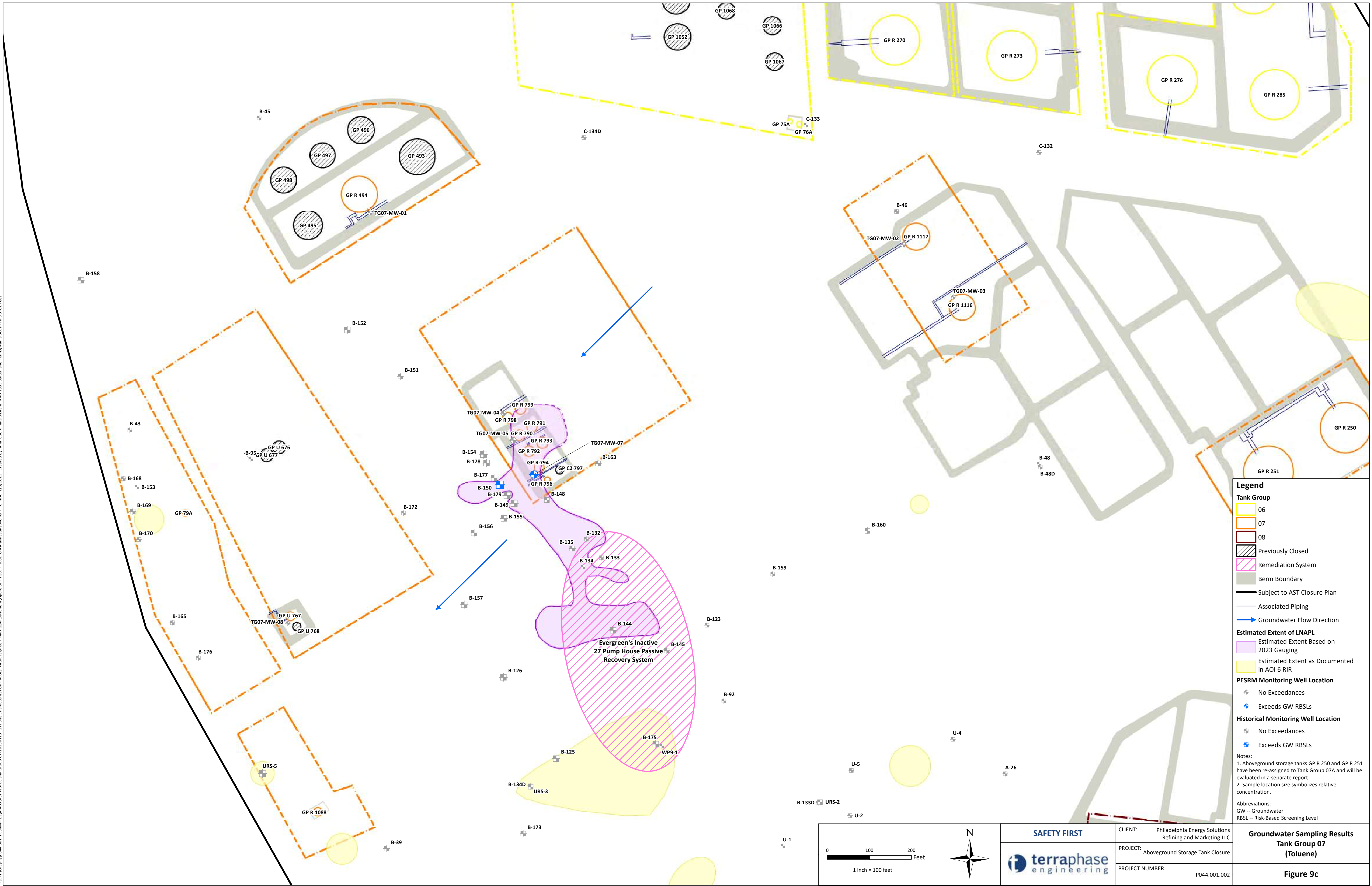
PROJECT NUMBER: P044.001.002

Groundwater Sampling Results

Tank Group 07 (Benzene)

Figure 9a

File: N:\GIS\Proj\044_001_PESRM\PE\WDA\AST Work\Tank Group 07\20230123_GW Site Characterization - RBSL with Evergreen_Maps\Results\Chem\Toluene_21/2/2023_Created by Mia Cordillaris System: IAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend

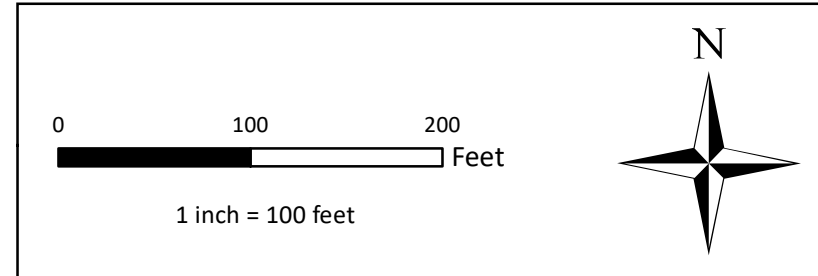
- Tank Group
 - 06
 - 07
 - 08
- Previously Closed
- Remediation System
- Berm Boundary
- Subject to AST Closure Plan
- Associated Piping
- Groundwater Flow Direction
- Estimated Extent of LNAPL
 - Estimated Extent Based on 2023 Gauging
 - Estimated Extent as Documented in AOI 6 RIR
- PESRM Monitoring Well Location
 - No Exceedances
 - Exceeds GW RBSLs
- Historical Monitoring Well Location
 - No Exceedances
 - Exceeds GW RBSLs

Notes:

- Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A and will be evaluated in a separate report.
- Sample location size symbolizes relative concentration.

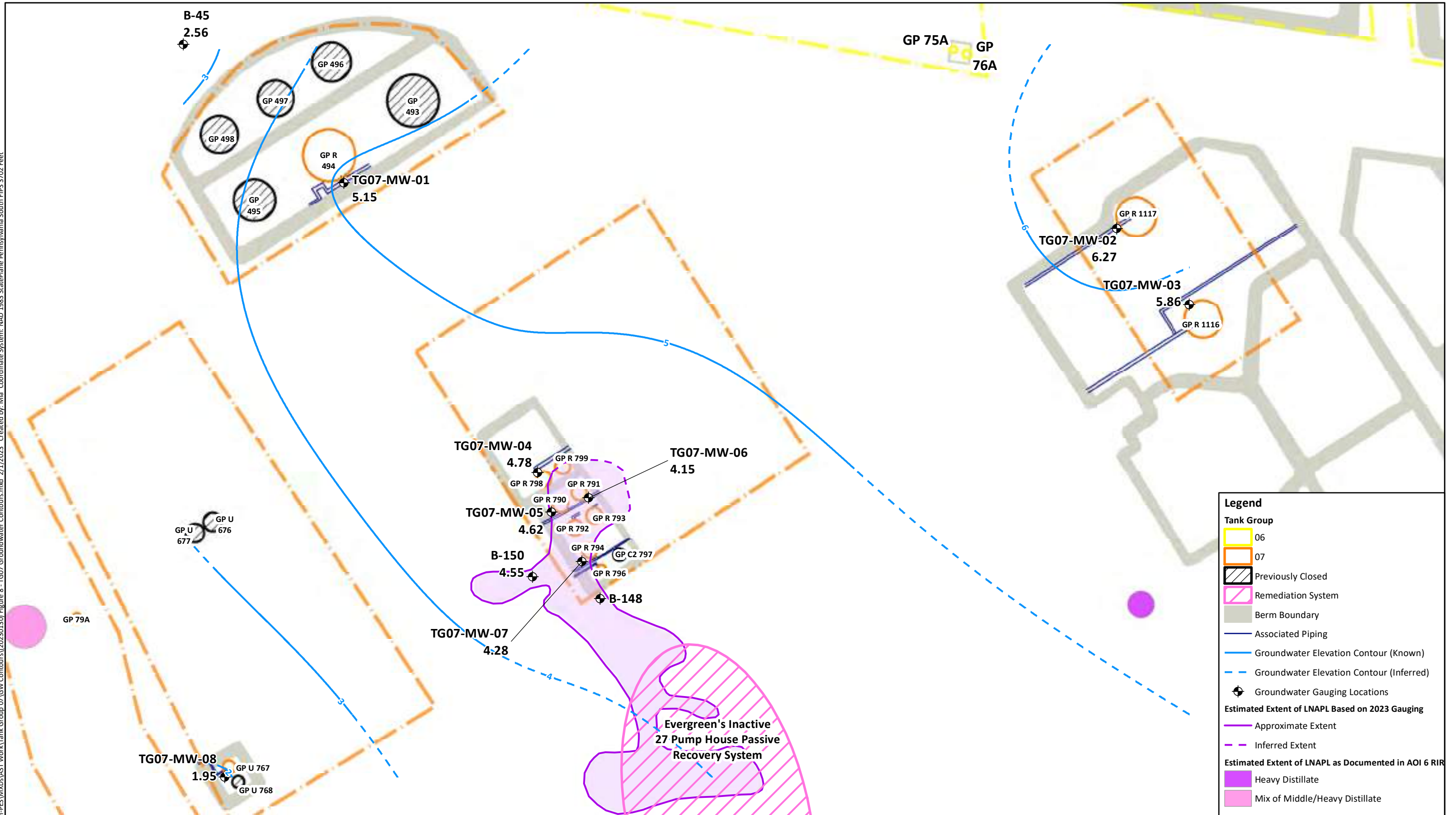
Abbreviations:

- GW -- Groundwater
- RBSL -- Risk-Based Screening Level

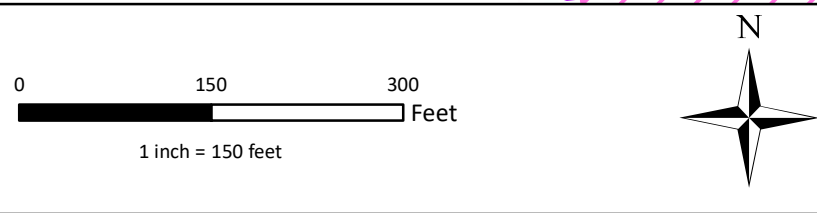


	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Groundwater Sampling Results Tank Group 07 (Toluene) Figure 9c
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

File: N:\GIS\PT\P044_001_PESRM-PES\MapDocs\AST\Work\Tank_Group_07\GW_Contours\20230130\Figure 8 - TG07 Groundwater Contours.mxd 2/1/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

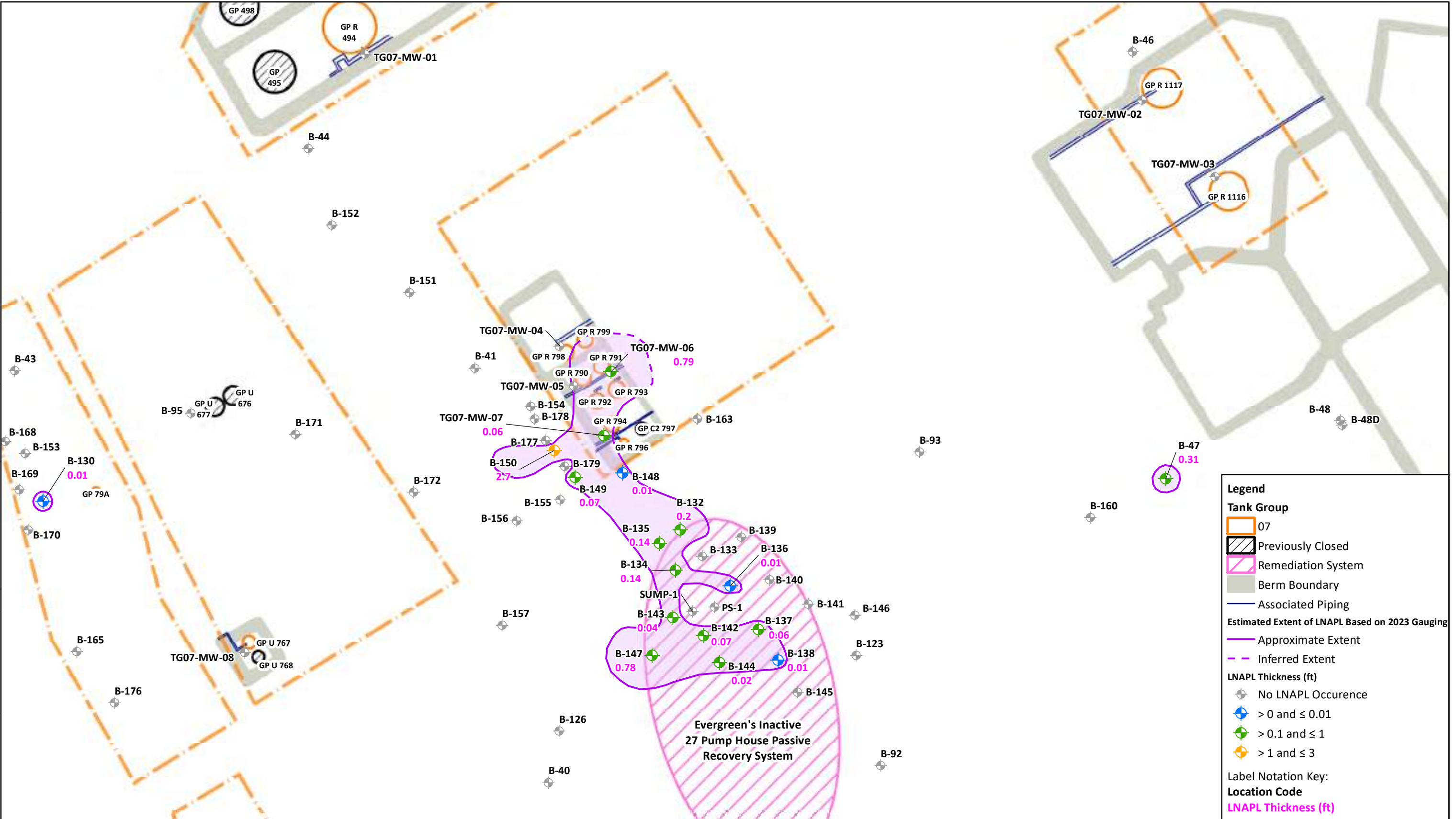


Note:
 1. Groundwater elevation contour interval is 1.0 feet.
 2. Corrected Depth to Water Levels factor an average LNAPL density of 0.82, where present.
 3. Monitoring well B-148 was not included in groundwater contour maps provided in the AOI 6 RIR (GHD 2017) presumably due to its anomalously low groundwater elevation. PESRM has likewise not included well B-148 in the groundwater contours presented in this figure.

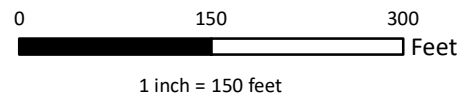


SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Interpreted Potentiometric Surface, January 3, 2023 Figure 10
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

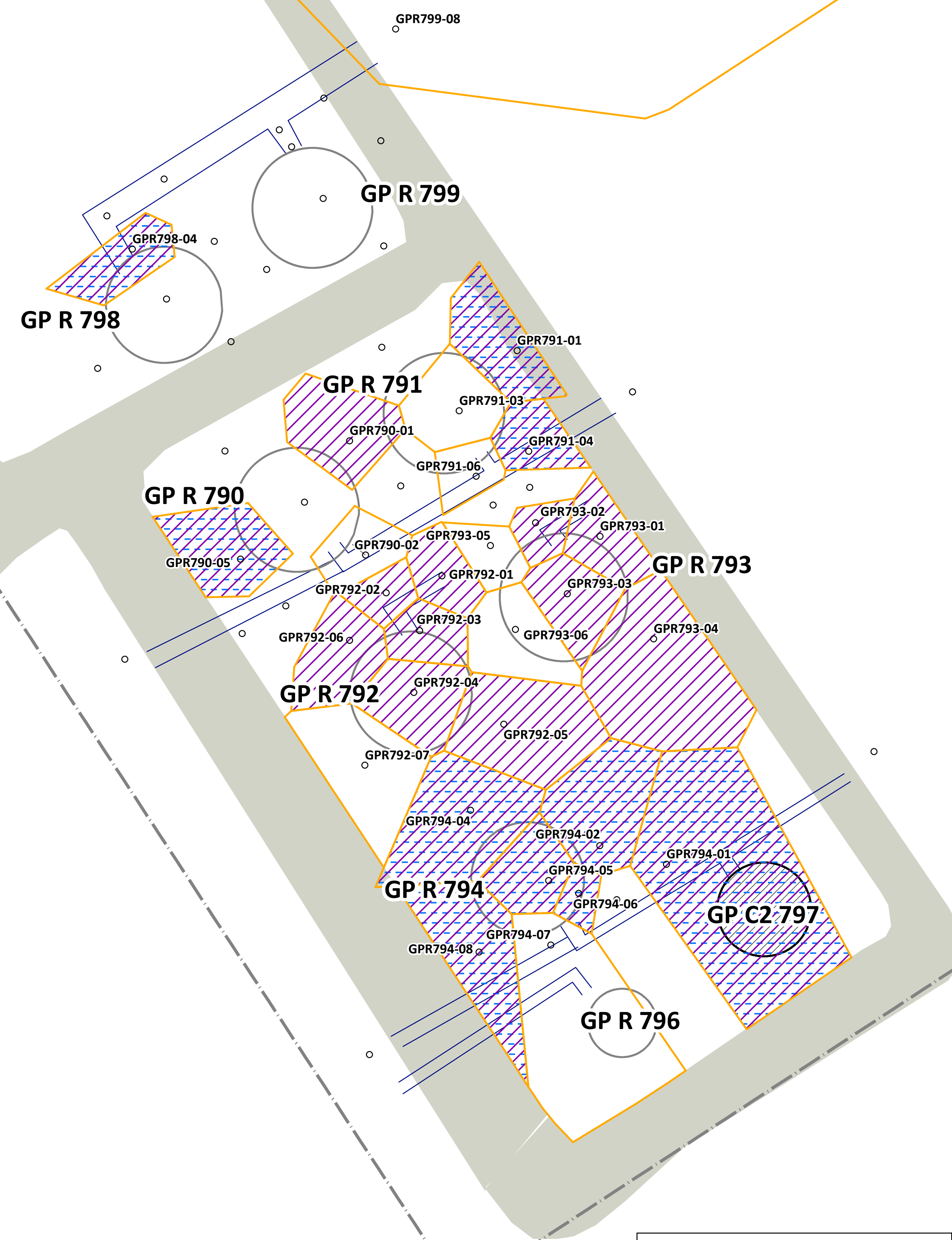
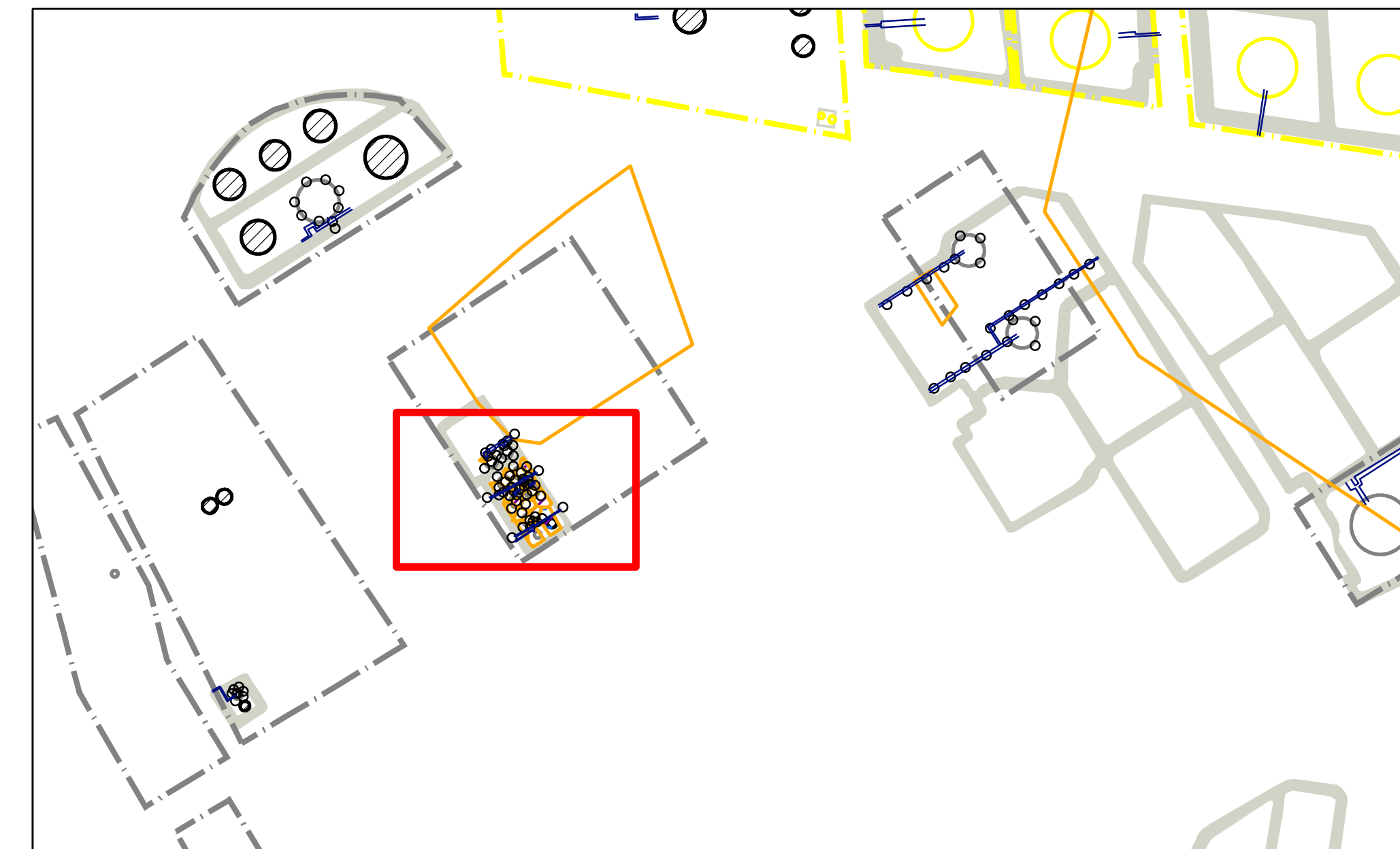
File: N:\GIS\Prj\044_001_PESRM-PES\MXDS\AST\Work\Tank Group 07\For Site Characterization Report\Figure 11 - Most Recent LNAPL Thickness.mxd 2/1/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Note:
1. The approximate extent of LNAPL is based on the most recent thickness measurements.



 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Most Recent LNAPL Thickness Tank Group 07 Figure 11
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

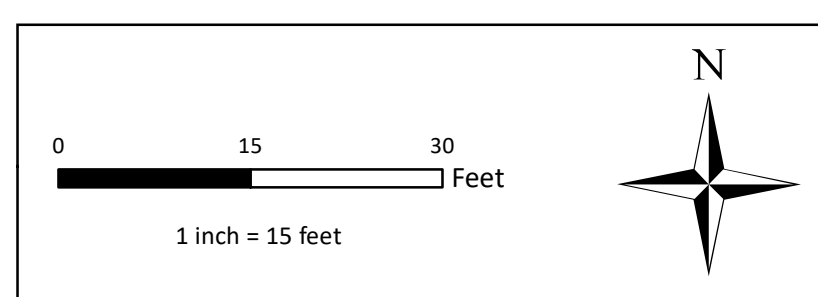


Legend

- Tank Group Boundary
- Previously Closed AST
- Berm Boundary
- Associated Piping
- Soil Sample Location

Soil Cancer Risk > 10⁻⁴ and/or HI > 1:

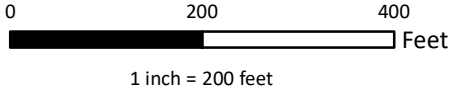
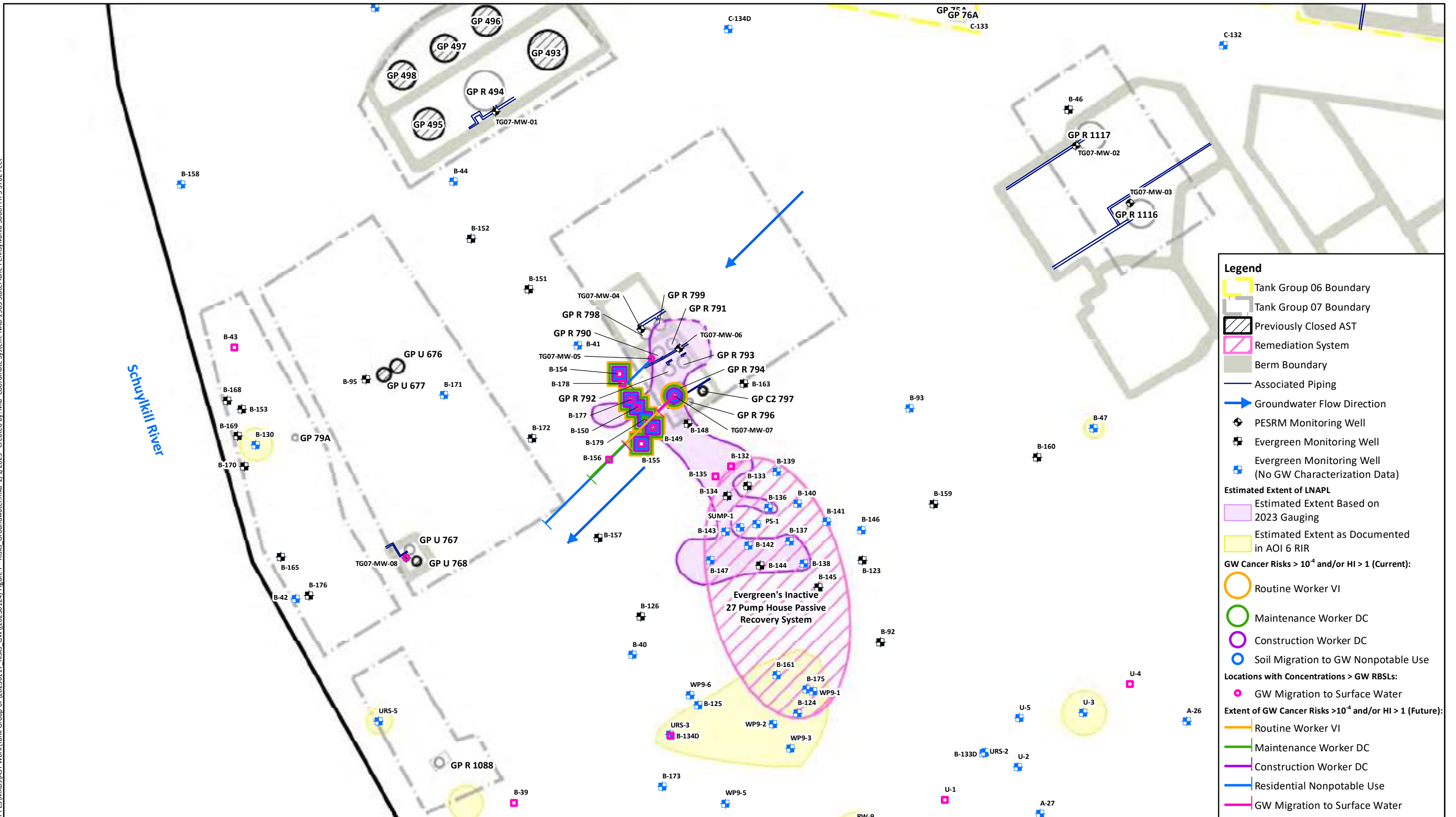
- Routine Worker VI
- Construction Worker DC
- Soil Migration to GW Nonpotable Use



	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Risk Assessment Results (Soil)
Tank Group 07
Figure 12

File: N:\GIS\Proj\044_001_PES\Map\ES\Map\AST\Work\Tank Group 07\20230117_Bkx_S01\20230124_Figure 6 - Bkx_Soil.mxd 1/24/2023 Created by: Mia, Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Risk Assessment Results (Groundwater) Tank Group 07 Figure 13
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

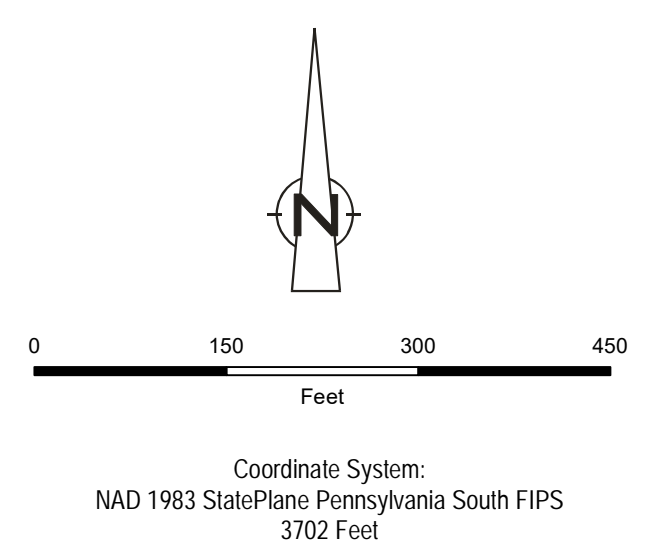
Appendix A

Select Figures from the AOI 6 RIR



Notes:
 - Tank Group 07 boundaries/notation and cross section lines were added by Terraphase and were not on the original figures.
 - The cross section lines were approximated from Figure 8 of the GHD 2016 AOI-6 RIR.

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



- Legend**
- 2016 RI Groundwater Sample
 - Water Table Monitoring Well
 - Recovery Well
 - Deep Monitoring Well
 - Damaged Monitoring Well
 - Destroyed Monitoring Well
 - ▲ Monitoring Well (Unable to Locate)
 - Piezometer
 - 2016 RI Soil Sample
 - 2017 RI Soil Sample
 - Historical Soil Sample
 - 2016 RI (Not Sampled)
 - 2016 RI (Attempted Sample Location)
 - Air Sample
 - Bulkhead
 - Tank
 - Tank Addressed in SCR/RACR 2017
 - Solid Waste Management Unit
 - Area Of Interest

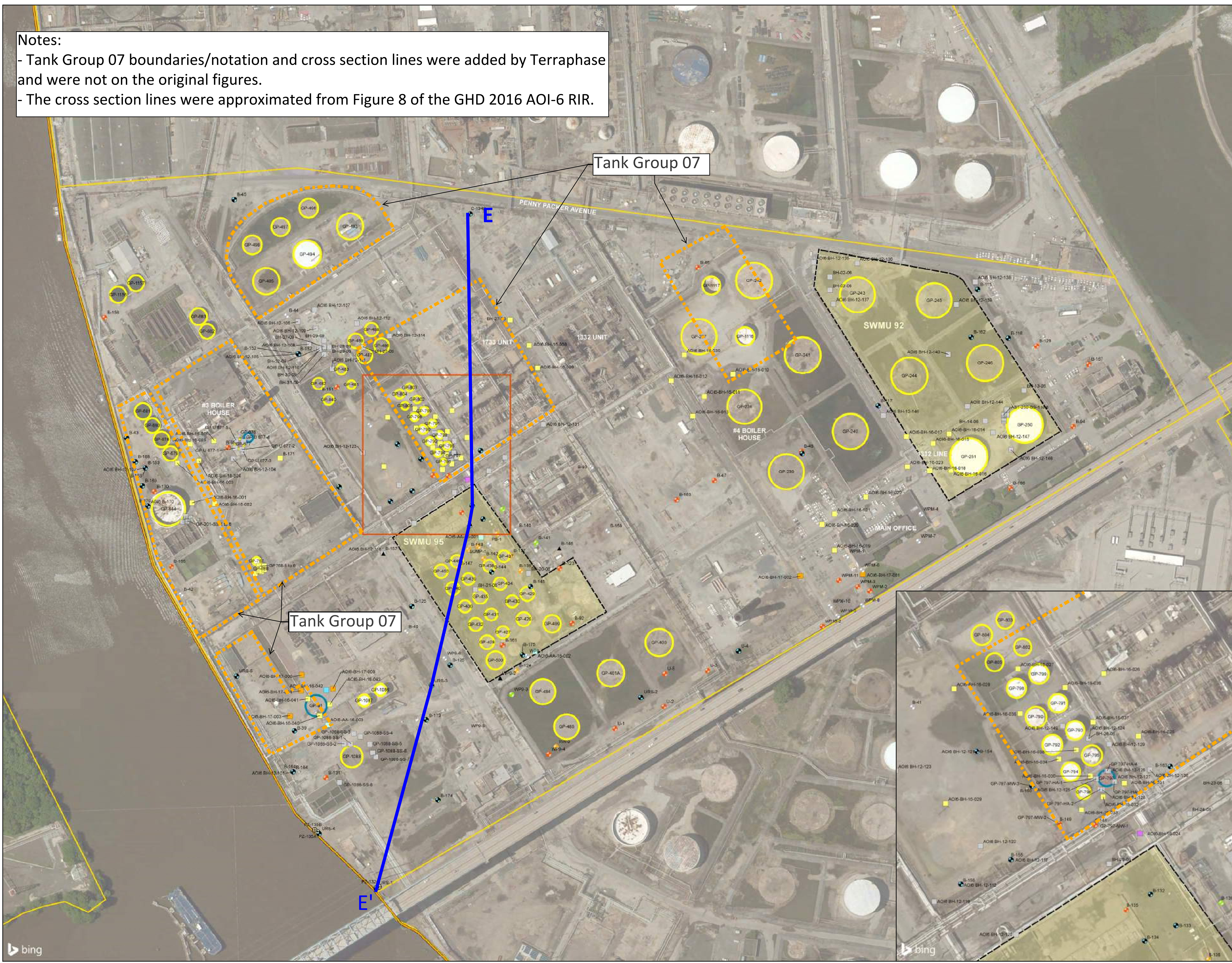
Original Size: ANSI D
 Bar is one inch on original size drawing
 0 — 1"

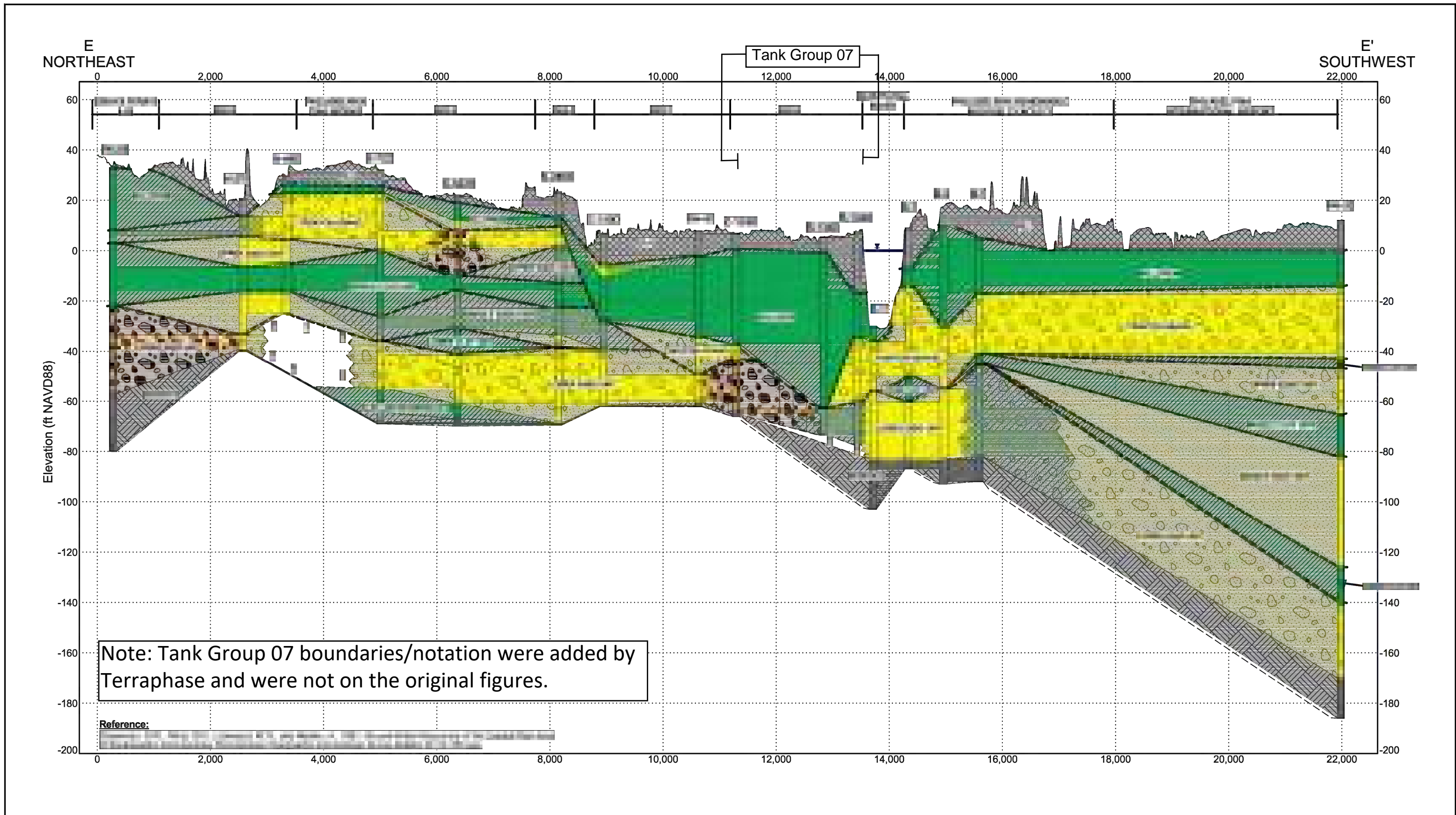
Project: 11109613
 Date: Nov 20, 2017

EVERGREEN RESOURCES MANAGEMENT
 AOI-6 PHILADELPHIA REFINERY OPERATIONS

AOI 6 SITE PLAN

Figure No. **FIGURE 2**





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., 1991. Geographic locations for those historic borings were estimated by Stantec in a GIS using a georeferenced image of Plate 1 of that report. Fill thickness interpreted by Stantec.
3. PH-25 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



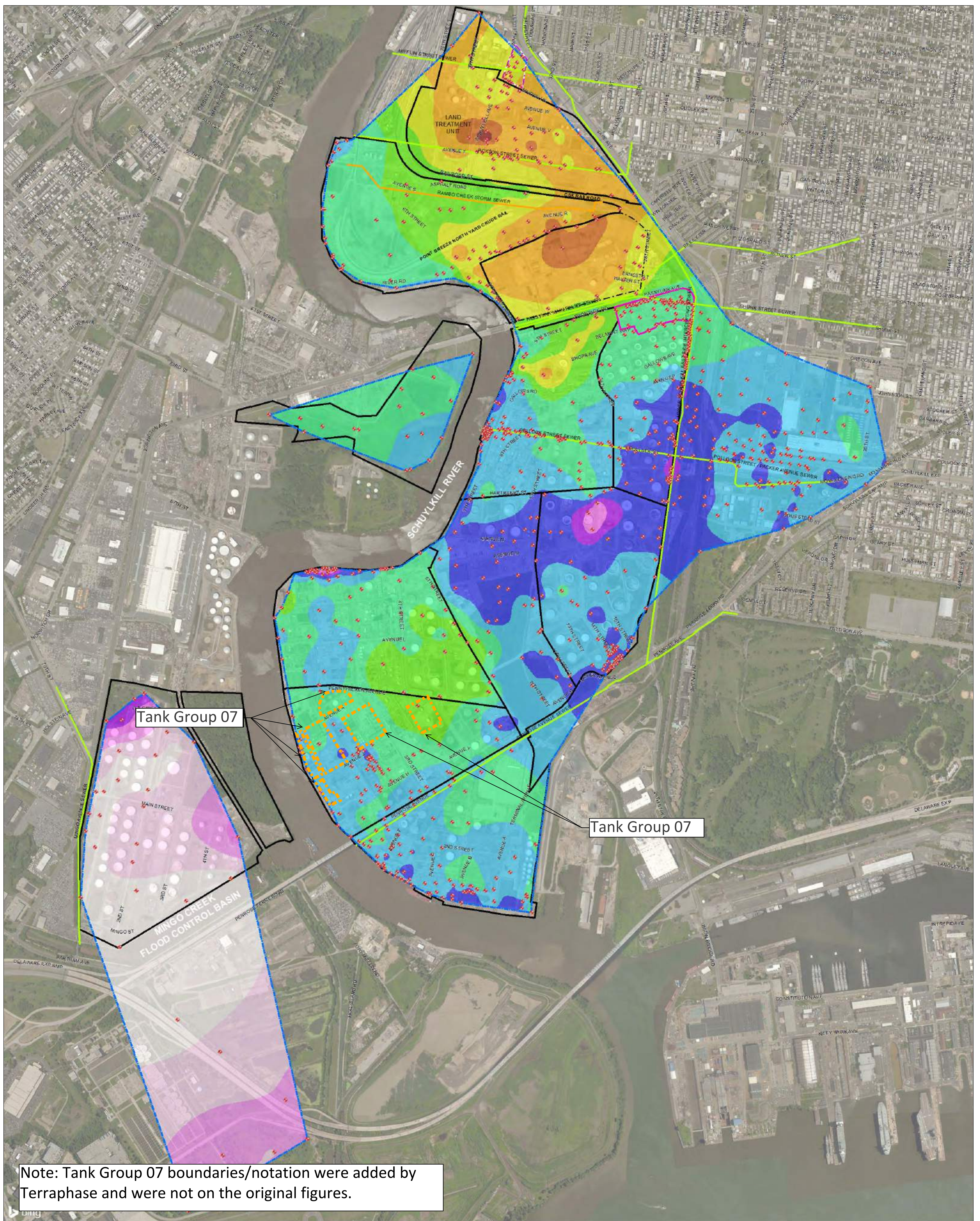
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT

STRATIGRAPHIC PROFILE

11109613-01

Dec 1, 2016

FIGURE 8



Note: Tank Group 07 boundaries/notation were added by Terraphase and were not on the original figures.



- LEGEND**
- ♦ WELL UTILIZED FOR THE JUNE 2018 WATER-TABLE ELEVATION SURFACE
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK STORM SEWER
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - BELMONT TERMINAL
 - APPROXIMATE LIMITS OF WATER-TABLE WELL CONTROL

JUNE 2018 WATER-TABLE ELEVATION
FT NAVD88

14 - 16
12 - 14
10 - 12
8 - 10
6 - 8
4 - 6
2 - 4
0 - 2
-2 - 0
-4 - -2
-6 - -4
-8 - -6
-10 - -8

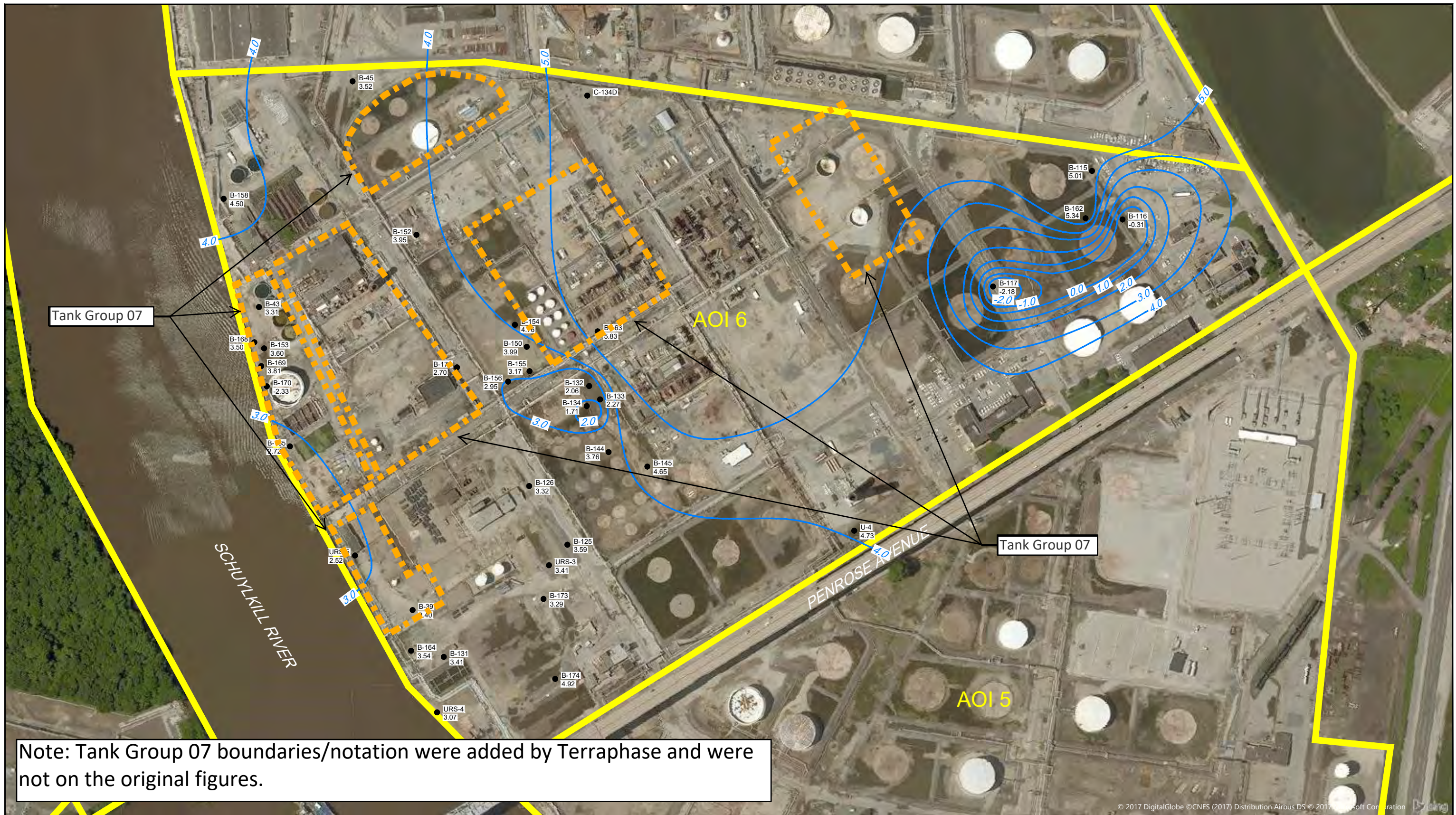
0 500 1,000 1,500 Feet
1:8,100 (At original document size of 24x36)

Figure No. 3-29
Title JUNE 2018 WATER-TABLE ELEVATION

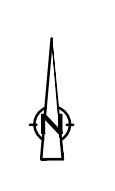
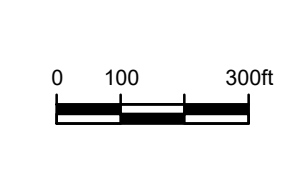
Client/Project PHILADELPHIA REFINERY OPERATIONS, A SERIES OF EVERGREEN RESOURCES GROUP, LLC FORMER PHILADELPHIA REFINERY 3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

Project Location Philadelphia, Philadelphia County, Pennsylvania
213402454
Prepared by ADK on 8/14/2018
Technical Review by ANP on 9/20/2018
Independent Review by JLM on 10/19/2018





Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date June 2014, Accessed: 2017



LEGEND

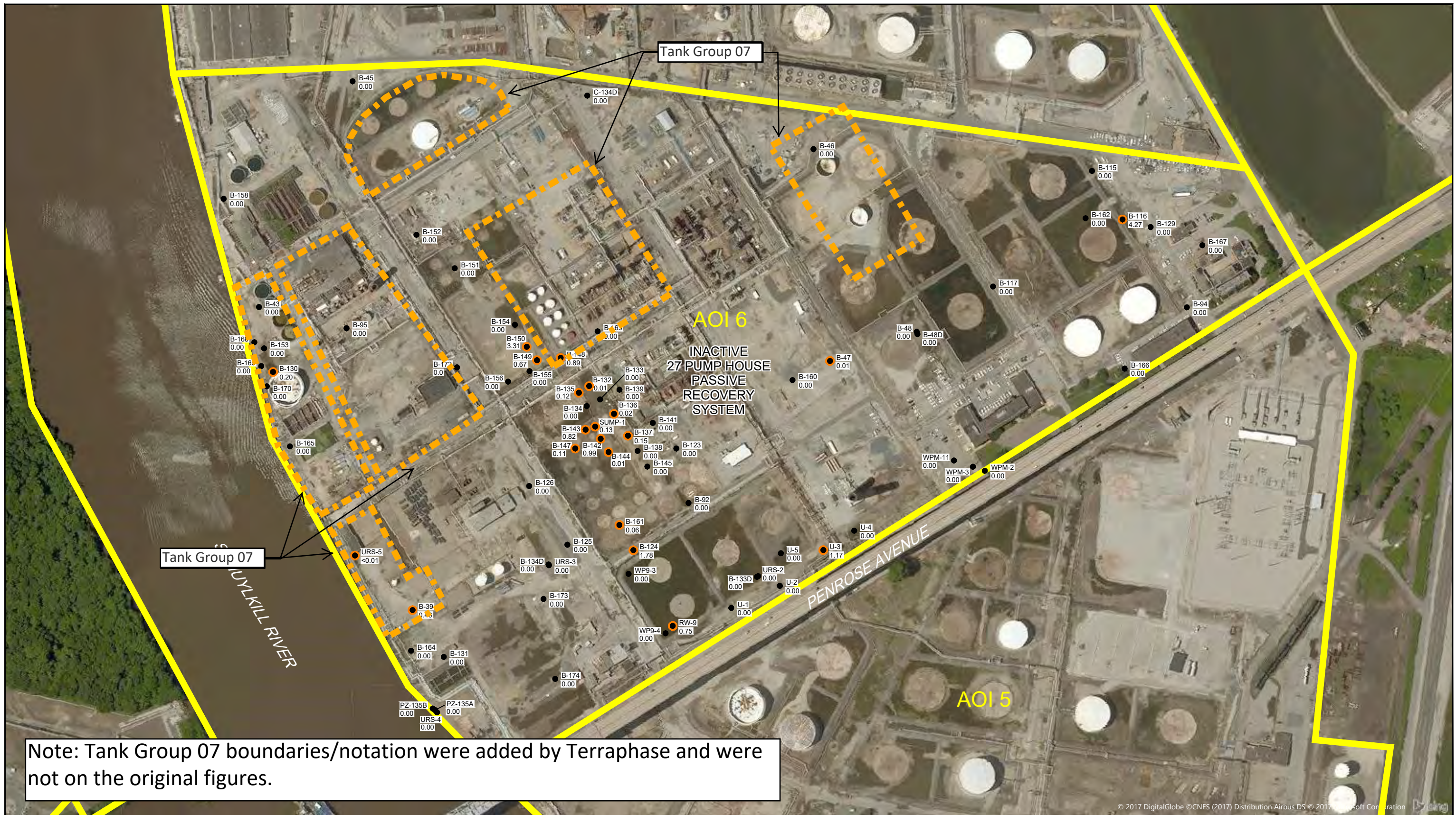
- B-39 SAMPLE LOCATION
- 3.40 WATER TABLE ELEVATION (ft. AMSL)
- 0.0 — WATER TABLE CONTOUR (ft. AMSL)



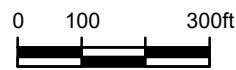
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT
WATER TABLE CONTOURS
 MAY 2, 2016

11109613-01
 Nov 11, 2017

FIGURE 14



Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date June 2014, Accessed: 2017



- LEGEND**
- B-174 SAMPLE LOCATION
 - 0.00 LNAPL APPARENT THICKNESS (ft.)
 - LNAPL PRESENT



EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT
 LNAPL APPARENT THICKNESS
 MAY 11, 2017

11109613-01
 Nov 11, 2017

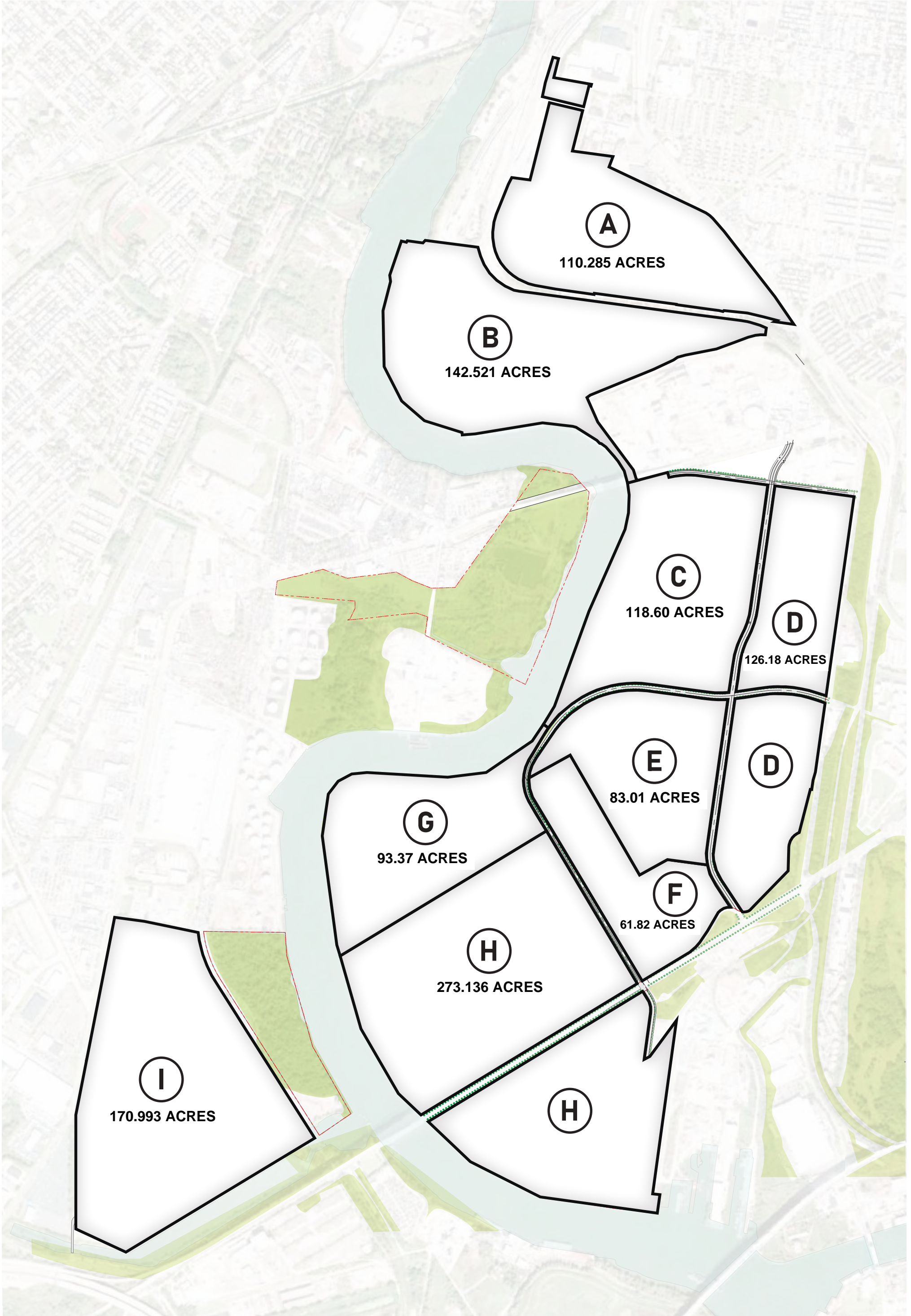
FIGURE 17

Appendix B

Individual Parcel Map



INDIVIDUAL PARCEL MAP



Appendix C

Risk Assessment



FINAL

Site-Specific Human Health Risk Assessment

Tank Group 07

Former Philadelphia Energy Solutions Refinery

3144 West Passyunk Avenue

Philadelphia, Pennsylvania

(Incident No. 57973)

Prepared for

Philadelphia Energy Solutions Refining and Marketing LLC

111 S. Wacker Dr Suite 3000

Chicago, IL 60606

Prepared by

Terraphase Engineering Inc.

100 Canal Pointe Boulevard, Suite 110

Princeton, New Jersey 08540

February 2023

Project Number P044.001.002



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6	RME Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil
7	Location-Specific Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil
8	Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Groundwater
9	Location-Specific Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Groundwater
10	Site-Specific Remediation Standards for Constituents of Concern (COC) for Construction Worker Soil Direct Contact Exposure
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12	Site-Specific Remediation Standards for Constituents of Concern (COC) for Construction Worker Groundwater Direct Contact Exposure



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- 1 Facility Location
- 2 Site Location
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- 4 Soil Sample Results Compared to RBSLs
- 5 Groundwater Sample Results Compared to RBSLs
- 6 Risk Assessment Results (Soil)
- 7 Risk Assessment Results (Groundwater)

Appendices

- A Human Health Risk Assessment Supporting Information and Calculations
- B Risk-Based Screening Level Supporting Information and Calculations
- C Analytical Data
- D Select Figures from Sitewide RIR



Acronyms and Abbreviations

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
124-TMB	1,2,4-trimethylbenzene
135-TMB	1,3,5-trimethylbenzene
Act 2	Pennsylvania Land Recycling and Environmental Remediation Standards Act
Act 32	Storage Tank and Spill Prevention Act
AST	above ground storage tanks
AT _c	averaging time for carcinogens
BaP	benzo(a)pyrene
bgs	below ground surface
C _{air}	constituent concentration in air
cm ² /day	square centimeters per day
COC	constituent of concern
COPC	constituent of potential concern
C _{unit}	unit constituent concentration
ED	exposure duration
EF	exposure frequency
ET	exposure time
Facility	Former Philadelphia Energy Solutions refinery
ft	feet or foot
Girard Point	Girard Point Refinery
HI	hazard index
HQ	hazard quotient
<i>i</i>	route
kg	kilograms
K _p	permeability coefficient
LNAPL	light non-aqueous phase liquid
mg/cm ²	milligrams per square centimeter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/L	milligram per liter
PADEP	Pennsylvania Department of Environmental Protection
PESRM	Philadelphia Energy Solutions Refining and Marketing LLC
PM ₁₀	respirable soil particulates
RBSL	risk-based screening level



Report	<i>Site Characterization Report</i>
RfC	reference concentration
RfD	reference dose
RME	reasonable maximum exposure
SAP	<i>Site Characterization Sampling and Analysis Plan – Tank Group 07</i>
the Site	Point Breeze Hazardous Waste Container Storage Unit
SF	slope factor
SSS	site-specific standards
TCRL	target cancer risk
Terraphase	Terraphase Engineering Inc.
THQ	target hazard quotient
UCL	upper confidence limit
URF	unit risk factor
USEPA	United States Environmental Protection Agency
Work Plan	<i>Aboveground Storage Tank Closure Work Plan</i>



1 Introduction

Terraphase Engineering Inc. (Terraphase), on behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PESRM), has prepared this *Site-Specific Human Health Risk Assessment* (the Risk Assessment) in support of the *Site Characterization Report* (Report) for Tank Group 07 (the Site), located within the Former Philadelphia Energy Solutions refinery facility (the Facility). This document describes the methodology and results of a site-specific human health risk assessment, performed in accordance with 25 Pa. Code § 250.409, to support a demonstration that conditions at the Site meet the tank closure requirements in accordance with the Storage Tank and Spill Prevention Act (Act 32).

The Facility, which is located at 3144 West Passyunk Avenue, Philadelphia, Pennsylvania (**Figure 1**), is undergoing tank closure activities in preparation for redevelopment. Tank Group 07 is located within an area of the Facility referred to as the Girard Point Refinery (Girard Point) (**Figure 2**). As discussed in Terraphase's (2021) *Aboveground Storage Tank Closure Work Plan* (Work Plan), which was approved by the Pennsylvania Department of Environmental Protection (PADEP) on April 23, 2021, closure of the above ground storage tanks (ASTs) under Act 32 is being pursued through a group closure process, in which ASTs in the same general area (e.g., tank farm) are demolished, removed, investigated, and evaluated at about the same time. There are eight tank groups in all and demolition of the tanks has been proceeding in phases at the Facility from the north to the south.

Following the demolition of the ASTs in Tank Group 07, between July 2022 and January 2023, soil and groundwater (including light non-aqueous phase liquid [LNAPL]) sampling was conducted in accordance with the Work Plan and the *Site Characterization Sampling and Analysis Plan – Tank Group 07* (SAP) submitted to PADEP on December 7, 2022. The sampling was performed to gather the data necessary to assess whether conditions at the Site following closure activities are protective of human health and the environment.

This Risk Assessment has been completed in accordance with the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) and risk assessment guidance from PADEP and the United States Environmental Protection Agency (USEPA). It is organized as follows:

- Section 2 presents the site setting. Information regarding the site description, operational history and usage of the tanks, topography, geology, and hydrology of the area is summarized. A discussion of on-site and off-site land and groundwater use under current and reasonably expected future land and groundwater use is also provided.
- Section 3 discusses the results of the soil, groundwater, and LNAPL¹ sampling performed in accordance with the Work Plan and SAP. This section documents how the sampling results adequately characterize the nature and extent of constituents in the environment to select a remediation standard and perform a site-specific risk assessment.

¹ At the time this Risk Assessment was completed, LNAPL characterization data had not been received. Therefore, wells with LNAPL are conservatively assumed to present an unacceptable risk to current and reasonably expected future receptors. An addendum will be provided to PADEP upon receipt and evaluation of the forthcoming LNAPL characterization data.



- Section 4 discusses the preparation of data used in the risk calculations.
- Section 5 presents the human health risk assessment calculations and the resulting risk characterization.
- Section 6 provides the site-specific standards proposed to support remedial action planning in the area.
- Section 7 summarizes the results of the human health risk assessment and the site-specific standards developed to support remedial action.
- Section 8 provides the references used in the preparation of this report.

Supporting information for the Risk Assessment is provided in **Appendix A**. **Appendix B** provides a discussion regarding how risk-based screening levels were derived to support investigation decisions during the Site Characterization and to demonstrate adequate characterization to support the Risk Assessment. **Appendix C** provides the analytical results from the soil and groundwater sampling performed. Finally, **Appendix D** provides select figures from the *Remedial Investigation Report, AOI 6* (AOI 6 RIR; GHD 2017) and the *Sitewide Fate and Transport Remedial Investigation Report* (Sitewide Fate and Transport RIR, Stantec 2022).

2 Site Setting

This section presents the site setting and includes a description of the Site, the local climate, topography, geology, and hydrology, and the on-site and off-site land and groundwater use.

2.1 Site Description

The Facility, a former 1,300-acre refinery, is currently undergoing decommissioning to support redevelopment. The Site² is 20.6 acres³ in size and is located within Girard Point, an area that is also referred to as AOI 6 by Evergreen as part of their One Cleanup Program effort. The Site is located north of the Platt Bridge, between Lanier Street and the Schuylkill River. Prior to demolition, Tank Group 07 consisted of six separate areas containing tanks located in the central portion of Girard Point. The areas are separated by buildings, large piping structures, and plant access roadways. Except for the asphalt roadways and parking areas that pass through the portions of Tank Group 07, and the tank foundations themselves, the area is not covered by hardscape.

The ASTs addressed in this Report are listed in **Table 1 of the Report**. Nine other ASTs, not subject to this closure effort, were previously located within Tank Group 07.

Figure 3 provides a layout of Tank Group 07.

² Tank Group 07 consists of a tank farm referred to by the Facility as the North Tank Farm.

³ This is the area of Tank Group 07, excluding the 07A area, which will be evaluated separately.



2.2 Operational History/Usage of the Tanks

The Facility operated as a petroleum refinery between 1860 and 2019. The refinery ceased operations in 2019. The demolition and decommissioning of the subject ASTs began in September 2021. Prior to demolition, the primary products held within these tanks were: Benzene (GP R 790, GP R 791, GP R 798, and GP R 799), fresh caustic (GP R 1088), cumene (GP R 792 and GP R 793), distillate, main frac bottoms (GP R 494), recovered oil (GP U 767), tetraethylene glycol (GP R 794), and UDEX feed (GP R 1116 and GP R 1117). Additional details regarding the size, contents, and construction of the tanks are provided in **Table 1 of the Report**.

2.3 Topography

Topography at the Site is generally flat except for containment berms constructed around the tank areas to provide containment in the event of a release. Regional topography slopes gently to the west towards the Schuylkill River, the nearest water body to the Site. The ground surface elevation at the Site is approximately 7 feet (ft) above mean sea level⁴.

2.4 Regional Geology and Hydrogeology

The Facility is located within the Atlantic Coastal Plain Physiographic Province of Pennsylvania. The Atlantic Coastal Plain is a physiographic province that is defined as having a flat topography, underlain by unconsolidated sediments that thicken to the southeast. The Coastal Plain deposits are sand, gravel, silt, and clay which drape over crystalline igneous and metamorphic rocks. In general, the resulting sediments are approximately 250 ft thick along the Delaware River. These sediments unconformably overlie much older, very complexly deformed rocks of the Piedmont physiographic province. The Coastal Plain deposits in the vicinity of the Facility consist of anthropogenic fill underlain by quaternary deposits.

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. Below the fill material, sediments consist of gray, muddy deposits with occasional sand, gravel, and organic-rich lenses. These sediments were deposited in floodplain, channel, and marsh environments through the Holocene. The most recent deposits are poorly consolidated and below the phreatic surface of the unconfined aquifer, as a result of their relatively young geologic age and position along the Schuylkill River (tributaries and creeks). Below the Holocene deposits is a Pleistocene glacial outwash deposit, commonly referred to as the "Trenton Gravel" along the Delaware River valley. Cretaceous-age sand and clay units making up the Potomac-Raritan-Magothy aquifer system underly the Pleistocene deposits.

The sedimentary record near the Site consists of a complex series of water-bearing sand units which can comprise one or more hydrostatic units. Historical investigations conducted at the Facility have identified two saturated zones, including an unconfined shallow groundwater unit (occurring within the Holocene and Trenton Gravel deposits) and a deep groundwater unit known as the Farrington Sand,

⁴ North American Vertical Datum of 1988.



which is part of the Potomac-Raritan-Magothy aquifer system. The deeper groundwater unit is separated by a clay unit; as such, the deeper groundwater has been classified as a semi-confined aquifer. Groundwater is first encountered generally at the Facility at a depth approximately 0.5 to 6 ft below ground surface (bgs) (GHD 2017). **Appendix D** provides select figures from the *Remedial Investigation Report, AOI 66* (AOI 6 RIR; GHD 2017) and the *Sitewide Fate and Transport Remedial Investigation Report* (Sitewide Fate and Transport RIR, Stantec 2022) for reference including, Figure 8 from the AOI 6 RIR which provides a detailed cross section of the subsurface in this area.

2.5 Local Geology and Hydrogeology

During the Site Assessment and Site Characterization, soil at the Site was primarily investigated within the upper 5 ft, although Site Characterization monitoring wells were advanced to a maximum depth of 13 ft. Anthropogenic fill up to 5 ft thick was observed in soil cores collected from most of the soil borings installed in Tank Group 07. Soil beneath the fill layer generally consists of brown to gray sand, clay, and silt.

Historically, unconfined aquifer groundwater has been first encountered in Tank Group 07 at a depth of approximately 0.5 to 6 ft bgs (GHD 2017). During Site Characterization activities, groundwater was encountered between approximately 0.5 and 6 ft bgs.

Groundwater at Girard Point has historically been interpreted to flow toward the Schuylkill River. Based on Figure 14 of the AOI 6 RIR (GHD 2017) and Figure 3-29 of the Sitewide Fate and Transport RIR (Stantec 2022) included in **Appendix D**, unconfined aquifer groundwater flow within Tank Group 07 appears to be southwest.

2.6 On-site and Off-site Land Use

This section describes on-site and off-site land use under current and reasonably expected future conditions. As shown on **Figure 2**, the Site is located between approximately 30-ft and 3,300-ft from the Facility property boundary and almost 3,600-ft (2/3 mile) from the nearest residential area. While the following sections include a discussion of off-facility land and groundwater use, for the purposes of this Risk Assessment, on-site is considered to be the Site and off-site is considered to be the area surrounding the Site but still within the Facility's property boundary.

2.6.1 Current

Currently, the Site and its immediate surrounding area is undergoing decommissioning/demolition work, environmental investigation, and predevelopment activities. The land is zoned for Industrial Use.⁵ Aside from the asphalt roadways that pass through portions of Tank Group 07, and the tank foundations themselves, the area is currently uncovered and lightly vegetated. The Site is generally flat except for containment berms constructed around the tank areas to provide containment in the event of a release.

⁵ <https://openmaps.phila.gov/>.



The area surrounding the Facility is currently characterized by a mixture of residential, commercial, and industrial properties.⁶

2.6.2 Future

As captured in the conceptual imagery developed by Hilco Redevelopment Partners⁷, the area encompassing Tank Group 07 is being redeveloped into a state-of-the-art, multimodal industrial park and life sciences campus with ancillary rail infrastructure, energy infrastructure, marine capabilities, and commercial uses. As a result, reasonably expected future land use in the area of the Site is commercial/industrial. Also, following redevelopment, much of the area is expected to be covered by hardscape (e.g., building pads, drive aisles, parking lots, roadways) or other features that will generally function as barriers to direct contact exposure.

In the future, land use in proximity to the Facility is expected to remain a mixture of residential, commercial, and industrial properties (City of Philadelphia 2022).

2.7 Groundwater Use

Stemming from several efforts to assess the potential for current and reasonably expected future use of groundwater at and in the vicinity of the Facility, Evergreen has documented no confirmed drinking water supply wells within 1-mile of the Facility. These efforts have included several well searches, field verification, and a review of the City of Philadelphia's ordinances. In 2021, Evergreen supplemented these efforts by reviewing the City of Philadelphia's publicly available information concerning potable drinking water intakes, contacting PADEP's Safe Drinking Water Program, contacting the City of Philadelphia's Health Department, contacting the City of Philadelphia Water Department, contacting the City of Philadelphia Department of Parks and Recreation, conducting updated database searches (paGWIS and eMapPA), coordinating with the PADEP to obtain information from the New Jersey Department of Environmental Protection, and providing additional documentation concerning the institutional controls at the Site which prohibit groundwater use (Evergreen 2021).

Overall, with consideration for the information compiled by Evergreen regarding groundwater use, this Risk Assessment assumes the following:

- Groundwater on-site, off-site, and on-facility is not a current or reasonably expected future source of potable or nonpotable water.
- Groundwater off-facility is not a current or reasonably expected source of potable water or nonpotable water.
- Groundwater off-facility is assumed to be a reasonably expected future source of nonpotable water.

⁶ <https://openmaps.phila.gov/>.

⁷ <https://www.thebellwetherdistrict.com/>.



3 Site Characterization

This section discusses the results of the soil and groundwater sampling and LNAPL gauging performed in accordance with the Work Plan and SAP. A review of these results and how they adequately characterize the nature and extent of constituents in soil and groundwater at the Site, in support of the site-specific risk assessment, is also provided.

3.1 Soil Investigation

As discussed in the Work Plan, when no evidence of a release to the environment was identified during Tank Group 07 AST removal, ASTs were subject to Site Assessment sampling using a grid-based approach with additional biased samples toward the locations of pipe connections or other key infrastructure. Sampling was conducted during multiple mobilizations as the tanks were being demolished and the ground became available for sampling. The first mobilization was on July 18, 2022, and the last mobilization was completed on October 21, 2022, after the removal of double bottoms.

In total, 95 soil borings were installed and 108 soil samples were collected during the Site Assessment. **Figures 4A through 4D** show the location of each of the Site Assessment soil borings.

Based on the results of Site Assessment sampling in Tank Group 07, a Site Characterization plan was developed (Terraphase 2022). The objective of the Site Characterization was to delineate the horizontal and vertical extent of the potential releases until sufficient data were available to determine the need for interim or remedial measures. Site Characterization soil sampling was conducted between December 21, 2022, and January 3, 2023. The Site Characterization scope included the installation of an additional 15 soil borings and the collection of an additional 27 soil samples.

Each soil sample was analyzed for the constituents of potential concern (COPCs) listed in **Table 1** by Alpha Analytical, Inc. of Westborough, Massachusetts, or Eurofins of Edison, New Jersey, both of which are PADEP-certified laboratories.

Further details are provided in Sections 5 and 6 of the Report.

3.2 Adequacy of Characterization

In accordance with 25 Pa Code § 245.309(b), the site characterization “shall provide sufficient physical data, through field investigations, to determine the regulated substances involved, and the extent of migration of those regulated substances in surface water, groundwater, soil or sediment.” Per the *Technical Guidance Manual* (PADEP 2021), in order to support a site-specific risk assessment “the investigation needs to sufficiently characterize the nature and extent and composition of the regulated substances that have been released.”

Per these requirements, the soil and groundwater sampling data collected were reviewed to determine whether additional soil sampling would be warranted to complete site characterization and a site-



specific risk assessment.⁸ To help support this evaluation, site-specific risk-based screening levels (RBSLs) were derived in accordance with PADEP and USEPA risk assessment guidance. The RBSLs help to segregate soil and groundwater sampling data that indicate a higher potential for health significance from those that indicate a low potential. The RBSLs and their derivation are summarized in **Appendix B**. The soil and groundwater sampling results were compared to the RBSLs and the spatial distribution of concentrations greater than these levels is presented on **Figures 4 and 5**. The identification of locations with constituent concentrations greater than these RBSLs does not necessarily mean that an unacceptable risk has been identified. It simply helps a reviewer focus on a subset of the data in order to make decisions regarding whether additional field investigation is necessary to support a risk assessment. The key consideration during this evaluation is whether constituents identified at concentrations above the RBSLs have sufficient lateral and vertical characterization to ensure that reliable and conservative estimates of the exposure concentration (usually a 95 percent upper confidence limit (UCL) on the mean) for a particular exposure area (and exposure scenario) can be developed. Based on these considerations, the soil and groundwater sample results at the Site were evaluated to determine the adequacy of the data to support the site-specific risk assessment.

3.2.1 Soil

As shown in **Table 2**, 19 of the 23 analyzed constituents were detected in soil at the Site. Benzene, cumene, ethyl benzene, toluene, 1,2,4-trimethylbenzene (124-TMB), 1,3,5-trimethylbenzene (135-TMB), xylenes (total), benzo(a)pyrene (BaP), and naphthalene were detected in soil at concentrations greater than the RBSLs. Benzene, cumene, 124-TMB, xylenes (total), BaP, and naphthalene were detected in soil at concentrations greater than the routine worker direct contact RBSLs. Benzene, cumene, ethyl benzene, toluene, 124-TMB, 135-TMB, xylenes (total), and naphthalene were detected in soil at concentrations greater than the routine worker vapor intrusion RBSLs. Benzene, cumene, toluene, 124-TMB, 135-TMB, xylenes (total), BaP, and naphthalene were detected in soil at concentrations greater than the construction worker direct contact RBSLs. Benzene, cumene, 124-TMB, xylenes (total), and naphthalene were detected in soil at concentrations greater than the soil migration to groundwater RBSLs. Cumene exceeds the soil migration-to-groundwater screening level for groundwater migration-to-surface water.

As further described in Section 7 of the Report, based on the review of the soil concentrations in comparison to the RBSLs and the spatial distribution of concentrations greater than these levels, the soil sampling performed adequately characterizes the nature and extent of regulated substances to support a site-specific risk assessment. The horizontal and vertical extent of constituents identified at concentrations above the RBSLs has been determined such that reliable and conservative estimates of the exposure concentration for the exposure area can be developed.

⁸ LNAPL samples were also collected for analysis. However, receipt of analytical results is still pending.



3.2.2 Groundwater

As shown on **Table 3**, 20 of the 22 analyzed constituents were detected in groundwater. Benzene, cumene, toluene, xylenes (total), and naphthalene were detected in groundwater at concentrations greater than the RBSLs. Benzene and toluene were detected in groundwater at concentrations greater than the nonpotable groundwater use RBSLs. No constituents were detected in groundwater at concentrations greater than the routine worker volatilization to outdoor air RBSLs. Benzene was detected in groundwater at concentrations greater than the routine worker vapor intrusion and construction worker direct contact RBSLs. Benzene and cumene were detected in groundwater at concentrations greater than the groundwater migration to surface water RBSLs.

As further described in Section 7 of the Report, based on the review of the groundwater concentrations in comparison to the RBSLs (considering the most recent groundwater sampling results from each of the wells installed and sampled by Evergreen) and the spatial distribution of concentrations greater than these levels, the groundwater wells provide results that adequately characterize the nature and extent of regulated substances to support a site-specific risk assessment. The horizontal extent of constituents identified at concentrations above the RBSLs has been determined such that reliable and conservative estimates of the exposure concentration for the exposure area can be developed.

4 Data Selection and Preparation

All soil and groundwater data collected during the investigation are considered in this Risk Assessment. The most recent groundwater sampling results from each of the wells installed and sampled by Evergreen in the area of Tank Group 07 were also considered. The following procedures are used to prepare the sampling data to support quantitative risk assessment. These procedures, which account for USEPA risk assessment guidance (USEPA 1989), are as follows:

- Constituent concentrations qualified by the lab as not detected (i.e., U-qualified) are evaluated as non-detects in accordance with USEPA guidance (1989)⁹.
- Constituent concentrations qualified by the lab as estimated (i.e., J-qualified) are included and treated as detected concentrations for quantitative assessment.
- The concentrations of xylenes are the sums of the concentrations of the isomers that were detected and half the quantitation limits of the isomers that were not detected in the same sample but were

⁹ As described in Section 4, any constituent detected in soil or groundwater is considered a COPC in the Risk Assessment. Also, as discussed in Section 5.1.2, in accordance with USEPA (1989) guidance, for each COPC the maximum detected concentrations in soil and groundwater are initially used as exposure concentrations for each exposure scenario. For some COPCs, the risk estimates were refined to reflect conservative estimates of the mean COPC concentration across the exposure area and reflected data from some locations where COPC were non-detect. These estimates of the mean were calculated using USEPA's (2015) ProUCL software which includes methods for estimating upper confidence limits on the mean for left-censored datasets.



detected in the same matrix at the Site. If no isomer was detected in a sample, the constituent is considered to be not detected in the sample and handled accordingly, as described in Section 5.1.2.

- Constituent concentrations in duplicate field samples are averaged to obtain a representative concentration for the sample. When a constituent was detected in only one sample of a duplicate pair, the average of the detected concentration and one-half the quantitation limit for the non-detect is used.

While PADEP's (2021) *Technical Guidance Manual* and USEPA's (1989) risk assessment guidance include an optional step for shortening the list of constituents included in quantitative assessments, this risk assessment does not eliminate any detected constituents from the cumulative risk calculations. For this Risk Assessment, any constituent detected in soil or groundwater at the Site is considered a COPC, regardless of if the constituent exceeded the RBSL or not.

5 Human Health Risk Assessment

Terraphase has performed this risk assessment to evaluate potential human health risks that could be attributable to former releases of hazardous constituents at the Site (i.e., Tank Group 07). Potential risks are characterized using a reasonable maximum exposure (RME), or a conservative estimate of the RME under the current and reasonably expected future land uses at and around the Site. The methods used in the human health risk assessment are based upon PADEP and USEPA human health risk assessment guidance.

Section 5.1 describes how the exposure assessment is performed including the identification of scenarios for potential human exposure, the compilation of exposure factors for each receptor, and how exposure concentrations are calculated. Section 5.2 describes how toxicity values are compiled. Section 5.3 discusses how the risk characterization is performed and Section 5.4 summarizes the impact of currently anticipated uncertainties on the outcome of the risk characterization.

5.1 Exposure Assessment

In accordance with 25 Pa Code § 250.602(c)(2), this section discusses the exposure assessment performed to evaluate risks associated with potential human exposures to COPCs in soil and groundwater at the Site. It discusses the exposure assumptions used to quantify potential exposure via the incidental ingestion and inhalation exposure routes. Please note that while 25 Pa Code § 250.602(c)(2) indicates that an exposure assessment shall consider "ingestion, inhalation, and volatilization" pathways, this risk assessment also includes an evaluation of dermal contact in the exposure assessment.

The potential exposures via ingestion and dermal contact are quantified in terms of a dose as follows:

$$Dose = Concentration \times Intake$$

The dose for evaluating cancer risk is averaged over a lifetime and is called the lifetime average daily dose. For evaluating noncancer effects, the dose is averaged over the duration of potential exposure



and is called the average daily dose. The concentration term in the dose equation refers to the average constituent concentration in an environmental medium to which a population is exposed over a specified duration. The intake term refers to the intake rate of the contaminated environmental medium, which is a function of the magnitude, frequency, and duration of exposure. The methods for estimating the concentration term are discussed in Sections 5.1.2 and 5.1.3. The exposure factors used to quantify the magnitude, frequency, and duration of potential exposures are discussed in Section 5.1.4.

Inhalation exposures are quantified in terms of an exposure concentration, which is an air concentration that is time-weighted over the duration of exposure. The exposure concentration for evaluating cancer risk is an average over a lifetime. For evaluating chronic and subchronic noncancer effects, the exposure concentration is an average over the duration of exposure. The methods for estimating air concentrations are discussed in Sections 5.1.2 and 5.1.3.

The environmental setting at and around the Site, including climate, geology, hydrogeology, water supply, land and groundwater use, is discussed in the Report and Section 2, and therefore is not repeated in this section.

5.1.1 Scenarios for Potential Human Exposure

Per the requirements specified in 25 Pa Code § 250.602 and § 250.603, this section identifies potentially exposed populations (receptors) and describes the exposure pathways for each receptor. The receptors and exposure pathways are also summarized in **Table 3**.

Current Conditions

The Site is currently undergoing decommissioning/demolition work, environmental investigation, and predevelopment activities. Access to the Facility is controlled with fencing and site security. Because of this, trespassing at the Site is expected to be extremely limited under current conditions. The current on-site receptors evaluated in the human health risk assessment include construction workers who may become exposed during site redevelopment or major construction activities and trespassers. Workers who occasionally perform site investigation work on-site are not evaluated because they are required to follow health and safety procedures, including the use of appropriate personal protective equipment, to prevent unacceptable exposures. Workers involved with the redevelopment and reuse of the Site are evaluated in the risk assessment, assuming they do not follow health and safety procedures or wear personal protective equipment.

Future Conditions

Reasonably anticipated future receptors at and in the immediate vicinity of the Site could include workers who may be exposed during the performance of typical or routine commercial activities (routine workers), maintenance workers who may become exposed during maintenance activities including minor subsurface repair/utility activities, construction workers who may become exposed during site redevelopment or major construction activities, and trespassers.



Potential exposure of routine workers is assumed to include incidental ingestion and dermal contact with COPCs in exposed surface soil. Routine workers could also be exposed to the following:

- COPCs in vapors and particulates from exposed surface soil
- COPCs in vapors from subsurface soil shallow groundwater that migrates into outdoor air
- COPCs in vapors from subsurface soil and groundwater that migrates through building foundations into indoor air

Potential future exposure of construction workers and maintenance workers is assumed to include the following:

- Incidental ingestion and dermal contact with COPCs in exposed surface and subsurface soil and shallow groundwater
- Inhalation of COPCs in airborne particulates and vapors from exposed surface and subsurface soil and shallow groundwater

Potential future exposures of trespassers¹⁰ are assumed to include the following:

- Incidental ingestion of and dermal contact with COPCs in exposed surface soil
- COPCs in vapors and particulates from exposed surface soil
- COPCs in vapors from subsurface soil and shallow groundwater that migrates into outdoor air

Overall, the risk assessment quantitatively evaluates potential exposure of on-site and off-site receptor populations under current (construction workers, trespassers) and future (routine workers, maintenance workers, construction workers, trespassers) conditions. As discussed in Section 2 and as shown on Figure 2, the Site is located between 30-ft and 3,300-ft from the Facility property boundary and approximately 3,600-ft (2/3 mile) from the nearest residential area. For the purposes of this Risk Assessment, on-site is considered to be the Site and off-site is considered to be the area surrounding the Site but still within the Facility's property boundary. The risk assessment does consider and evaluate the potential for groundwater contamination to migrate to the Schuylkill River given its proximity to the Site.

5.1.2 Exposure Concentrations

This section describes how exposure concentrations are determined for the soil and groundwater risk estimates.

5.1.2.1 Soil Exposure Concentrations

To evaluate potential exposure to soil and to streamline this risk assessment, initially the maximum detected concentration of each COPC in soil from any location across the Site and at any depth is conservatively used as the exposure concentration for each exposure scenario. This initial set of soil

¹⁰ While receptor populations could include trespassers, this risk assessment did not quantitatively evaluate the potential exposure of these receptors, but instead relies upon the quantitative risk calculations performed for routine workers to serve as a surrogate for this population.



concentrations represents upper-bound estimates of the actual exposure concentrations, and as such, the cumulative cancer risk and noncancer hazard index (HI) estimates calculated using these concentrations represent upper-bound estimates.

If an upper-bound RME cumulative cancer or noncancer HI estimate for an exposure unit exceeds the PADEP risk management goals (i.e., incremental cumulative cancer risk greater than 1×10^{-4} and/or noncancer HI greater than 1)¹¹, then a less high-biased estimate of the RME risk/HI is calculated only for those constituents contributing most to the upper-bound cumulative risk/HI estimates using more representative (refined) exposure concentrations. For the remaining COPCs, maximum detected concentrations are retained as the exposure concentrations.

For evaluating direct contact with soil,¹² refined exposure concentrations are estimated by calculating a 95 percent UCL on the mean using the soil data from sampling locations within the exposure area, which conservatively includes the entire Tank Group 07 area. The UCLs are calculated using the maximum detected concentrations from any depth at each sample location. The UCL calculations are performed using ProUCL (Version 5.1.00 [USEPA 2015]), including the Kaplan-Meier method for datasets with non-detects¹³. For expediency, the recommended values from ProUCL are used. The UCLs are then used to estimate the cumulative cancer risk and HI for the exposure area. Where such refinements are made, the specific refinement for each case and rationale is discussed in Section 5.3.2. This approach (i.e., refining the exposure concentrations for only the COPCs contributing most to the cumulative risk/HI) is efficient since it avoids calculations (such as UCL calculations) that would not materially affect the cumulative cancer risk and/or HI estimates and is consistent with USEPA guidance (1989). This approach is also conservative, because it uses the maximum detected concentration, rather than 95 percent UCLs, for many COPCs.

¹¹ Per PADEP's request, cumulative cancer risks and noncancer HIs greater than 1.0×10^{-4} and 1.0 respectively, have also been identified as potentially warranting risk management. While this approach has been used in support of this project, it is Terraphase's position that USEPA's risk assessment and risk management guidance, as well as PA's regulations and guidance indicate that rounding risk estimates to one significant figure is appropriate. Presenting risk characterization results with one significant figure is standard practice, and we are not aware of any scientific basis that would justify presenting the risk characterization results with more than one significant figure. As USEPA (2004) noted, doing so would imply a level of precision that cannot be justified.

¹² Direct contact exposure to soil includes incidental ingestion, dermal contact, and inhalation of particulates from exposed surface soil and vapors from surface and subsurface soil into outdoor air.

¹³ For such left-censored data sets with non-detect results consisting of multiple detection limits (DLs) or reporting limits (RLs), ProUCL includes several methods for estimating upper confidence limits on the mean including methods which use Kaplan Meier (KM) (1985) estimates. Based upon Kaplan Meier estimates, and the distribution and skewness of detected observations, several upper limit computation methods which adjust for data skewness are incorporated in ProUCL 5.1. The KM estimation method is based upon a distribution function estimate, like the sample distribution function, except that the KM method adjusts for censoring. The KM method is commonly used in survival analysis (e.g., dealing with right-censored data associated with terminally ill patients) and various other biomedical applications. Section 4 of USEPA's (2015) *ProUCL Version 5.1.002 Technical Guide* includes a detailed discussion regarding how ProUCL calculates upper confidence limits on the mean for data sets containing non-detect observations, including using the KM estimation method (Section 4.4).



As a supplement to these exposure area risk/HI estimates, for exposure scenarios where potentially unacceptable risks/HIs are identified and for vapor intrusion exposure, soil risk/HI estimates are calculated for each soil sampling location. This is done to facilitate the identification of areas with potentially unacceptable risks/HI and to guide risk management decision making (e.g., what areas of the Site would warrant and not warrant vapor intrusion risk management). For these location-specific calculations, the highest detected concentration of each COPC from any depth at each soil sample location is used. Additionally, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, ½ the analytical limit is used. This set of soil concentrations represent upper-bound estimates of the actual exposure concentrations, and as such, the cumulative cancer risk and noncancer HI estimates calculated using these concentrations should also be considered upper-bound estimates.

5.1.2.2 Groundwater Exposure Concentrations

To evaluate potential exposure to groundwater and streamline this risk assessment, initially the maximum detected concentration of each COPC in groundwater from any location across the Site is conservatively used as the exposure concentration for each exposure scenario. As a supplement to these exposure area risk estimates, for exposure scenarios where potentially unacceptable risk/HI estimates are identified, groundwater risk/HI estimates are calculated for each well. This is done to facilitate the identification of areas of the Site with potentially unacceptable risk/HI and to guide risk management decision making. For these location-specific calculations, the highest detected concentration for each COPC is used. Where a COPC is non-detect at a location but detected within the media at the Site, ½ the analytical limit is used.

5.1.3 Fate and Transport Models

The following models are used in the risk assessment to estimate exposure concentrations for the exposure scenarios discussed in Section 5.1.1. These models are used by USEPA and state regulatory agencies (including PADEP) for conservative, screening level analysis. The following are brief descriptions of the models. Further details of these models are provided in **Appendix A**.

5.1.3.1 Vapor Emission from Exposed Soil

Vapor emissions from exposed soil are estimated using the Jury model (Jury et al. 1938) based on depletion over time, assuming conservatively that the soil is initially impacted from the ground surface to the water table (a depth of approximately 3 ft bgs, the average depth to groundwater in Tank Group 07).

A discussion of the model is provided in **Appendix A**.

5.1.3.2 Vapor Emission from Groundwater

Vapor emissions from groundwater (not exposed) are calculated using the steady-state diffusion equation in one-dimension assuming a constant source concentration and a maximum concentration gradient.



A discussion of the model is provided in **Appendix A**.

5.1.3.3 Vapor Emission from Exposed Groundwater

The model for estimating vapor emissions from exposed groundwater during excavation activities is estimated using mass transfer coefficients recommended by USEPA (1995).

A discussion of the model is provided in **Appendix A**.

5.1.3.4 Air Dispersion

Annual average air concentrations are estimated using the empirical correlations presented in USEPA's (2002) *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*, assuming a square source area, and correlation coefficients for the Philadelphia, Pennsylvania meteorological area, which is the area nearest to the Site among the locations with available correlation coefficients.

For soil and groundwater exposures, the source area is assumed to be 20.6 acres, the area of Tank Group 07. For exposure scenarios where groundwater is encountered during excavations to the water table, the air concentrations are estimated in an analogous manner, but the source area is based on a 15 by 15-foot excavation area and an averaging period of 24 hours. The maximum 24-hour average air concentration was estimated from the annual average air concentration by using a conservative factor of 0.4/0.19 (or 2.1 [USEPA 2002]).

5.1.3.5 Dust Emission

For the routine worker exposure scenario that involves exposure to COPCs in outdoor soil, the emission of respirable soil particulates (PM₁₀) is calculated using the wind erosion model recommended by USEPA (1996b) with USEPA default soil parameters, and wind speed and anemometer height from the nearest weather station, which is located in Philadelphia, Pennsylvania (NOAA 2018).

During maintenance activities, the PM₁₀ level is set at 50 micrograms per cubic meter (µg/m³). This PM₁₀ level is based on a time-weighted average assuming maintenance workers spend 1/3 of their exposure period excavating into the subsurface and 2/3 of their exposure period conducting maintenance activities that do not involve excavation into the subsurface. In calculating the time-weighted average, the 24-hour average National Ambient Air Quality Standards for PM₁₀ of 150 µg/m³ is used as the PM₁₀ concentration during excavations and a PM₁₀ concentration of 1 µg/m³ is used for the time during maintenance activities that do not involve excavation. The PM₁₀ concentration during non-excavation maintenance activities is expected to be less than 1 µg/m³, based on the wind erosion model recommended by USEPA (1996b) using site-specific wind speed from Philadelphia, Pennsylvania (NOAA 2018).

During construction activities, the PM₁₀ level is set at 50 µg/m³, which is the former annual average National Ambient Air Quality Standard for PM₁₀ since construction workers are assumed to be performing excavations for a work year. It is assumed that the PM₁₀ concentration would be at this limit every day for the entire period of construction worker exposure.



5.1.3.6 Vapor Intrusion into Future Buildings

Indoor air concentrations from the migration of vapors from soil and groundwater into a hypothetical future nonresidential building is estimated using the model described by Johnson and Ettinger (1991), which PADEP and USEPA recommend for screening level evaluations (PADEP 2021; USEPA 2004a, 2017b). Indoor air concentrations from groundwater into a hypothetical future nonresidential building are also estimated using this model.

Indoor air concentrations from the migration of vapors from on-site soil is calculated by assuming that soil contamination extends from the bottom of the future building slab to the water table (i.e., a depth of 3 ft) for all constituents. These calculations also assume that the building cracks are filled with sand and utilize generic properties for sand recommended by USEPA (2004a).

A discussion of the model and the input parameters used in the assessment is provided in **Appendix A**.

5.1.3.7 Nonpotable Groundwater Use

Potential exposures to COPCs in groundwater via nonpotable groundwater use are evaluated using a hypothetical scenario where groundwater is used to fill a backyard wading pool (“kiddie” pool). This scenario represents a reasonable worst case exposure scenario in which the estimated exposure is expected to be higher than those associated with other nonpotable uses (e.g., watering lawns, washing cars). The model for estimating vapor emission from a residential kiddie pool is based on models for estimating vapor emissions from open-top batch tanks (USEPA 1995a, 1995b).

A discussion of the model and the input parameters used in the assessment is provided in **Appendix A**.

5.1.3.8 Soil-to-Groundwater Pathway

Impacts to groundwater from site-related constituents are evaluated by calculating cancer risk and noncancer HI estimates by scaling off of the risk-based soil migration-to-groundwater RBSLs. These RBSLs were calculated using both an “equilibrium partitioning” (also called soil/water partitioning [USEPA 1996a]) and a “leach test” methodology, as described in **Appendix B**. For each COPC, the soil screening level corresponding to the more realistic of the two calculation methods is used as a soil migration-to-groundwater screening level. Soil migration-to-groundwater RBSLs were calculated using the target groundwater concentrations based on groundwater RBSLs for the following scenarios:

- Routine worker exposure to COPCs in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPCs in groundwater via direct contact
- Receptor exposure to COPCs in groundwater via nonpotable groundwater use

Because the groundwater migration to surface water screening levels are not entirely human health based, estimates of cancer risk and HI are not calculated to evaluate this exposure scenario. Instead, soil concentrations that could result in exceedances of the groundwater migration to surface water RBSLs are identified.

The target groundwater concentrations are presented in **Appendix B, Attachment 4**.



5.1.3.9 Groundwater Contaminant Transport

Where potentially unacceptable risk/HI via exposure to groundwater has been identified in Site Characterization samples collected from groundwater monitoring wells installed to characterize current concentration(s) in the vicinity of soil sources that could be related to releases from the ASTs, a 2-dimensional fate and transport model was used to calculate the maximum potential future downgradient extent of the unacceptable risk/HI. The PADEP's spreadsheet application of the analytical model developed by P.A. Domenico (Quick Domenico; QD) was used to conduct the evaluation which PADEP recommends be used for screening level evaluations.

The results of the QD modeling are depicted in **Figure 7** and **Appendix A, Attachment 8**.

5.1.4 Exposure Factors

In this risk assessment, standard default exposure factors¹⁴ recommended by PADEP and USEPA for estimating RME are used where available and appropriate. Where standard default exposure factors are not available or appropriate for an exposure scenario, the evaluation was conducted using exposure factors that are based on site-specific considerations and professional judgment. The standard default exposure factors are conservative assumptions about the magnitude, frequency, and duration of exposures, which, in combination, are intended to provide estimates of exposures that are higher than actual exposures to a large portion (90 to 99 percent) of a potentially exposed population.

5.1.4.1 Routine Workers

In this risk assessment, potential exposure of routine workers to constituents in soil and groundwater is conservatively evaluated using the standard default exposure factors used by PADEP in deriving the Statewide Health Standards. Where PADEP has not recommended a standard default exposure factor, standard default exposure factors recommended by USEPA (1991, 2014) are used where available and appropriate.

Soil Ingestion Rate

The soil ingestion rate of 50 milligrams per day (mg/day) is PADEP's default value for evaluating RME in nonresidential settings (25 Pa Code § 250.306(d)).

Soil Dermal Contact Rate and Absorption

The dermal contact rate is the product of the exposed skin surface area and the soil-to-skin adherence factor. The exposed skin surface area of 3,527 square centimeters per day (cm²/day) and the soil-to-skin adherence factor of 0.12 milligrams per square centimeter (mg/cm²) are USEPA's recommended values for evaluating RME with soil by workers in commercial/industrial settings (USEPA 2014). The absorbed dose from dermal contact with soil is estimated by multiplying the dermal contact rate by USEPA-recommended absorption factors for absorption from soil (USEPA 2004b).

¹⁴ Because PADEP does not maintain default exposure factors for dermal contact with soil, this exposure assessment used standard default dermal contact exposure factors recommended by USEPA for evaluating RME (USEPA 2014).



Exposure Time

Routine workers are assumed to be at the Site with the potential to inhale vapors and particulates from site-related sources for 8 hours/day. This exposure time is PADEP's (25 Pa Code § 250.307(d)) and USEPA's recommended value for full-time workers (USEPA 2009).

Exposure Frequency

An exposure frequency of 180 days/year is used to evaluate outdoor nonresidential exposure to soil. It is also used to evaluate nonresidential exposure to vapors in outdoor air from shallow groundwater. This is PADEP's standard default value for evaluating nonresidential exposures, which assumes frozen ground for several days of the year consistent with 25 Pa Code § 250.307(d).

An exposure frequency of 250 days/year is used to evaluate indoor nonresidential exposure to constituents from soil and shallow groundwater via vapor intrusion. This assumption is USEPA's standard default value for evaluating RME in commercial/industrial settings (USEPA 1991, 2014). It is based on a 5-day work week and 50 weeks/year.

Exposure Duration

The exposure duration of 25 years is the PADEP (25 Pa Code § 250.307(d)) and USEPA (1991, 2014) standard value for estimating RME in commercial/industrial settings. It is the 95th percentile job tenure of workers in manufacturing.

This combination of exposure frequency and exposure duration is expected to be conservative for the amount of time that workers are actually exposed to soil during outdoor activities, as routine workers spend the majority of their time indoors. USEPA (1991, 2014) has recommended the use of these values for evaluating high-end routine worker exposures.

Body Weight

The body weight of 80 kilograms (kg) is PADEP's (25 Pa Code § 250.307(d)) and USEPA's standard value for assessing exposure of adults (USEPA 2014).

Averaging Time

The averaging time for evaluating cancer risk is equal to a lifetime of 70 years, and the averaging time for evaluating noncancer risk is equal to the exposure duration (USEPA 1989).

5.1.4.2 Maintenance Workers

The exposure factors used for evaluating potential exposure of maintenance workers to soil and groundwater are as follows:

Soil Ingestion Rate

The ingestion rate of 100 mg/day is USEPA's recommended soil ingestion rate for outdoor workers engaged in high-intensity soil contact activities such as repairing underground utilities, repairing roadways or performing landscaping activities (USEPA 2002). This soil ingestion rate is proposed by



USEPA to reflect increased ingestion exposures experienced by workers during landscaping or other soil disturbing activities.

Soil Dermal Contact Rate and Absorption

The dermal contact rate is the product of the exposed skin surface area and soil-to-skin adherence factor. The exposed skin surface area of 3,527 cm²/day and the soil-to-skin adherence factor of 0.12 mg/cm² are USEPA's recommended values for evaluating RME in commercial/industrial settings (USEPA 2014). The exposed skin surface area is based on the weighted average of mean values for head, hands, and forearms.

Soil Exposure Frequency

The exposure frequency of 30 days/year is based on professional judgment regarding the number of days per year of maintenance activities involving soil contact. It is the number of workdays in 6 weeks of such activities, which is an estimate of the time needed to complete occasional subsurface maintenance activities. This exposure frequency is also consistent with a high-end exposure frequency expected for individuals charged with performing landscaping activities at the Site throughout a year (e.g., one day a week, every two weeks or about 26 days/year).

Inhalation Exposure Time

Maintenance workers are assumed to be at the Site with the potential to inhale vapors and particulates from site-related sources for 8 hours/day, the PADEP (25 Pa Code § 250.307(d)) and USEPA recommended value for full-time workers (USEPA 2009).

Groundwater Ingestion

The incidental groundwater ingestion rate is the product of the hourly ingestion rate and exposure time. The ingestion rate of 0.005 liters per hour is one-tenth of USEPA's recommended value for incidental ingestion while swimming (USEPA 1989) and represents a very conservative estimate of incidental groundwater ingestion that could occur while workers are in an excavation pit. The exposure time of 2 hours per day for contact with groundwater or surface water during maintenance activities is based on professional judgment.

Groundwater Dermal Contact

The exposed skin surface area of 3,527 cm² is based on the USEPA-recommended exposed skin surface area for evaluating high-end contact with soil by workers in industrial settings (USEPA 2014). Workers are conservatively assumed to be covered with groundwater over this exposed skin surface area for 2 hours per event. The chemical-specific permeability coefficient (K_p) for dermal absorption from groundwater is estimated following USEPA guidance (USEPA 1992, USEPA 2004b).

Groundwater Exposure Frequency

The exposure frequency of 15 days per year assumes that the maintenance work involves excavations that encounter groundwater for 5 days per week for 3 weeks per year, based on professional judgment. These exposure frequencies are expected to be conservative for the amount of time that workers are



actually exposed to groundwater (as opposed to the total time for maintenance or construction, which typically includes time not associated with excavation).

Groundwater Vapor Inhalation Exposure Time

Maintenance workers are assumed to be exposed to vapors from groundwater 2 hours per day while performing maintenance activities in groundwater, based on professional judgment.

Exposure Duration

An exposure duration of 10 years is used for maintenance worker exposure to soil or groundwater. The exposure duration of 10 years is supported by the analysis of Burmaster (2000), using data from the Bureau of Labor Statistics through February 1996, which indicated that 95th and 90th percentile job tenure of workers in construction is approximately 12.48 years and 7.7 years, respectively. The duration of 10 years is longer than the length of time that workers typically work in an occupation (USEPA 2014).

Body Weight

The body weight of 80 kg is PADEP's (25 Pa Code § 250.307(d)) and USEPA's standard value for assessing exposure of adults (USEPA 2014).

Averaging Time

The averaging time for evaluating cancer risk is equal to a lifetime of 70 years, and the averaging time for evaluating noncancer HI is equal to the exposure duration (USEPA 1989).

5.1.4.3 Construction Workers

The exposure factors used for evaluating potential exposure of construction workers to soil and groundwater are as follows:

Soil Ingestion Rate

The ingestion rate of 200 mg/day is the 90th percentile from the adult soil ingestion study published by Stanek et al. (1997). It is more appropriate than the 95th percentile (330 mg/day) from the same study, because in a study of only 10 adults, the 95th percentile is at or beyond the highest observed ingestion rate and, as such, has far more uncertainty than the 90th percentile. Using the 90th percentile is also consistent with USEPA and PADEP guidance on selecting exposure factors for estimating the RME.

Soil Dermal Contact Rate and Absorption

The dermal contact rate is the product of the exposed skin surface area and soil-to-skin adherence factor. The exposed skin surface area of 3,527 cm²/day and the soil-to-skin adherence factor of 0.12 mg/cm² are USEPA's recommended values for evaluating RME in commercial/industrial settings (USEPA 2014). The exposed skin surface area is based on the weighted average of mean values for head, hands, and forearms.



Soil Exposure Frequency

The exposure frequency of 250 days/year is based on professional judgment regarding the number of days of soil excavation or other high-intensity soil contact activities. This exposure frequency is expected to overestimate the amount of time that workers are actually exposed to soil in excavations or during other high-intensity soil contact activities (as opposed to the total time for construction, which typically includes time not associated with high-intensity soil contact activities). It is based on a 5-day work week and 50 weeks per year.

Inhalation Exposure Time

Construction workers are assumed to be at the Site with the potential to inhale vapors and particulates from site-related sources for 8 hours/day, the PADEP (25 Pa Code § 250.307(d)) and USEPA recommended value for full-time workers (USEPA 2009).

Groundwater Ingestion

The incidental groundwater ingestion rate is the product of the hourly ingestion rate and exposure time. The ingestion rate of 0.005 liters per hour is one-tenth of USEPA's recommended value for incidental ingestion while swimming (USEPA 1989) and represents a very conservative estimate of incidental groundwater ingestion that could occur while workers are in an excavation pit. The exposure time of 2 hours per day for contact with groundwater during construction activities is based on professional judgment.

Groundwater Dermal Contact

The exposed skin surface area of 3,527 cm² is based on the USEPA-recommended exposed skin surface area for evaluating high-end contact with soil by workers in industrial settings (USEPA 2014). Workers are conservatively assumed to be covered with groundwater over this exposed skin surface area for 2 hours per event. K_p for dermal absorption from groundwater is estimated following USEPA guidance (USEPA 1992, USEPA 2004b).

Groundwater Exposure Frequency

The exposure frequency of 15 days per year assumes that the construction work involves excavations that encounter groundwater for 5 days per week for 3 weeks per year, based on professional judgment.

Groundwater Vapor Inhalation Exposure Time

Construction workers are assumed to be exposed to vapors from groundwater 2 hours per day while performing maintenance activities in groundwater, based on professional judgment.

Exposure Duration

The exposure duration of 1 year is based on professional judgment regarding the duration of site redevelopment activities at the Site that will involve earthmoving.



Body Weight

The body weight of 80 kg is PADEP's (25 Pa Code § 250.307(d)) and USEPA's standard value for assessing exposure of adults (USEPA 2014).

5.1.4.4 Nonpotable Use

The exposure factors used for evaluating potential exposure to groundwater through a hypothetical scenario where groundwater is used to fill a backyard wading pool ("kiddie" pool) are as follows:

Exposure Frequency and Duration

The exposure frequency for the kiddie pool scenario is 96 days/year, which is based on 4 days per week for the number of months, 6 months, when the average daily temperature is above 65 degrees Fahrenheit in Philadelphia, Pennsylvania (NOAA 2018). Residents are assumed to be exposed to groundwater for 26 years (6 years as children and 20 years as adults; USEPA 2014). This combination of exposure frequency and exposure duration is expected to be conservative for the amount of time that residents would actually spend using groundwater for nonpotable purposes off-facility.

Incidental Water Ingestion

The rate of 0.05 L/hour is the USEPA-recommended value for ingestion of water while swimming (USEPA 1989).

Dermal Contact Rate

The exposed skin surface areas of 6,365 cm² and 19,652 cm² are USEPA's recommended values for evaluating RME with groundwater by children and adults, respectively (USEPA 2014). Child and adult residents are assumed to wade in the pool for 2 hours per event, and one event per day, based on professional judgment. The absorbed dose for organic constituents is estimated using the nonsteady-state approach (USEPA 2004b), which is more conservative than the steady-state approach (USEPA 1989), particularly for hydrophobic constituents. The permeability coefficient (K_p) for dermal absorption of organic constituents from groundwater is estimated following USEPA guidance (USEPA 2004b).

5.2 Toxicity Assessment

In accordance with 25 Pa Code § 250.602(c)(3), this section presents the toxicity assessment. A toxicity assessment identifies potential adverse health effects that are associated with exposure to constituents and determines the dose response relationship between exposure and the occurrence of adverse effects.

The toxicity values used in this risk assessment are compiled from USEPA's hierarchy of sources (USEPA 2003), as follows:

1. Integrated Risk Information System;
2. Provisional Peer Reviewed Toxicity Values; and
3. Other Toxicity Values.



When a toxicity value is not available from the first two tiers of the hierarchy, other USEPA and non-USEPA sources (e.g., Agency for Toxic Substances and Disease Registry) of toxicity values are considered.

The toxicity values used in the risk assessment and their sources are summarized in **Appendix A**. The toxicity values used in this risk assessment are current as of January 9, 2023.

5.2.1 Cancer Toxicity Values

For constituents that USEPA assessed prior to the Guidelines for Carcinogen Risk Assessment (USEPA 2005), USEPA considers constituents belonging to the following cancer weight of evidence groups as human carcinogens:

- Group A - Known Human Carcinogen: Sufficient evidence of carcinogenicity in humans;
- Group B1 - Probable Human Carcinogen: Limited evidence of carcinogenicity in humans;
- Group B2 - Probable Human Carcinogen: Sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans; and
- Group C - Possible Human Carcinogen: Limited evidence of carcinogenicity in animals and inadequate or lack of evidence in humans.

For constituents that USEPA assessed after the *Guidelines for Carcinogen Risk Assessment* (USEPA 2005), USEPA uses the following cancer weight of evidence groups:

- Carcinogenic to Humans
- Likely to be Carcinogenic to Humans
- Suggestive Evidence of Carcinogenic Potential
- Inadequate Information to Assess Carcinogenic Potential

As shown in **Appendix A**, some of the constituents in this risk assessment are not designated as Group A or as being “Carcinogenic to Humans”, which means USEPA acknowledges that there is either inadequate evidence or a lack of evidence that these constituents cause cancer in humans. Therefore, evaluating these constituents as human carcinogens in the risk assessment is conservative.

Cancer slope factors (SFs) and unit risk factors (URFs) for these constituents and their sources are shown in **Appendix A**. The oral SFs and inhalation URFs represent 95 percent upper confidence bounds on the probability of getting cancer over a lifetime per unit dose. As recognized by USEPA, there is significant scientific evidence that some of the SFs and URFs may be overly conservative and may ignore the potential existence of threshold doses. Nonetheless, they are used here as assessment tools.

5.2.2 Noncancer Toxicity Values

Constituents designated by USEPA as belonging to the cancer weight-of-evidence Group D (Not Classifiable as to Human Carcinogenicity) are considered noncarcinogens. Constituents not designated as belonging to any cancer group are also treated as noncarcinogens. Chronic and subchronic reference doses (RfDs) and chronic and subchronic inhalation reference concentrations (RfCs) and their sources are shown in **Appendix A**.



The oral RfDs and inhalation RfCs represent estimates of the daily exposure to the human population, including sensitive subpopulations (e.g., children), which are likely to be without an appreciable risk of deleterious effects during a lifetime. These RfDs and RfCs typically incorporate several safety factors to account for uncertainties in their derivation, which in combination often result in overall uncertainty factors of 1,000 or more. Furthermore, for many constituents, there is significant scientific debate about the validity of these RfDs and RfCs, and the association of these doses and concentrations to potential adverse health consequences. Nonetheless, the RfDs and RfCs are used here as conservative assessment tools.

5.2.3 Extrapolation of Toxicity Values

The USEPA sources of toxicity values listed above do not provide dermal toxicity values for any of the constituents. Therefore, oral toxicity values (i.e., oral SFs and RfDs) are used as dermal toxicity values in this risk assessment. Adjustments to the oral toxicity values, where appropriate, are made in this route-to-route extrapolation following USEPA guidance (USEPA 2004b).

The USEPA sources of toxicity values listed above do not provide inhalation toxicity values (URFs and RfCs) for all of the constituents. Route-to-route extrapolation from oral toxicity values was not performed to obtain inhalation toxicity values for these constituents, consistent with USEPA guidance on performing inhalation risk assessments (USEPA 2009).

Uncertainties introduced by using extrapolated toxicity values are discussed in Section 5.4.3.

5.3 Risk Characterization

The health significance of the potential exposures described in Section 5.1.1 is discussed in the following subsections. Section 5.3.1 describes the methods for estimating cancer risks and noncancer HIs. Section 5.3.2 discusses the risk estimates and the significance of the potential exposures for each receptor population/exposure scenario.

5.3.1 Cancer and Noncancer Risks

In accordance with 25 Pa Code § 250.602(c)(4), this section presents the risk characterization performed to conservatively quantify the cancer risk and noncancer HI for receptors potentially exposed to COPCs in soil and groundwater at the Site.

The cancer risk associated with potential exposure to a carcinogenic constituent via ingestion and dermal contact is calculated by multiplying an estimate of the lifetime average daily dose for a particular exposure scenario by the cancer SF for the constituent as follows:

$$Risk = LADD \cdot SF$$

For the inhalation route, the cancer risk is calculated using the constituent concentration in air (C_{air}) and the URF, as follows:

$$Risk = URF \cdot C_{air} \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$



Where ET is exposure time, EF is exposure frequency, ED is exposure duration, and averaging time for carcinogens (AT_c) is the averaging time for carcinogens.

The noncancer hazard quotient (HQ) associated with potential exposure via incidental ingestion and dermal contact is calculated by dividing an estimate of the average daily dose by the RfD for the constituent as follows:

$$HQ = \frac{ADD}{RfD}$$

For the inhalation route, the HQ is calculated using C_{air} and the RfC, as follows:

$$HQ = \frac{C_{air}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

Unit cancer risks and unit HQs are calculated for a unit constituent concentration (C_{unit}). C_{unit} is 1 milligram per kilogram (mg/kg) for soil and 1 milligram per liter (mg/L) for groundwater. Because risk estimates scale directly with the constituent concentration (except for cancer risk estimates at very high doses), these unit risks and unit HQs can be calculated once and used to calculate cancer and noncancer risk estimates efficiently for a large number of locations by multiplying the constituent concentrations for each location by the unit risks and unit HQs. Unit risks/HQs can also be used to derive RBSLs at a given target cancer risk level (TCRL) or target hazard quotient (THQ). The unit risks and unit HQs for all routes of exposure (incidental ingestion, dermal contact, vapor inhalation, and/or particulate inhalation) for a given receptor to constituents in a given environmental medium are conservatively summed to produce a single unit risk and unit HQ for each constituent. The cancer risk and noncancer HQ for a particular constituent i at a particular location are calculated as follows:

$$Risk_i = \frac{C_i \cdot UnitRisk_i}{C_{unit}}$$

$$HQ_i = \frac{C_i \cdot UnitHQ_i}{C_{unit}}$$

The media-specific cumulative cancer risk and noncancer HI from exposure to the combination of COPCs are estimated following USEPA (1989) guidance, as follows:

$$Cumulative\ Risk = \sum_i Risk_i$$

$$Hazard\ Index = \sum_i HQ_i$$

Where $Risk_i$ is the estimated cancer risk for the i^{th} constituent and HQ_i is the HQ for the i^{th} constituent. This approach may result in estimates of media-specific cumulative cancer risk and HI that are more conservative than necessary. For example, different COPCs may cause different and unrelated noncancer health effects, so summing the HQs for their individual effects would overestimate the significance of their combined effects. Nonetheless, this approach is used here as a conservative assessment tool.



Estimated media-specific cumulative cancer risks for each receptor population identified in **Table 3** are compared to PADEP’s risk management goals established in 25 Pa Code § 250.402(b). Specifically, cumulative cancer risks were compared to a risk of 1×10^{-4} while noncancer HIs are compared to an HI of 1.¹⁵ Risk estimates equal to or below these goals represent levels which would not warrant risk management action.

In order to support site characterization decision-making, RBSLs from unit cancer risks and unit noncancer HQs are also calculated. Unit cancer risks/HQs for each route (*i*) of exposure (e.g., ingestion, dermal contact, inhalation) are used to derive RBSLs for each receptor-specific exposure scenario. RBSLs are calculated at a TCRL of 1×10^{-5} and a THQ of 0.1. The TCRL and THQ are used with consideration for the risk management goals established in 25 Pa Code § 250.402(b) for attainment of the Site-Specific Standard (i.e., a cumulative excess cancer risk greater than 1×10^{-4} and a noncancer HI¹⁶ greater than 1).

$$\text{Cancer RBC}_i = \frac{C_{unit} \cdot TCRL}{UnitRisk_i}$$

$$\text{Noncancer RBC}_i = \frac{C_{unit} \cdot THQ}{UnitHQ_i}$$

The RBCs for each route (*i*) are conservatively combined to give cancer and noncancer-based RBCs as follows:

$$RBSL = \left(\sum_i RBSL_i^{-1} \right)^{-1}$$

Appendix B provides specific details on how the RBSLs for soil and groundwater were calculated using the general approach discussed above and the general assumptions provided in Sections 5.1 and 5.2.

5.3.2 Risk Characterization for Potentially Exposed Populations

The risk characterizations for routine workers, maintenance workers, and construction workers are summarized in this section. The lead exposure, nonpotable groundwater use, soil migration-to-groundwater, and groundwater migration-to-surface water pathway evaluations are also presented. Further details regarding the scenarios for potential human exposure are summarized in **Table 4**.

¹⁵ Per PADEP’s request, cumulative cancer risks and noncancer HIs greater than 1.0×10^{-4} and 1.0 respectively, have also been identified as potentially warranting risk management. While this approach has been used in support of this project, it is Terraphase’s position that USEPA’s risk assessment and risk management guidance, as well as PA’s regulations and guidance indicate that rounding risk estimates to one significant figure is appropriate. Presenting risk characterization results with one significant figure is standard practice, and we are not aware of any scientific basis that would justify presenting the risk characterization results with more than one significant figure. As USEPA (2004) noted, doing so would imply a level of precision that cannot be justified.

¹⁶ As estimated from exposure to constituents with the same target organ or target effect.



5.3.2.1 Routine Workers

Soil Contact and Soil Vapor Intrusion

As discussed in Section 5.1.1, routine workers could be exposed to soil in unpaved or uncovered areas during time spent outdoors. Routine workers could also be exposed to constituents in soil via inhalation of constituents if they were to volatilize into the outdoor air or migrate through cracks in the building foundation into indoor air. This section presents the results of risk calculations performed to characterize the risks associated with these exposures.

Potential exposure of routine workers to COPCs in soil is evaluated in this risk assessment by assuming the following two alternate hypothetical future cases:

- (1) All soil at the Site is uncovered and workers are assumed to be exposed to COPCs in soil while outdoors for the entire work-day through incidental ingestion, dermal contact, and inhalation of particulates and vapors in outdoor air, or
- (2) the soil is under an occupied generic commercial building to be constructed in the future, and workers are assumed to be exposed to COPCs in the soil via inhalation of vapor in indoor air (vapor intrusion) for the entire work-day.

Calculating risks for these alternate hypothetical cases is conservative and efficient because it avoids the need to prorate the portion of the day spent indoors and/or outdoors, and risk estimates for any combination of indoor and outdoor time periods would not exceed the higher of the risk estimates for the two alternative hypothetical cases.

Potential exposures for each hypothetical future case are evaluated by initially calculating upper-bound estimates of RME cumulative cancer risk and HIs to streamline the risk assessment. These estimates are calculated using the highest observed concentrations for all constituents detected in soil regardless of depth. These estimates are conservative upper-bound estimates because the site-related RME risks for an area would be lower if they were calculated using: (1) concentrations representative of the average concentrations to which receptors would be exposed at the area; and (2) site-specific exposure factors that account for the magnitude, frequency, and duration of exposures appropriate for the area.

The upper-bound estimates of cumulative cancer risk and HI for potential future exposure of routine workers for each alternate hypothetical case (i.e., all-day exposure to COPCs in soil during outdoor activities or all-day exposure to soil COPCs via vapor intrusion) are presented in **Table 5**.

Outdoor Direct Contact Exposure to Soil

As shown in **Table 5**, for the hypothetical case of a routine worker exposed to COPCs in soil during outdoor activities, the upper-bound cumulative cancer risk (3×10^{-4}) and noncancer HI (4) estimates are greater than PADEP's cumulative cancer and noncancer HI risk management goals of 1×10^{-4} and 1, respectively. As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate is predominately driven by benzene and BaP. The unacceptable upper-bound HI is predominantly driven by benzene, cumene, and BaP.



A more reasonable but still conservative estimate of the RME risk and HI for potential routine worker to COPCs in soil is estimated using a refined exposure concentration for COPCs contributing most to these exposure area risk estimates: benzene, cumene, toluene, 124-TMB, xylenes (total), BaP, and naphthalene. For all other COPCs, the maximum detected concentrations are used. As discussed in Section 5.1.2, the refined exposure concentration is estimated by conservatively calculating the 95 percent UCL on the mean concentration in soil in the exposure area. For expediency, this UCL is calculated using the maximum concentrations from any depth at each soil sampling location. As shown on **Table 6**, using the refined exposure concentration for benzene (1,278 mg/kg), cumene (3,764 mg/kg), toluene (1,168 mg/kg), 124-TMB (36.4 mg/kg), xylenes (total) (110.4 mg/kg), BaP (3.9 mg/kg), and naphthalene (4.4 mg/kg), the RME risk and HI estimates for routine worker exposure to COPCs in soil are 3×10^{-5} and 0.5, respectively. These estimates are below the risk management goals of 1×10^{-4} and 1. Therefore, potential routine worker direct contact exposure to COPCs in soil would not result in unacceptable risk/HI.

Vapor Intrusion Exposure from Soil (into a Future Nonresidential Building)

As also shown in **Table 5**, for the hypothetical case of a routine worker exposed to COPCs in soil via vapor intrusion, the upper-bound cumulative cancer risk (3×10^{-2}) and noncancer HI (400) estimates are greater than the risk management goals of 1×10^{-4} and 1, respectively. As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate is predominately driven by benzene and naphthalene. The potentially unacceptable upper-bound HI is predominately driven by benzene, cumene, toluene, 124-TMB, 135-TMB, xylenes (total), and naphthalene.

To support and guide risk management decisions (e.g., further sampling, further assessment, vapor mitigation, remediation, etc.), upper-bound estimates of cumulative cancer risk and HI were also calculated on a point-by-point basis, using the highest observed concentration for all COPCs from any depth at each location. As discussed in Section 5.1.2.1, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 7** and **Figure 6**, 15 soil sampling locations (i.e., GPR790-01, GPR790-02, GPR790-05, GPR791-01, GPR791-03, GPR791-04, GPR791-06, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-07, GPR794-08, and GPR798-04) exhibited a cancer risk greater than the risk management goal. 31 soil sampling locations (i.e., GPR1116-07, GPR1117-03, GPR790-01, GPR790-02, GPR790-05, GPR791-01, GPR791-03, GPR791-04, GPR791-06, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR792-07, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR793-05, GPR793-06, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-07, GPR794-08, GPR798-04, and GPR799-08) exhibited a noncancer HI estimate greater than the risk management goal.

Based upon this risk characterization, further consideration for risk management action due to routine worker vapor intrusion exposure to COPCs in soil (i.e., benzene, cumene, toluene, 124-TMB, 135-TMB, xylenes (total), and naphthalene) at these locations would be warranted.



Groundwater Vapor Intrusion Exposure (into a Future Nonresidential Building) – Current Extent

Routine workers could be exposed to COPCs in shallow groundwater to the extent that such COPCs volatilize and migrate through cracks in future building foundations into indoor air. The cumulative cancer risk and noncancer HI estimates for routine worker exposure to groundwater via vapor intrusion are calculated using the highest observed concentrations for all constituents detected in groundwater.

As shown in **Table 8**, taking into consideration the groundwater sampling results from the source area monitoring wells installed and sampled by PESRM, for the hypothetical case of a routine worker exposed to COPCs in groundwater via vapor intrusion, the upper-bound cumulative cancer risk is estimated to be 5×10^{-4} and the noncancer HI is estimated to be 6, greater than the risk management goals of 1×10^{-4} and 1, respectively. Taking into consideration the most recent groundwater sampling results from each of the existing monitoring wells in the area (previously installed by Evergreen), similar estimates of cumulative cancer risk (7×10^{-4}) and noncancer HI (9) are estimated.

As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate and HI are predominately driven by benzene.

To support and guide risk management decisions (e.g., further sampling, further assessment, vapor mitigation, remediation, etc.), upper-bound estimates of cumulative cancer risk and HI were also calculated on a point-by-point basis using the highest observed concentration for all COPCs from each groundwater well. As discussed in Section 5.1.2.2, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 9** and **Figure 7**, seven wells (i.e., TG07-MW-07, B-149, B-150, B-154, B-155, B-177, and B-179) exhibit COPC concentrations estimated to result in groundwater vapor intrusion cancer risk and/or HI greater than the risk management goals.

Based upon this risk characterization, further consideration for risk management action due to routine worker vapor intrusion exposure to COPCs in groundwater (i.e., benzene) at these locations would be warranted.

Groundwater Vapor Intrusion Exposure (into a Future Nonresidential Building) – Future Extent

As described in Section 5.1.3.9, where unacceptable risk via exposure to groundwater has been identified, a 2-dimensional fate and transport model, QD, is used to calculate the maximum potential future downgradient extent of the unacceptable risk/HI. The modeling demonstrates that after 30 years, concentrations of COPC that present a potentially unacceptable risk to routine workers (i.e., benzene) could extend as far as 148 ft downgradient of TG07-MW-07.

The results of the QD modeling are depicted in **Figure 7** and **Appendix A, Attachment 8**.

Groundwater Volatilization to Outdoor Air Exposure

Routine workers could be exposed to COPCs in shallow groundwater to the extent that such COPCs volatilize and migrate into outdoor air. As shown in **Table 4**, taking into consideration the groundwater sampling results from the source area monitoring wells installed and sampled by PESRM, the upper-bound cumulative cancer risk (3×10^{-6}) and noncancer HI (0.04) estimates are below PADEP's cumulative



cancer and noncancer HI risk management goals of 1×10^{-4} and 1, respectively. Therefore, potential routine worker exposure to COPCs in groundwater via volatilization to outdoor air would not result in unacceptable risk/HI. Taking into consideration the most recent groundwater sampling results from each of the existing monitoring wells in the area (previously installed by Evergreen), similar estimates of cumulative cancer risk (4×10^{-6}) and noncancer HI (0.05) are estimated.

5.3.2.2 Maintenance Workers

Outdoor Direct Contact Exposure to Soil

As discussed in Section 5.1.1, maintenance workers could be exposed to COPCs in soil in the future during regular maintenance activities (e.g., landscaping, underground utility repairs, etc.) following site redevelopment activities. This section presents the results of risk calculations performed to characterize the risks associated with these exposures.

Potential exposures are evaluated by initially calculating upper-bound estimates of RME cumulative cancer risk and HIs to streamline the risk assessment. These estimates are calculated using the highest observed concentrations for all constituents detected in soil regardless of depth.

As shown on **Table 5**, the upper-bound estimates of cumulative cancer risk and HI for potential exposure of maintenance workers to soil are 5×10^{-5} and 2, respectively. The upper-bound estimate of cumulative cancer risk is less than the risk management goal of 1×10^{-4} . The upper-bound estimate of HI of 2 is greater than the risk management goal of 1. As shown in **Appendix A, Attachment 7**, this upper-bound HI is predominantly driven by benzene and cumene.

A more reasonable but still conservative estimate of the HI for potential maintenance worker RME to COPCs in soil is estimated using a refined exposure concentration for COPCs contributing most to the exposure area HI estimate (i.e., benzene and cumene). Because refined exposure concentrations for toluene, 124-TMB, xylenes (total), BaP, and naphthalene were already estimated for the exposure area, refined exposure concentrations for these constituents are also used. For all other COPCs, the maximum detected concentrations are used.

As discussed in Section 5.1.2, the refined exposure concentration is estimated by conservatively calculating the 95 percent UCL on the mean concentration in soil. For expediency, this UCL is calculated using the maximum concentrations from any depth at each soil sample location. As shown on **Table 6**, using the refined exposure concentration for benzene (1,278 mg/kg), cumene (3,764 mg/kg), toluene (1,168 mg/kg), 124-TMB (36.4 mg/kg), xylenes (total) (110.4 mg/kg), BaP (3.9 mg/kg), and naphthalene (4.4 mg/kg), the RME HI estimate for maintenance worker exposure to COPCs is 0.2, below the risk management goal of 1. Therefore, potential maintenance worker exposure to COPCs in soil would not result in unacceptable risk.

Outdoor Direct Contact Exposure to Groundwater – Current Extent

Maintenance workers could be directly exposed to COPCs in shallow groundwater during occasional subsurface maintenance or excavation activities that encounter groundwater. Exposure to groundwater could include incidental ingestion, dermal contact, and inhalation of vapors in outdoor air.



As shown in **Table 8**, taking into consideration the groundwater sampling results from the source area monitoring wells installed and sampled by PESRM, for the hypothetical case of a maintenance worker exposed to COPCs in groundwater via direct contact, the upper-bound cumulative cancer risk is estimated to be 6×10^{-4} and the noncancer HI is estimated to be 20, greater than the risk management goals of 1×10^{-4} and 1, respectively. Taking into consideration the most recent groundwater sampling results from each of the existing monitoring wells in the area (previously installed by Evergreen), similar estimates of cumulative cancer risk (8×10^{-4}) and noncancer HI (20) are estimated.

As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk and HI are predominately driven by benzene.

To support and guide risk management decisions, upper-bound estimates of cumulative cancer risk and HI were also calculated on a point-by-point basis using the highest observed concentration for all COPCs from each groundwater well. As discussed in Section 5.1.2.2, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 9** and **Figure 7**, seven wells (i.e., TG07-MW-07, B-149, B-150, B-154, B-155, B-177, and B-179) exhibit COPCs concentrations estimated to result in groundwater vapor intrusion cancer risk and/or HI greater than the risk management goals.

Based upon this risk characterization, further consideration for risk management action due to maintenance worker exposure to COPCs in groundwater (i.e., benzene) at these locations would be warranted.

Outdoor Direct Contact Exposure to Groundwater – Future Extent

As described in Section 5.1.3.9, where unacceptable risk via exposure to groundwater has been identified, a 2-dimensional fate and transport model, QD, is used to calculate the maximum potential future downgradient extent of the unacceptable risk. The modeling demonstrates that after 30 years, concentrations of COP that present a potentially unacceptable risk to maintenance workers (i.e., benzene) could extend as far as 257 ft downgradient of TG07-MW-07.

The results of the QD modeling are depicted in **Figure 7** and **Appendix A, Attachment 8**.

5.3.2.3 Construction Workers

Outdoor Direct Contact Exposure to Soil

As discussed in Section 5.1.1, construction workers could be exposed to soil in the future during site redevelopment activities. This section presents the results of risk calculations performed to characterize the risks associated with these exposures.

Potential exposures are evaluated by initially calculating upper-bound estimates of RME cumulative cancer risk and HIs to streamline the risk assessment. These estimates are calculated using the highest observed concentrations for all constituents detected in soil regardless of depth.



As shown on **Table 5**, the upper-bound estimates of cumulative cancer risk and HI for potential exposure of construction workers to soil are 3×10^{-4} and 40, respectively, greater than PADEP's cumulative cancer and noncancer HI risk management goals. As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate is predominately driven by benzene. The potentially unacceptable upper-bound HI is predominately driven by benzene, cumene, toluene, 124-TMB, xylenes (total), BaP, and naphthalene.

A more reasonable but still conservative estimate of the risk and HI for potential construction worker RME to COPCs in soil is estimated using a refined exposure concentration for benzene, cumene, toluene, 124-TMB, xylenes (total), BaP, and naphthalene in the exposure area. For all other COPCs, the maximum detected concentrations are used.

As discussed in Section 5.1.2, the refined exposure concentration is estimated by conservatively calculating the 95 percent UCL on the mean concentration in soil. For expediency, this UCL is calculated using the maximum concentrations from any depth at each soil sample location. As shown on **Table 6**, using the refined exposure concentration for benzene (1,278 mg/kg), cumene (3,764 mg/kg), toluene (1,168 mg/kg), 124-TMB (36.4 mg/kg), xylenes (total) (110.4 mg/kg), BaP (3.9 mg/kg), and naphthalene (4.4 mg/kg), the RME risk and HI estimates for construction worker exposure to COPCs in soil are 3×10^{-5} and 5, respectively. The upper-bound estimate of cumulative cancer risk is less than the risk management goal of 1×10^{-4} . The upper-bound estimate of HI of 5 is greater than the risk management goal of 1. Therefore, potential construction worker exposure to COPCs in soil could result in unacceptable HI.

To support and guide risk management decisions, upper-bound estimates of cumulative cancer risk and HIs were calculated on a point-by-point basis, using the highest observed concentration for all COPCs from any depth at each location. As discussed in Section 5.1.2.1, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 7** and **Figure 6**, 21 soil sampling locations (i.e., GPR790-01, GPR790-05, GPR791-01, GPR791-04, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-08, and GPR798-04) exhibited a HI greater than the risk management goal.

Based upon this risk characterization, further consideration for risk management action due to construction worker exposure to COPCs in soil (i.e., benzene, cumene, toluene, 124-TMB, xylenes (total), BaP, and naphthalene) at these locations would be warranted.

Outdoor Direct Contact Exposure to Groundwater – Current Extent

During redevelopment or site construction activities that encounter groundwater, construction workers could be directly exposed to COPCs in shallow groundwater via incidental ingestion, dermal contact, and inhalation of vapors in outdoor air.

As shown in **Table 8**, taking into consideration the groundwater sampling results from the source area monitoring wells installed and sampled by PESRM, for the hypothetical case of a construction worker exposed to COPCs in groundwater via direct contact, the upper-bound cumulative cancer risk is



estimated to be 6×10^{-5} and the noncancer HI is estimated to be 6. The upper-bound estimate of cumulative cancer risk is less than the risk management goal of 1×10^{-4} . The upper-bound estimate of noncancer HI of 6 is greater than the risk management goal of 1. Taking into consideration the most recent groundwater sampling results from each of the existing monitoring wells in the area (previously installed by Evergreen), similar estimates of cumulative cancer risk (8×10^{-5}) and noncancer HI (9) are estimated.

As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound HI are predominately driven by benzene.

To support and guide risk management decisions, upper-bound estimates of cumulative cancer risk and HI were also calculated on a point-by-point basis using the highest observed concentration for all COPCs from each groundwater well. As discussed in Section 5.1.2.2, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 9** and **Figure 7**, seven wells (i.e., TG07-MW-07, B-149, B-150, B-154, B-155, B-177, and B-179) exhibited an HI greater than the risk management goal.

Based upon this risk characterization, further consideration for risk management action due to construction worker exposure to COPCs in groundwater (i.e., benzene) at these locations would be warranted.

Outdoor Direct Contact Exposure to Groundwater – Future Extent

As described in Section 5.1.3.9, where unacceptable risk via exposure to groundwater has been identified, a 2-dimensional fate and transport model, QD, is used to calculate the maximum potential future downgradient extent of the unacceptable HI. The modeling demonstrates that after 30 years, concentrations of COPCs that present a potentially unacceptable risk to construction workers (i.e., benzene) could extend as far as 151 ft downgradient of TG07-MW-07.

The results of the QD modeling are depicted in **Figure 7** and **Appendix A, Attachment 8**.

5.3.2.4 Nonpotable Groundwater Use

Current Extent

Potential exposures to COPCs in groundwater via nonpotable groundwater use are evaluated using a hypothetical scenario where groundwater is used to fill a backyard wading pool (“kiddie” pool), described in **Appendix A**. This scenario represents a reasonable worst case exposure scenario in which the estimated exposure is expected to be higher than those associated with other nonpotable uses (e.g., watering lawns, washing cars). Potential routes of exposure in this scenario include incidental ingestion, dermal contact, and inhalation of vapors.

The cumulative cancer risk and noncancer HI estimates for receptor exposure to groundwater via nonpotable use are calculated using the highest observed concentrations for all constituents detected in groundwater.



As shown in **Table 8**, taking into consideration that groundwater sampling results from the source area monitoring wells installed and sampled by PESRM, for nonpotable exposure to COPCs in groundwater, the upper-bound cumulative cancer risk is estimated to be 8×10^{-3} and the noncancer HI is estimated to be 40, greater than the risk management goals of 1×10^{-4} and 1, respectively. Taking into consideration the most recent groundwater sampling results from each of the existing monitoring wells in the area (previously installed by Evergreen), similar estimates of cumulative cancer risk (1×10^{-2}) and noncancer HI (50) are estimated for the unconfined aquifer. Estimates of risk and HI taking into consideration the most recent groundwater sampling results from the lower aquifer monitoring wells in the area results in an estimated cancer risk of 1×10^{-8} and noncancer HI of 0.00005.

As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate and HI are predominately driven by benzene, toluene, and 1,2-dichloroethane.

To support and guide risk management decisions, upper-bound estimates of cumulative cancer risk and HI were also calculated on a point-by-point basis using the highest observed concentration for all COPCs from each unconfined groundwater well. As discussed in Section 5.1.2.2, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 9** and **Figure 7**, nine groundwater wells (i.e., TG07-MW-05, TG07-MW-07, B-149, B-150, B-154, B-155, B-177, B-178, and B-179) exhibit COPCs concentrations estimated to result in nonpotable groundwater use cancer risk and/or HI greater than the risk management goals.

Currently, on-site nonpotable groundwater is not reasonably expected and, therefore, risk management action to address this condition is not warranted.

Future Extent

As described in Section 5.1.3.9, where unacceptable risk via exposure to groundwater has been identified, a 2-dimensional fate and transport model, QD, is used to calculate the maximum potential future downgradient extent of the unacceptable risk in groundwater. The modeling demonstrates that after 30 years, concentrations of COPCs that present a potentially unacceptable risk via nonpotable groundwater use (i.e., benzene) could extend as far as 396 ft downgradient of TG07-MW-07 and 72 ft downgradient of TG07-MW-05. At this distance, the aerial extent of potential unacceptable risk is still on-site. Because on-site nonpotable groundwater use is not a current or reasonably expected future exposure scenario, risk management action to address this condition is not warranted.

The results of the QD modeling are depicted in **Figure 7** and **Appendix A, Attachment 8**.

5.3.2.5 Soil Migration-to-Groundwater Pathway

In order to evaluate the potential for subsurface soil to leach unacceptable concentrations to groundwater in the future, RBSLs were developed in accordance with the methodologies described in USEPA's (1996b) *Soil Screening Guidance: User's Guide*. Additional details describing the derivation of these screening levels are presented in Section 5.1.3.8. Upper-bound cancer risk and noncancer HI estimates were calculated by scaling off of the soil migration-to-groundwater RBSLs.



Soil migration-to-groundwater cumulative cancer risk and HI estimates were calculated for the following scenarios:

- Routine worker exposure to COPCs in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPCs in groundwater via direct contact
- Receptor exposure to COPCs in groundwater via nonpotable groundwater use

As shown in **Table 5**, the upper-bound cumulative cancer risk and HI estimates for soil migration-to-groundwater protective of routine worker groundwater exposure via volatilization to outdoor air and vapor intrusion and construction worker exposure to COPCs in groundwater via direct contact are below the risk management goals of 1×10^{-4} and 1, respectively. The upper-bound cumulative cancer risk and HI estimate for soil migration-to-groundwater protective of nonpotable groundwater use upper-bound cumulative cancer risk (1×10^{-3}) and noncancer HI (5) estimates are greater than the risk management goals of 1×10^{-4} and 1, respectively. As shown in **Appendix A, Attachment 7**, the unacceptable upper-bound cumulative cancer risk estimate and HI are predominately driven by benzene.

To support and guide risk management decisions, upper-bound estimates of cumulative cancer risk and HIs for this exposure scenario were also calculated on a point-by-point basis using the highest observed concentration for all COPCs from each soil sampling location. As discussed in Section 5.1.2.1, where a COPC is non-detect at a location but detected within the specific exposure media at the Site, $\frac{1}{2}$ the analytical limit at the location was used.

As shown on **Table 7** and **Figure 6**, 10 soil sampling locations (i.e., GPR790-05, GPR791-01, GPR791-04, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-08, and GPR798-04) exhibited a cancer risk greater than the risk management goal. Six soil sampling locations (i.e., GPR790-05, GPR794-02, GPR794-04, GPR794-05, GPR794-08, and GPR798-04) exhibited a noncancer HI estimate greater than the risk management goal.

As discussed in Section 5.1.3.7, exposure to COPCs in groundwater via nonpotable groundwater use is evaluated and concludes that currently, on-site nonpotable groundwater is not reasonably expected, and in the future the modeled extent of potential unacceptable risk remains on-site. Therefore, risk management action to address this condition is not warranted.

5.3.2.6 Groundwater Migration-to-Surface Water Pathway

In order to evaluate the potential for COPCs observed in groundwater in the area to adversely impact surface water in the future as a result of groundwater migration and discharge to surface water, COPC concentrations observed in the source area wells installed by PESRM were compared to the RBSLs developed for this pathway (**Appendix B**).

As shown in **Table 3**, benzene and cumene were detected at concentrations in groundwater above the MtSW screening levels of 130 mg/L and 2.6 mg/L, respectively. Benzene concentrations were greater than the MtSW screening level at TG07-MW-07. Cumene concentrations were greater than the MtSW screening level at TG07-MW-05, TG07-MW-07, and TG07-MW-08. These locations are also shown on



Figure 11. Soil concentrations greater than the soil migration-to-groundwater screening levels for this exposure pathway were identified in proximity to TG07-MW-05 and TG07-MW-07. The soil concentrations in proximity to TG07-MW-08 were less than the soil migration-to-groundwater screening levels for this pathway indicating that the contamination identified in groundwater may be unrelated to the AST.

As described in Section 5.1.3.9, because the potential for unacceptable risk via migration of groundwater-to-surface water was identified at these three locations, a 2-dimensional fate and transport model, QD, is used to calculate the maximum potential future downgradient extent of COPC concentrations which could pose a threat to surface water. The modeling demonstrates that after 30 years, concentrations of benzene that could pose a threat to surface water will only extend 49 ft downgradient of TG07-MW-07. Similarly, after 30 years, concentrations of cumene will only extend 2 ft downgradient of TG07-MW-07 and 3 ft downgradient of TG07-MW-05. The potential future extent of cumene concentrations in well TG07-MW-08 was not modeled due to the lack of an identified soil source (i.e., soil samples exceeding the soil migration to groundwater RBSL for cumene) in the vicinity of tank GP U 767.

While concentrations exist greater than the migration-to-surface water screening levels, none of the future extents of unacceptable concentrations reach the River and therefore do not warrant risk management action.

5.3.2.7 Exposure to Lead in Soil

Exposure of routine workers, maintenance workers, and construction workers to lead in soil during outdoor activities is evaluated using a screening level of 2,520 mg/kg. This screening level is calculated following USEPA guidance (USEPA 2003), including updates (USEPA 2009, 2017a). The derivation of the industrial soil screening level is presented in **Appendix B**. As shown on **Table 2**, the concentrations of lead in soil range from 3.7 mg/kg to 1,400 mg/kg and are all below the RBSL. Therefore, potential worker exposure to lead concentrations in soil at the Site would not result in unacceptable risk.

5.4 Uncertainty Analysis

While the Risk Assessment is conducted in accordance with PADEP and USEPA guidance, there may be some uncertainties associated with certain aspects of the risk assessment process. In general, the methods and assumptions used to complete the Risk Assessment are very conservative by design to account for such uncertainties. This section discusses potential uncertainties in the risk characterization and the potential impact (or lack thereof) such uncertainties could have on risk management decision-making.

5.4.1 Exposure Concentrations

The exposure concentrations in this risk assessment are predominantly based on the highest concentrations of COPCs detected in soil and groundwater or conservative refinements to the exposure concentrations (e.g., UCLs), performed only when an upper-bound estimate of the RME media-specific cumulative cancer risk or noncancer HI exceeds the risk management goals. This streamlines the risk



assessment by avoiding the calculation of refinements that would not materially change the risk assessment conclusions, the need for risk management action, or require additional sampling/characterization to support the refinements. However, this approach likely overestimates the cumulative cancer risk and noncancer HI estimates because these estimates are based on maximum detected concentrations. The use of maximum detected concentrations introduces more conservatism than necessary for RME estimates because it assumes simultaneous worst-case exposure. The overestimation of exposure concentrations results in risk and HI estimates that are closer to, or in excess of, PADEP's risk management goals than they would be if refinements were used.

Most exposure concentrations that are based on mathematical modeling of constituent transfer from soil or groundwater to air are conservative for the same reasons discussed above, since the model estimates are predominantly based on the use of maximum detected concentrations in soil or groundwater. In addition, some model estimates are conservative because they do not account for the reduction of constituent concentration or mass in the soil or groundwater as constituents transfer from these media. Even for models that account for reduction of mass in the soil (e.g., Jury model), risk calculations for ingestion and dermal contact with soil assume soil concentrations remain constant, which is consistent with USEPA and PADEP practice but contradicts the mass conservation principle. As a result, risk estimates that are based on the sum of risk estimates from soil and soil vapor/particulates are more conservative than necessary for RME estimates. These include almost all of the risk estimates discussed in Section 5.3.2.

Another factor that contributes to the likely overestimation of exposure concentrations is the assumption that the COPCs are entirely site-related. The concentrations of all constituents are assumed to be site-related in this risk assessment because the field investigation did not quantify site-specific background levels (i.e., concentrations not associated with a release from the Site, for example, fill-related constituent concentrations).

Considering all these factors, the exposure concentrations used in this risk assessment are more conservative than necessary for RME estimates and therefore likely result in an overestimation of risk and/or hazard.

5.4.2 Exposure Factors

As discussed in Section 5.1.4, most of the exposure factors used in the risk assessment are high-end (i.e., 90th to 95th percentile) estimates of the magnitude, frequency, and duration of potential exposures. When several such high-end factors are multiplied, the resulting estimates of dose will be higher than the 90th percentile of the distribution of exposures in the potentially exposed population and could be higher than the exposure to the maximally exposed individual, particularly when such exposure factors are combined with exposure concentrations that are based on maximum detected concentrations (as discussed above). The use of upper-bound exposure factors is likely to result in an overestimate of potential risks and/or hazards.

5.4.3 Extrapolated Toxicity Values

As discussed in Section 5.2, the dermal toxicity values used in the risk assessment are oral toxicity values that were extrapolated to the dermal route without constituent-specific judgment regarding whether such extrapolation might be appropriate for a particular constituent. This is consistent with USEPA guidance (2004b) and is a conservative approach to ensure that potential risk via the dermal route is not overlooked. However, some constituents might exhibit different degrees of toxicity for the dermal route relative to the oral route. For such constituents, the extrapolation approach used in the risk evaluation could introduce uncertainty.

5.4.4 Risk Characterization

The summation of cancer risks and HQs for multiple COPCs is based upon USEPA guidance (1989) to assume dose additivity, which means that constituents in a mixture are assumed to have no synergistic or antagonistic interactions and each constituent has the same mode of action and elicits the same health effects. In general, this approach can introduce significant uncertainty with the over- or underestimation of risk and/or hazard. However, because only a few constituents contribute to the cumulative risk and HI estimates, the impact of this uncertainty on the outcome of the risk assessment is likely to be minimal.

5.5 Summary

This report documents the methodology and results of a site-specific human health risk assessment performed to support a demonstration that conditions at Tank Group 07 meet the tank closure performance standard in accordance with Act 32. The potential risks are characterized based upon the RME under the current and reasonably expected future land and groundwater uses at and around the Site.

The scope of the human health risk assessment calculations is summarized by the scenarios for potential human exposure as shown on **Table 4**. All soil and groundwater data collected in accordance with the Work Plan and SAP were considered in this Risk Assessment.

Tables 5 through 10 present the results of the soil and groundwater risk calculations and which exposure scenarios would present an unacceptable risk and would warrant risk management action. Likewise, **Figures 6 and 7** present the spatial distribution of potentially unacceptable risks for soil and groundwater, respectively, and the general locations where risk management action would be warranted due to unacceptable risks/HIs for specific exposure scenarios.

As discussed in Section 5.3, the Risk Assessment identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion) and construction workers (via direct contact) from exposure to constituents of concern (COCs) in soil in the area of Tank Group 07. It also identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion), maintenance workers (via direct contact), and construction workers (via direct contact) from exposure to COCs in groundwater in the area of Tank Group 07.



The following discusses these results by environmental media and locations on the Site that would warrant consideration for risk management action.

5.5.1 Soil

As presented on **Table 7**, locations with soil COPCs concentrations that could result in cumulative cancer risk and/or HI estimates for potential routine workers via vapor intrusion from soil that are above the risk management goals include GPR1116-07, GPR1117-03, GPR790-01, GPR790-02, GPR790-05, GPR791-01, GPR791-03, GPR791-04, GPR791-06, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR792-07, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR793-05, GPR793-06, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-07, GPR794-08, GPR798-04, and GPR799-08. These unacceptable cancer risk and/or HI estimates are predominately driven by benzene, cumene, toluene, 124-TMB, 1,3,5-TMB, xylenes (total), and naphthalene.

As presented on **Table 7**, locations with soil COPCs concentrations that could result in HI estimates above the risk management goal for potential construction workers via soil direct contact soil include GPR790-01, GPR790-05, GPR791-01, GPR791-04, GPR792-01, GPR792-02, GPR792-03, GPR792-04, GPR792-05, GPR792-06, GPR793-01, GPR793-02, GPR793-03, GPR793-04, GPR794-01, GPR794-02, GPR794-04, GPR794-05, GPR794-06, GPR794-08, and GPR798-04. These unacceptable HI estimates are predominately driven by benzene, cumene, toluene, 124-TMB, xylenes (total), BaP, and naphthalene.

5.5.2 Groundwater

As presented on **Table 9**, locations with groundwater COPCs concentrations that could result in cumulative cancer risk and/or HI estimates above the risk management goals for potential routine workers via vapor intrusion from groundwater, maintenance worker groundwater direct contact, and construction worker groundwater direct contact include TG07-MW-07, B-149, B-150, B-154, B-155, B-177, and B-179. These unacceptable cancer risk and/or HI estimates are predominately driven by benzene.

6 Site-Specific Remediation Standards

As discussed in Section 5.3, the Risk Assessment identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion) and construction workers (via direct contact) from exposure to COCs in soil in the area of Tank Group 07. It also identifies potentially unacceptable risk/HI to routine workers (via vapor intrusion), maintenance workers (via direct contact), and construction workers (via direct contact) from exposure to COCs in groundwater in the area of Tank Group 07.

Overall, potentially unacceptable risk/HI from exposure to soil in the area is driven by the following COCs:

- Benzene
- Cumene



- Toluene
- 124-TMB
- 135-TMB
- Xylenes (total)
- BaP
- Naphthalene

Potentially unacceptable risk/HI from exposure to groundwater is driven by the following COC:

- Benzene

As discussed in Section 7.3.3 of the Report, potentially unacceptable vapor intrusion exposures will be managed separately following additional characterization/evaluation and eventually through pathway elimination. In order to support remedial action planning for all other exposure pathways, site-specific standards (SSS) are proposed for these COCs. The proposed SSS will be used in the forthcoming Remedial Action Plan for Tank Group 07. **Table 10** presents the SSS and the resulting risk/HI that would be associated with exposure to soil at these concentrations. This includes direct contact exposure of construction workers to soil. Similarly, **Tables 11 through 12** present the SSS and the resulting risk/HI that would be associated with exposure to groundwater at these concentrations. This includes direct contact exposure of maintenance workers and construction workers to groundwater.

SSS were developed considering: (1) the cumulative risk management goals established under Act 2 (i.e., cumulative cancer risk of 1×10^{-4} and noncancer HI of 1); and (2) including the risk/HI posed by constituents other than the COCs detected in soil/groundwater at the Site. Assuming receptors are exposed to the maximum site-wide concentrations for every constituent except the COCs, achieving the SSS for the COCs would result in acceptable risk/HI for each of the relevant exposure scenarios.

The overall SSS that would achieve an acceptable risk/HI for receptor exposure to soil in the area are as follows¹⁷:

- Benzene: 130 mg/kg
- Cumene: 680 mg/kg
- Toluene: 1,200 mg/kg
- 124-TMB: 36 mg/kg
- Xylenes (total): 110 mg/kg
- BaP: 3.9 mg/kg
- Naphthalene: 4.4 mg/kg

The overall SSS that would achieve an acceptable risk/HI for groundwater is:

- Benzene: 11 mg/L

¹⁷ An SSS was not calculated for 135-TMB as it was only a COC for routine worker exposure via vapor intrusion.



7 Summary and Conclusions

This Risk Assessment was prepared in support of the *Site Characterization Report* for Tank Group 07 to document the methodology and results of a site-specific human health risk assessment performed in accordance with 25 Pa. Code § 250.409, to demonstrate that conditions at the Site meet the tank closure performance standard in accordance with Act 32.

As discussed in Section 3, based on the review of the soil and groundwater concentrations in comparison to the RBSLs and the spatial distribution of concentrations greater than these levels, the soil and groundwater sampling performed adequately defines the horizontal and vertical extent of COPCs to support a site-specific risk assessment.

Using soil and groundwater data collected in accordance with the Work Plan and the SAP and the methodologies as described in Section 5, cumulative cancer risk and noncancer HI estimates for the exposure of current and reasonably expected future receptor populations to COPCs in soil and groundwater were calculated. Exposure of routine workers to COCs via soil vapor intrusion and of construction workers to COCs via soil direct contact may warrant risk management action. Exposure of routine workers to COCs via groundwater vapor intrusion and of maintenance and construction workers to COCs via groundwater direct contact may warrant risk management. All other exposure scenarios do not warrant risk management.

To facilitate remedial action planning, aside from vapor intrusion, which will be managed separately following additional characterization/evaluation and eventually through pathway elimination, SSS for each of the COCs were developed. These SSS, if achieved in the Tank Group 07 area, would achieve acceptable risk/HI for each receptor exposure scenario under current and reasonably expected future land/groundwater use.

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Table 1**Chemicals of Potential Concern**

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Detected in Soil	Detected in Groundwater
INORG	Lead	7439-92-1	Y	Y
SVOC	Anthracene	120-12-7	Y	Y
SVOC	Benzo(a)anthracene	56-55-3	Y	Y
SVOC	Benzo(a)pyrene	50-32-8	Y	Y
SVOC	Benzo(b)fluoranthene	205-99-2	Y	Y
SVOC	Benzo(g,h,i)perylene	191-24-2	Y	Y
SVOC	Chrysene	218-01-9	Y	Y
SVOC	Fluorene	86-73-7	Y	Y
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	Y	Y
SVOC	Naphthalene	91-20-3	Y	Y
SVOC	Phenanthrene	85-01-8	Y	Y
SVOC	Pyrene	129-00-0	Y	Y
SVOC	Tetraethylene Glycol	112-60-7	N	-
VOC	Benzene	71-43-2	Y	Y
VOC	Cumene	98-82-8	Y	Y
VOC	1,2-Dibromoethane	106-93-4	Y	Y
VOC	1,2-Dichloroethane	107-06-2	N	Y
VOC	Ethyl Benzene	100-41-4	Y	Y
VOC	Methyl tert-butyl ether	1634-04-4	Y	Y
VOC	Toluene	108-88-3	Y	Y
VOC	1,2,4-Trimethylbenzene	95-63-6	Y	Y
VOC	1,3,5-Trimethylbenzene	108-67-8	Y	Y
VOC	Xylenes (total)	1330-20-7	Y	Y

Notes:

Y - Detected.

N - Not Detected.

Table 2
Soil Screening Summary
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Matrix	Chem Group	Chemical	CASRN	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Routine Worker Direct Contact (mg/kg)	Ratio of Max Detect to Routine Worker Direct Contact	Routine Worker Vapor Intrusion (mg/kg)	Ratio of Max Detect to Routine Worker Vapor Intrusion	Construction Worker Direct Contact (mg/kg)	Ratio of Max Detect to Construction Worker Direct Contact	Soil MtGW Screening Level (mg/kg)	Ratio of Max Detect to Soil MtGW	Soil GW MtSW Screening Level (mg/kg)	Ratio of Max Detect to Soil GW MtSW
Soil	VOC	Benzene	71-43-2	105	89	0.000070	600	12000	63	190	0.46	2600	8.7	1400	98	120		
Soil	VOC	Cumene	98-82-8	89	84	0.00028	1700	15000	1000	15	6.1	2500	87	170	1000	15	1040	14
Soil	VOC	Ethyl Benzene	100-41-4	75	53	0.00016	13	120	2300	0.052	15	8.0	1300	0.092	820	0.15		
Soil	VOC	Toluene	108-88-3	75	49	0.00018	500	6200	8000	0.78	76	82	650	9.5	9800	0.63		
Soil	VOC	1,2,4-Trimethylbenzene	95-63-6	75	56	0.00027	14	330	180	1.8	0.92	360	70	4.7	250	1.3		
Soil	VOC	1,3,5-Trimethylbenzene	108-67-8	75	46	0.00010	7.5	140	220	0.64	0.92	150	99	1.4	240	0.58		
Soil	VOC	Xylenes (total)	1330-20-7	75	58	0.00037	54	560	240	2.3	1.5	370	51	11	340	1.6		
Soil	SVOC	Anthracene	120-12-7	48	35	0.039	1.7	23	46000	0.00050			46000	0.00050				
Soil	SVOC	Benzo(a)anthracene	56-55-3	48	42	0.027	3.5	71	430	0.17			3200	0.022				
Soil	SVOC	Benzo(a)pyrene	50-32-8	75	50	0.047	2.7	54	43	1.3			7.7	7.0				
Soil	SVOC	Benzo(b)fluoranthene	205-99-2	48	40	0.034	2.0	28	430	0.065			3200	0.0088				
Soil	SVOC	Benzo(g,h,i)perylene	191-24-2	48	37	0.025	1.4	18	4600	0.0039			14000	0.0013				
Soil	SVOC	Chrysene	218-01-9	48	43	0.024	6.7	170	43000	0.0040			320000	0.00053				
Soil	SVOC	Fluorene	86-73-7	48	40	0.024	1.6	11	6200	0.0018			18000	0.00061				
Soil	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	7	3	0.077	0.17	0.35	430	0.0008			3200	0.00011				
Soil	SVOC	Naphthalene	91-20-3	75	58	0.031	3.0	52	41	1.3	0.54	96	6.0	8.7	27	1.9		
Soil	SVOC	Phenanthrene	85-01-8	48	42	0.037	8.7	110	4600	0.024			14000	0.0079				
Soil	SVOC	Pyrene	129-00-0	48	44	0.022	6.0	130	4600	0.028			14000	0.0093				
Soil	INORG	Lead	7439-92-1	48	48	3.7	210	1400	2520	0.54			2520	0.54	45000	0.030	45010	0.030

Notes:

Only constituents detected are shown.

The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the criteria for Xylenes (total).

Ratios of concentration to the RBSLs greater than 1 are shaded in bold.

Chem Group - chemical group; INORG - metals; SVOC - semi-volatile organic compounds; VOC - volatile organic compounds

Table 4

Scenarios for Potential Human Exposure

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Receptor Population	Exposure Medium	Exposure Route	Potential Current Exposure?	Potential Future Exposure?	Comments
On-Site/Off-Site					
Routine Workers	surface soil	incidental ingestion of and dermal contact with surface soil	No	Yes	Currently, routine workers are not at the Site as the Facility is currently undergoing decommissioning, cleanup and redevelopment. Following redevelopment, exposure to surface soil through incidental ingestion, dermal contact, and inhalation of vapor and particulates is possible in areas without ground cover and in those areas where ground cover may be removed in the future. Following redevelopment, most of the soil at the Site will be located under building slabs, drive aisles, parking lots, new roadways, and other paved areas. Buildings in areas where potentially unacceptable vapor intrusion risks are identified will be managed via engineering controls (e.g., vapor barriers or other mitigation controls).
		inhalation of soil-derived vapors and airborne particulates (wind erosion) in outdoor air	No	Yes	
		inhalation of soil-derived vapors that migrate through building foundations into indoor air	No	Yes	
	subsurface soil	inhalation of soil-derived vapors in outdoor air	No	Yes	Following redevelopment, exposure to surface soil through incidental ingestion, dermal contact, and inhalation of vapor and particulates is possible in areas without ground cover and in those areas where ground cover may be removed in the future. Following redevelopment, most of the soil at the Site will be located under building slabs, drive aisles, parking lots, new roadways, and other paved areas. Buildings in areas where potentially unacceptable vapor intrusion risks are identified will be managed via engineering controls (e.g., vapor barriers or other mitigation controls).
		inhalation of soil-derived vapors that migrate through building foundations into indoor air	No	Yes	
	groundwater	incidental ingestion of and dermal contact with groundwater and inhalation of groundwater-derived vapors during use of groundwater for drinking water	No	No	Routine worker activities do not involve contact with groundwater. Groundwater is not currently used for potable purposes at the Site. Groundwater is not expected to be used for potable purposes in the future as the First Amendment to the Consent Order and Agreement restricts the use of groundwater at the Facility for any purpose except for sampling, treatment and/or other remedial activities, eliminating future potable or non-potable use.
		incidental ingestion of and dermal contact with groundwater and inhalation of groundwater-derived vapors during use of groundwater for purposes other than drinking water	No	No	
		inhalation of groundwater-derived vapors in outdoor air	No	Yes	Following redevelopment, exposure through inhalation of vapor is possible in areas without ground cover and in those areas where ground cover may be removed in the future. Buildings in areas where potentially unacceptable vapor intrusion risks are identified will be managed via engineering controls (e.g., vapor barriers or other mitigation controls).
		inhalation of groundwater-derived vapors that migrate through building foundations into indoor air	No	Yes	
	LNAPL	inhalation of vapors in outdoor air	No	Yes	Following redevelopment, exposure through inhalation of vapor is possible in areas without ground cover and in those areas where ground cover may be removed in the future. Buildings in areas where potentially unacceptable vapor intrusion risks are identified will be managed via engineering controls (e.g., vapor barriers or other mitigation controls).
inhalation of vapors that migrate through building foundations into indoor air		No	Yes		
Maintenance Workers	surface soil	incidental ingestion of and dermal contact with soil	No	Yes	Currently, maintenance workers are not at the Site as the Facility is currently undergoing decommissioning, cleanup and redevelopment.
		inhalation of soil-derived vapors and airborne particulates in work-space outdoor air	No	Yes	
	subsurface soil	incidental ingestion of and dermal contact with soil	No	Yes	Following redevelopment, maintenance workers could be exposed (1) to surface and subsurface soil during occasional excavations, or (2) to shallow groundwater or LNAPL during occasional excavations that encounter the water table, that are not covered by the health and safety protocols established by the Site health and safety program.
		inhalation of soil-derived vapors and airborne particulates in work-space outdoor air	No	Yes	
	groundwater	incidental ingestion of and dermal contact with exposed groundwater	No	Yes	
		inhalation of vapors from exposed groundwater in work-space outdoor air	No	Yes	
	LNAPL	dermal contact with exposed NAPL	No	Yes	
inhalation of vapors from exposed NAPL in work-space air		No	Yes		
Construction (Redevelopment) Workers	surface soil	incidental ingestion of and dermal contact with soil	Yes	Yes	
	subsurface soil	inhalation of soil-derived vapors and airborne particulates in work-space air	Yes	Yes	
	surface soil	incidental ingestion of and dermal contact with soil	Yes	Yes	
	subsurface soil	inhalation of soil-derived vapors and airborne particulates in work-space air	Yes	Yes	
	groundwater	incidental ingestion of and dermal contact with exposed groundwater	Yes	Yes	
		inhalation of vapors from exposed groundwater in work-space air	Yes	Yes	
	LNAPL	inhalation of vapors from exposed NAPL in work-space air	Yes	Yes	
		inhalation of vapors from exposed NAPL in work-space air	Yes	Yes	

Table 4

Scenarios for Potential Human Exposure

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Receptor Population	Exposure Medium	Exposure Route	Potential Current Exposure?	Potential Future Exposure?	Comments
On-Site/Off-Site (cont.)					
Trespassers	surface soil	incidental ingestion of and dermal contact with surface soil	Yes	Yes	Access to the Site is currently restricted by fencing and security measures. While limited, exposure to surface soil is possible in areas without ground cover, and in those areas where ground cover may be removed in the future. Following redevelopment, most of the soil at the Site will be located under building slabs, drive aisles, parking lots, new roadways, and other paved areas. Trespasser exposure to soil, groundwater, and LNAPL will be qualitatively evaluated by using routine worker exposure estimates as a surrogate.
		inhalation of soil-derived vapors and airborne particulates (wind erosion) in outdoor air	Yes	Yes	
	subsurface soil	inhalation of soil-derived vapors in outdoor air	Yes	Yes	
	groundwater	inhalation of groundwater-derived vapors in outdoor air	Yes	Yes	
	LNAPL	inhalation of vapors in outdoor air	Yes	Yes	

Table 5

Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Routine Worker				Maintenance Worker		Construction Worker		Soil Migration to GW							
	Outdoor Activities		Vapor Intrusion		Outdoor Activities		Outdoor Activities		Nonpotable Use		R. Worker GW Vol OA		R. Worker GW VI		Const. W GW Contact	
	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI
Tank Group 07	3E-04	4E+00	3E-02	4E+02	5E-05	2E+00	3E-04	4E+01	1E-03	5E+00	NC	NC	7E-05	8E-01	7E-06	8E-01

Notes:

Cumulative cancer risk and HI estimates in excess of 1E-4 and 1, respectively, are shaded and bold.

GW - Groundwater

Table 6

RME Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Routine Worker		Maintenance Worker		Construction Worker	
	Outdoor Activities		Outdoor Activities		Outdoor Activities	
	Risk	HI	Risk	HI	Risk	HI
Tank Group 07	3E-05	5E-01	5E-06	2E-01	3E-05	5E+00

Notes:

Cumulative cancer risk and HI estimates in excess of 1E-4 and 1, respectively, are shaded and bold.

Table 7

Location-Specific Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Routine Worker		Construction Worker		Soil Migration to GW	
		Vapor Intrusion		Outdoor Activities		Nonpotable Use	
		Risk	HI	Risk	HI	Risk	HI
Tank Group 07	GPR1116-01	6E-06	2E-01	4E-08	2E-02	6E-08	6E-04
Tank Group 07	GPR1116-02	1E-05	4E-01	9E-08	4E-02	1E-07	1E-03
Tank Group 07	GPR1116-03	4E-06	1E-01	3E-08	1E-02	3E-08	3E-04
Tank Group 07	GPR1116-04	2E-05	5E-01	8E-08	4E-02	2E-07	2E-03
Tank Group 07	GPR1116-05	2E-06	6E-02	2E-08	7E-03	2E-08	2E-04
Tank Group 07	GPR1116-06	8E-06	3E-01	4E-08	3E-02	8E-08	9E-04
Tank Group 07	GPR1116-07	4E-05	1E+00	3E-07	1E-01	3E-07	4E-03
Tank Group 07	GPR1116-08	6E-05	8E-01	7E-07	7E-02	2E-06	1E-02
Tank Group 07	GPR1116-09	7E-07	2E-02	5E-09	2E-03	6E-09	6E-05
Tank Group 07	GPR1116-10	1E-05	4E-01	1E-07	5E-02	1E-07	1E-03
Tank Group 07	GPR1116-11	1E-06	3E-02	1E-08	4E-03	1E-08	1E-04
Tank Group 07	GPR1116-12	2E-06	3E-01	3E-08	3E-02	2E-08	3E-04
Tank Group 07	GPR1116-13	9E-06	2E-01	6E-08	3E-02	8E-08	8E-04
Tank Group 07	GPR1116-14	3E-06	7E-02	2E-08	1E-02	2E-08	2E-04
Tank Group 07	GPR1116-15	3E-05	8E-01	3E-07	1E-01	2E-07	3E-03
Tank Group 07	GPR1117-01	7E-06	2E-01	6E-08	3E-02	7E-08	7E-04
Tank Group 07	GPR1117-02	1E-05	4E-01	8E-08	4E-02	1E-07	1E-03
Tank Group 07	GPR1117-03	4E-05	1E+00	2E-07	9E-02	4E-07	4E-03
Tank Group 07	GPR1117-04	1E-05	4E-01	2E-07	7E-02	1E-07	1E-03
Tank Group 07	GPR1117-05	2E-06	6E-02	3E-08	1E-02	2E-08	2E-04
Tank Group 07	GPR1117-06	8E-06	2E-01	5E-08	2E-02	7E-08	8E-04
Tank Group 07	GPR1117-07	3E-06	8E-02	2E-08	9E-03	3E-08	3E-04
Tank Group 07	GPR1117-08	1E-06	3E-02	2E-08	9E-03	9E-09	9E-05
Tank Group 07	GPR494-01	9E-06	2E-01	3E-07	1E-01	8E-08	9E-04
Tank Group 07	GPR494-02	1E-05	3E-01	7E-07	3E-01	9E-08	9E-04
Tank Group 07	GPR494-03	3E-06	8E-02	3E-07	1E-01	3E-08	3E-04
Tank Group 07	GPR494-04	2E-06	7E-02	3E-07	1E-01	2E-08	2E-04
Tank Group 07	GPR494-05	6E-06	2E-01	3E-07	1E-01	6E-08	6E-04
Tank Group 07	GPR494-06	3E-06	8E-02	9E-08	3E-02	3E-08	3E-04
Tank Group 07	GPR494-07	3E-06	9E-02	1E-07	4E-02	3E-08	3E-04
Tank Group 07	GPR494-08	3E-05	9E-01	2E-06	8E-01	3E-07	3E-03
Tank Group 07	GPR494-09	4E-07	1E-02	4E-08	2E-02	4E-09	4E-05
Tank Group 07	GPR790-01	1E-03	1E+01	1E-05	1E+00	4E-05	2E-01
Tank Group 07	GPR790-02	3E-04	3E+00	3E-06	3E-01	1E-05	5E-02
Tank Group 07	GPR790-03	6E-06	7E-02	7E-08	7E-03	2E-07	1E-03
Tank Group 07	GPR790-04	4E-07	5E-03	5E-09	5E-04	2E-08	8E-05
Tank Group 07	GPR790-05	7E-03	8E+01	8E-05	8E+00	3E-04	1E+00
Tank Group 07	GPR790-06	1E-05	1E-01	1E-07	1E-02	4E-07	2E-03
Tank Group 07	GPR790-07	7E-05	9E-01	8E-07	9E-02	3E-06	1E-02
Tank Group 07	GPR790-08	2E-07	7E-03	2E-08	7E-03	2E-09	2E-05
Tank Group 07	GPR791-01	3E-03	3E+01	3E-05	3E+00	1E-04	5E-01
Tank Group 07	GPR791-02	9E-06	1E-01	1E-07	1E-02	3E-07	2E-03
Tank Group 07	GPR791-03	3E-04	4E+00	4E-06	4E-01	1E-05	7E-02
Tank Group 07	GPR791-04	3E-03	4E+01	3E-05	5E+00	1E-04	5E-01
Tank Group 07	GPR791-05	2E-05	3E-01	2E-07	2E-02	8E-07	4E-03
Tank Group 07	GPR791-06	8E-04	1E+01	9E-06	1E+00	3E-05	2E-01
Tank Group 07	GPR791-07	3E-05	3E-01	3E-07	3E-02	1E-06	5E-03
Tank Group 07	GPR791-08	2E-05	2E-01	2E-07	2E-02	6E-07	3E-03
Tank Group 07	GPR791-09	8E-07	2E-02	2E-08	8E-03	8E-09	8E-05
Tank Group 07	GPR792-01		5E+00		1E+00	NC	NC
Tank Group 07	GPR792-02		9E+00		2E+00	NC	NC
Tank Group 07	GPR792-03	3E-06	2E+01	6E-08	6E+00	6E-08	4E-04
Tank Group 07	GPR792-04		1E+01		2E+00	NC	NC
Tank Group 07	GPR792-05		2E+01		4E+00	NC	NC
Tank Group 07	GPR792-06		9E+00		2E+00	NC	NC
Tank Group 07	GPR792-07		3E+00		6E-01	NC	NC
Tank Group 07	GPR793-01		1E+01		3E+00	NC	NC
Tank Group 07	GPR793-02		2E+01		5E+00	NC	NC
Tank Group 07	GPR793-03	6E-06	3E+01	9E-08	7E+00	1E-07	2E-03
Tank Group 07	GPR793-04		3E+01		6E+00	NC	NC
Tank Group 07	GPR793-05		4E+00		9E-01	NC	NC
Tank Group 07	GPR793-06		4E+00		8E-01	NC	NC
Tank Group 07	GPR794-01	5E-03	7E+01	6E-05	8E+00	2E-04	1E+00
Tank Group 07	GPR794-02	6E-03	8E+01	7E-05	9E+00	2E-04	1E+00
Tank Group 07	GPR794-03	2E-06	3E-02	1E-08	3E-03	4E-08	2E-04
Tank Group 07	GPR794-04	2E-02	2E+02	2E-04	3E+01	7E-04	3E+00
Tank Group 07	GPR794-05	6E-03	7E+01	6E-05	8E+00	2E-04	1E+00
Tank Group 07	GPR794-06	4E-03	7E+01	5E-05	8E+00	2E-04	9E-01
Tank Group 07	GPR794-07	3E-04	4E+00	3E-06	5E-01	1E-05	5E-02
Tank Group 07	GPR794-08	3E-02	3E+02	3E-04	4E+01	1E-03	5E+00
Tank Group 07	GPR794-09	6E-06	1E-01	6E-08	2E-02	2E-07	1E-03
Tank Group 07	GPR794-10	3E-06	2E-01	2E-08	2E-02	5E-08	3E-04
Tank Group 07	GPR798-01	7E-06	9E-02	8E-08	9E-03	3E-07	1E-03
Tank Group 07	GPR798-02	1E-05	2E-01	2E-07	2E-02	5E-07	3E-03
Tank Group 07	GPR798-03	9E-07	1E-02	1E-08	1E-03	3E-08	2E-04
Tank Group 07	GPR798-04	1E-02	2E+02	1E-04	1E+01	5E-04	2E+00
Tank Group 07	GPR798-05	3E-06	4E-02	3E-08	4E-03	1E-07	6E-04
Tank Group 07	GPR798-06	5E-06	6E-02	5E-08	6E-03	2E-07	9E-04
Tank Group 07	GPR798-07	2E-05	2E-01	2E-07	2E-02	7E-07	3E-03
Tank Group 07	GPR799-01	5E-06	6E-02	5E-08	6E-03	2E-07	9E-04
Tank Group 07	GPR799-02	3E-06	4E-02	4E-08	4E-03	1E-07	7E-04
Tank Group 07	GPR799-03	5E-05	9E-01	5E-07	9E-02	1E-06	8E-03

Table 7

Location-Specific Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Routine Worker		Construction Worker		Soil Migration to GW	
		Vapor Intrusion		Outdoor Activities		Nonpotable Use	
		Risk	HI	Risk	HI	Risk	HI
Tank Group 07	GPR799-04	5E-05	6E-01	5E-07	6E-02	2E-06	9E-03
Tank Group 07	GPR799-05	6E-06	7E-02	7E-08	7E-03	2E-07	1E-03
Tank Group 07	GPR799-06	3E-06	3E-02	3E-08	3E-03	1E-07	5E-04
Tank Group 07	GPR799-07	2E-06	2E-02	2E-08	2E-03	6E-08	3E-04
Tank Group 07	GPR799-08	1E-05	2E+00	8E-08	4E-01	2E-07	1E-03
Tank Group 07	GPU767-01	6E-07	2E-02	5E-09	2E-03	6E-09	6E-05
Tank Group 07	GPU767-02	3E-07	9E-03	7E-09	2E-03	3E-09	3E-05
Tank Group 07	GPU767-03	8E-07	2E-02	7E-09	3E-03	1E-08	1E-04
Tank Group 07	GPU767-04	7E-07	3E-02	5E-09	4E-03	7E-09	9E-05
Tank Group 07	GPU767-05	7E-07	7E-02	6E-09	1E-02	9E-09	1E-04
Tank Group 07	GPU767-06	5E-07	1E-02	2E-08	6E-03	4E-09	4E-05
Tank Group 07	GPU767-07	6E-07	2E-02	5E-09	2E-03	5E-09	6E-05

Notes:

Cumulative cancer risk and HI estimates in excess of 1E-4 and 1, respectively, are shaded and bold.

NC - Risk and HI estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect.

Table 8**Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Groundwater**

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Dataset	Area	Wellzone	Routine Worker				Maintenance Worker		Construction Worker		Resident	
			Vapor Intrusion		Outdoor Air Inhalation		Groundwater Contact		Groundwater Contact		Nonpotable Use	
			Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI
AST	Tank Group 07	unconfined	5E-04	6E+00	3E-06	4E-02	6E-04	2E+01	6E-05	6E+00	8E-03	4E+01
Evergreen	Tank Group 07	unconfined	7E-04	9E+00	4E-06	5E-02	8E-04	2E+01	8E-05	9E+00	1E-02	5E+01
Evergreen	Tank Group 07	lower aquifer	NA	NA	NA	NA	NA	NA	NA	NA	1E-08	5E-05

Notes:

Cumulative cancer risk and HI estimates in excess of 1E-4 and 1, respectively, are shaded and bold.

NA - Deeper groundwater exposure pathway is incomplete.

Table 9

Location-Specific Upper-Bound Cumulative Cancer Risk and Noncancer Hazard Index (HI) for Receptor Exposure to Groundwater
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Dataset	AOI	Wellzone	Location	Routine Worker				Maintenance Worker		Construction Worker		Resident	
				Vapor Intrusion		Outdoor Air Inhalation		Groundwater Contact		Groundwater Contact		Nonpotable Use	
				Risk	HI	Risk	HI	Risk	HI	Risk	HI	Risk	HI
AST	Tank Group 07	unconfined	TG07-MW-01	8E-10	3E-05	5E-12	2E-07	9E-10	8E-05	9E-11	4E-05	4E-08	1E-04
AST	Tank Group 07	unconfined	TG07-MW-02	4E-08	7E-04	2E-10	4E-06	5E-08	2E-03	5E-09	1E-03	7E-07	3E-03
AST	Tank Group 07	unconfined	TG07-MW-03	1E-09	9E-05	8E-12	5E-07	2E-09	2E-04	2E-10	1E-04	8E-08	3E-04
AST	Tank Group 07	unconfined	TG07-MW-04	8E-08	1E-03	5E-10	9E-06	9E-08	4E-03	9E-09	2E-03	1E-06	7E-03
AST	Tank Group 07	unconfined	TG07-MW-05	2E-05	3E-01	1E-07	2E-03	3E-05	8E-01	3E-06	3E-01	4E-04	2E+00
AST	Tank Group 07	unconfined	TG07-MW-07	5E-04	6E+00	3E-06	4E-02	6E-04	2E+01	6E-05	6E+00	8E-03	4E+01
AST	Tank Group 07	unconfined	TG07-MW-08	3E-08	8E-03	2E-10	5E-05	3E-08	2E-02	3E-09	2E-02	3E-07	2E-02
Evergreen	Tank Group 07	unconfined	B-123	3E-08	7E-04	2E-10	4E-06	3E-08	2E-03	3E-09	1E-03	3E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-126	3E-07	6E-03	2E-09	4E-05	4E-07	2E-02	4E-08	1E-02	4E-06	3E-02
Evergreen	Tank Group 07	unconfined	B-132	1E-08	3E-04	7E-11	2E-06	2E-08	8E-04	2E-09	7E-04	6E-06	1E-02
Evergreen	Tank Group 07	unconfined	B-133	1E-08	4E-04	6E-11	3E-06	1E-08	1E-03	1E-09	8E-04	1E-06	3E-03
Evergreen	Tank Group 07	unconfined	B-134	1E-08	5E-04	7E-11	3E-06	1E-08	1E-03	1E-09	9E-04	4E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-135	2E-08	6E-04	1E-10	3E-06	2E-08	2E-03	2E-09	1E-03	5E-06	1E-02
Evergreen	Tank Group 07	unconfined	B-144	4E-07	2E-02	2E-09	1E-04	4E-07	6E-02	4E-08	2E-02	6E-06	9E-02
Evergreen	Tank Group 07	unconfined	B-145	4E-08	9E-04	2E-10	5E-06	4E-08	3E-03	4E-09	2E-03	7E-07	3E-03
Evergreen	Tank Group 07	unconfined	B-148	1E-07	2E-03	8E-10	1E-05	2E-07	6E-03	2E-08	3E-03	2E-06	1E-02
Evergreen	Tank Group 07	unconfined	B-149	2E-04	2E+00	1E-06	1E-02	2E-04	6E+00	2E-05	2E+00	3E-03	1E+01
Evergreen	Tank Group 07	unconfined	B-150	7E-04	9E+00	4E-06	5E-02	8E-04	2E+01	8E-05	9E+00	1E-02	5E+01
Evergreen	Tank Group 07	unconfined	B-151	5E-08	8E-04	3E-10	4E-06	5E-08	2E-03	5E-09	7E-04	7E-07	3E-03
Evergreen	Tank Group 07	unconfined	B-152	9E-08	2E-03	5E-10	9E-06	1E-07	4E-03	1E-08	2E-03	2E-06	8E-03
Evergreen	Tank Group 07	unconfined	B-153	7E-09	1E-04	4E-11	9E-07	7E-09	4E-04	7E-10	2E-04	9E-08	4E-04
Evergreen	Tank Group 07	unconfined	B-154	5E-04	6E+00	3E-06	4E-02	6E-04	2E+01	6E-05	6E+00	8E-03	4E+01
Evergreen	Tank Group 07	unconfined	B-155	3E-04	3E+00	2E-06	2E-02	3E-04	9E+00	3E-05	3E+00	4E-03	2E+01
Evergreen	Tank Group 07	unconfined	B-156	5E-07	6E-03	3E-09	4E-05	5E-07	2E-02	5E-08	7E-03	8E-06	4E-02
Evergreen	Tank Group 07	unconfined	B-157	2E-07	3E-03	1E-09	2E-05	2E-07	8E-03	2E-08	3E-03	2E-06	1E-02
Evergreen	Tank Group 07	unconfined	B-159	3E-08	6E-04	2E-10	4E-06	3E-08	2E-03	3E-09	1E-03	2E-07	1E-03
Evergreen	Tank Group 07	unconfined	B-160	4E-08	1E-03	2E-10	6E-06	5E-08	3E-03	5E-09	2E-03	6E-06	1E-02
Evergreen	Tank Group 07	unconfined	B-163	8E-07	1E-02	5E-09	6E-05	9E-07	3E-02	9E-08	1E-02	1E-05	6E-02
Evergreen	Tank Group 07	unconfined	B-165	2E-08	3E-04	1E-10	2E-06	2E-08	9E-04	2E-09	3E-04	6E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-168	1E-08	3E-04	6E-11	2E-06	1E-08	7E-04	1E-09	6E-04	1E-07	7E-04
Evergreen	Tank Group 07	unconfined	B-169	5E-09	1E-04	3E-11	8E-07	6E-09	3E-04	6E-10	1E-04	1E-07	4E-04
Evergreen	Tank Group 07	unconfined	B-170	1E-07	3E-03	8E-10	2E-05	2E-07	1E-02	2E-08	1E-02	8E-07	8E-03
Evergreen	Tank Group 07	unconfined	B-172	2E-08	3E-04	1E-10	2E-06	2E-08	8E-04	2E-09	3E-04	4E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-177	7E-04	9E+00	4E-06	5E-02	8E-04	2E+01	8E-05	8E+00	1E-02	5E+01
Evergreen	Tank Group 07	unconfined	B-178	1E-05	2E-01	7E-08	9E-04	1E-05	4E-01	1E-06	2E-01	2E-04	9E-01
Evergreen	Tank Group 07	unconfined	B-179	2E-04	2E+00	1E-06	1E-02	2E-04	6E+00	2E-05	2E+00	3E-03	1E+01
Evergreen	Tank Group 07	unconfined	B-43	6E-09	2E-04	4E-11	1E-06	6E-09	4E-04	6E-10	2E-04	1E-07	4E-04
Evergreen	Tank Group 07	unconfined	B-46	2E-08	5E-04	1E-10	3E-06	3E-08	1E-03	3E-09	5E-04	4E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-48	3E-08	6E-04	2E-10	3E-06	3E-08	1E-03	3E-09	7E-04	8E-07	2E-03
Evergreen	Tank Group 07	unconfined	B-92	3E-08	5E-04	2E-10	3E-06	3E-08	1E-03	3E-09	6E-04	4E-07	1E-03
Evergreen	Tank Group 07	unconfined	B-95	7E-09	1E-04	4E-11	8E-07	8E-09	4E-04	8E-10	2E-04	4E-07	1E-03
Evergreen	Tank Group 07	unconfined	WP16-5	4E-08	9E-04	2E-10	5E-06	5E-08	3E-03	5E-09	2E-03	3E-07	2E-03
Evergreen	Tank Group 07	unconfined	WPM-11	7E-08	1E-03	4E-10	6E-06	2E-07	5E-03	2E-08	3E-03	1E-04	3E-01
Evergreen	Tank Group 07	lower aquifer	B-176	5E-09	1E-04	3E-11	8E-07	6E-09	3E-04	6E-10	1E-04	3E-07	9E-04
Evergreen	Tank Group 07	lower aquifer	B-48D	5E-09	9E-05	3E-11	5E-07	6E-09	2E-04	6E-10	7E-05	1E-07	3E-04

Notes:

Cumulative cancer risk and HI estimates in excess of 1E-4 and 1, respectively, are shaded and bold.

NA - Deeper groundwater exposure pathway is incomplete.

Table 10**Site-Specific Remediation Standards for Constituents of Concern (COC) for Construction Worker Soil Direct Contact Exposure**

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	Construction Worker		
		Outdoor Activities		
		Site Specific Standard (mg/kg)	Associated Risk at this Level	Associated HQ at this Level
VOC	Benzene	130	3.2E-06	3.3E-01
VOC	Cumene	680	NC	3.1E-01
VOC	Toluene	1168	NC	5.0E-02
VOC	1,2,4-Trimethylbenzene	36	NC	2.9E-02
VOC	Xylenes (total)	110	NC	7.2E-02
SVOC	Benzo(a)pyrene	3.9	1.2E-07	5.0E-02
SVOC	Naphthalene	4.4	9.5E-08	5.4E-02
Other	All Other Chemicals	Site Wide Max	3.2E-07	1.0E-01

Cumulative Risk/HI:	4E-06	1E+00
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Notes:

NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect
 The site-specific standard for all other chemicals is the site-wide maximum detected during the investigation.

Table 11**Site-Specific Remediation Standards for Constituents of Concern (COC) for Maintenance Worker Groundwater Direct Contact Exposure**

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	Maintenance Worker		
		Outdoor Activities		
		Site Specific Standard (mg/L)	Associated Risk at this Level	Associated HQ at this Level
VOC	Benzene	11	2.6E-05	7.9E-01
Other	All Other Chemicals	Site Wide Max	6.9E-07	1.6E-01

Cumulative Risk/HI:	3E-05	1E+00
----------------------------	-------	-------

Notes:

NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect
 The site-specific standard for all other chemicals is the site-wide maximum detected during the investigation.

Table 12

Site-Specific Remediation Standards for Constituents of Concern (COC) for Construction Worker Groundwater Direct Contact Exposure

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	Construction Worker		
		Outdoor Activities		
		Site Specific Standard (mg/L)	Associated Risk at this Level	Associated HQ at this Level
VOC	Benzene	35	8.3E-06	8.8E-01
Other	All Other Chemicals	Site Wide Max	6.9E-08	9.6E-02

Cumulative Risk/HI:	8E-06	1E+00
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Notes:

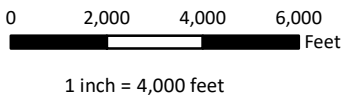
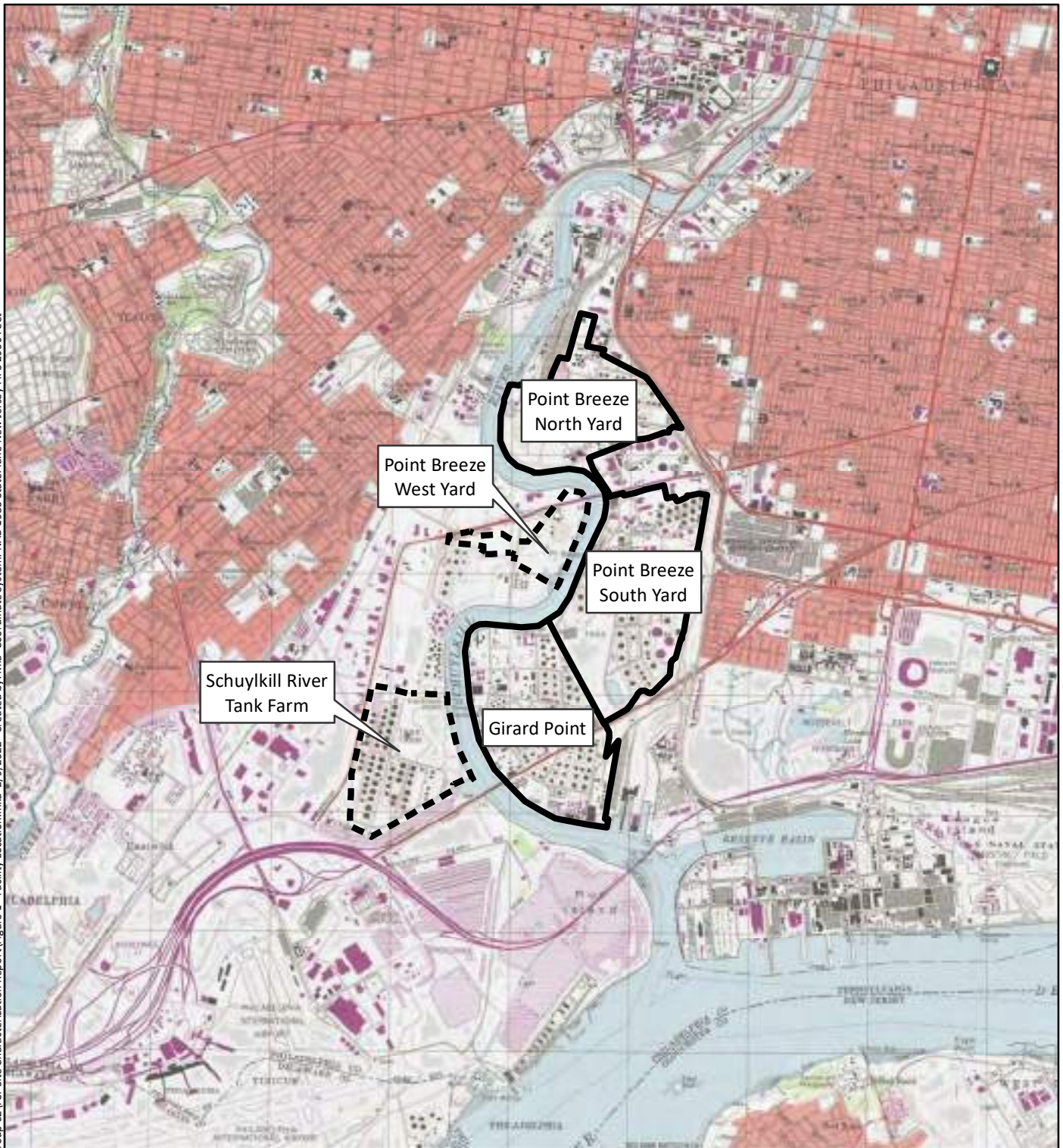
NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect
The site-specific standard for all other chemicals is the site-wide maximum detected during the investigation.

Figures

- 1 Facility Location
- 2 Site Location
- 3 Site Layout
- 4 Soil Sample Results Compared to RBSLs
- 5 Groundwater Sample Results Compared to RBSLs
- 6 Risk Assessment Results (Soil)
- 7 Risk Assessment Results (Groundwater)



File: N:\GIS\Prj\044.001_PESRM-PE\MXDS\AST\Work\Tank Group 02\For Site Characterization Report\Figure 1 - Facility Location.mxd 2/9/2022. Created by: Mia Coordinate System: NAD 1983 StatePlane New Jersey FIPS 2900 Feet



Legend

- Subject to AST Closure Plan
- Not Subject to AST Closure Plan

Base Map: USGS Philadelphia 1994 7.5 Minute Quadrangle.

SAFETY FIRST



CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

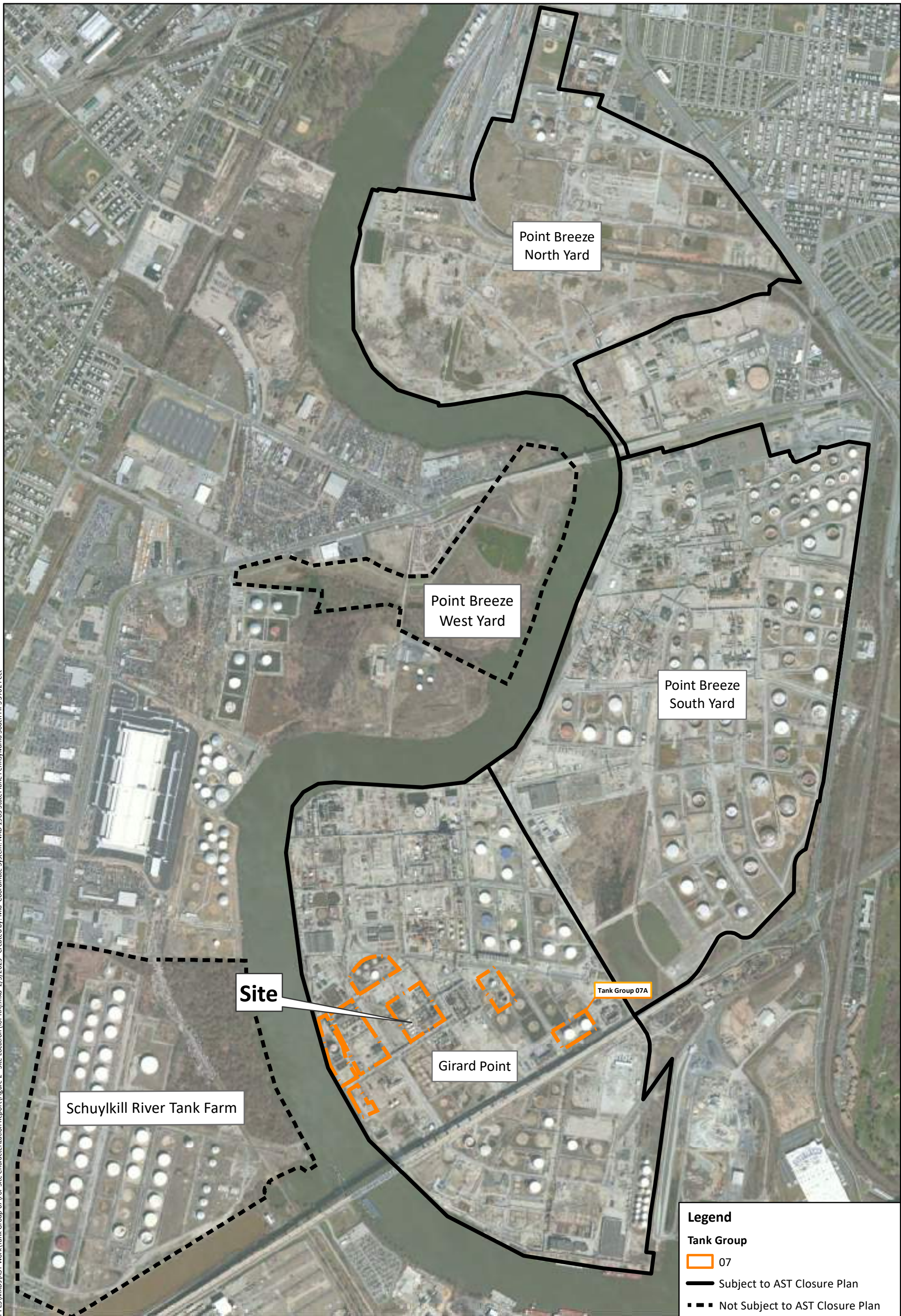
PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

Facility Location

Figure 1

File: N:\GIS\PI\P044_001_PESRM-PES\WXDS\AST Work\Tank Group 07\For Site Characterization Report\Figure 2 - Site Location (for RA).mxd 2/5/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



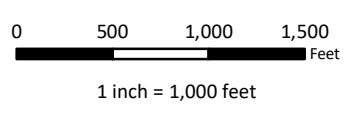
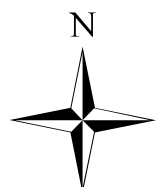
Legend

Tank Group

07

— Subject to AST Closure Plan

- - - Not Subject to AST Closure Plan



Notes: Aerial imagery source Maxar 10/19/2019

SAFETY FIRST

CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

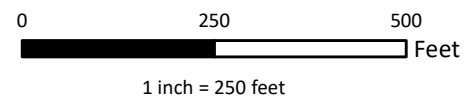
Site Location

Figure 2

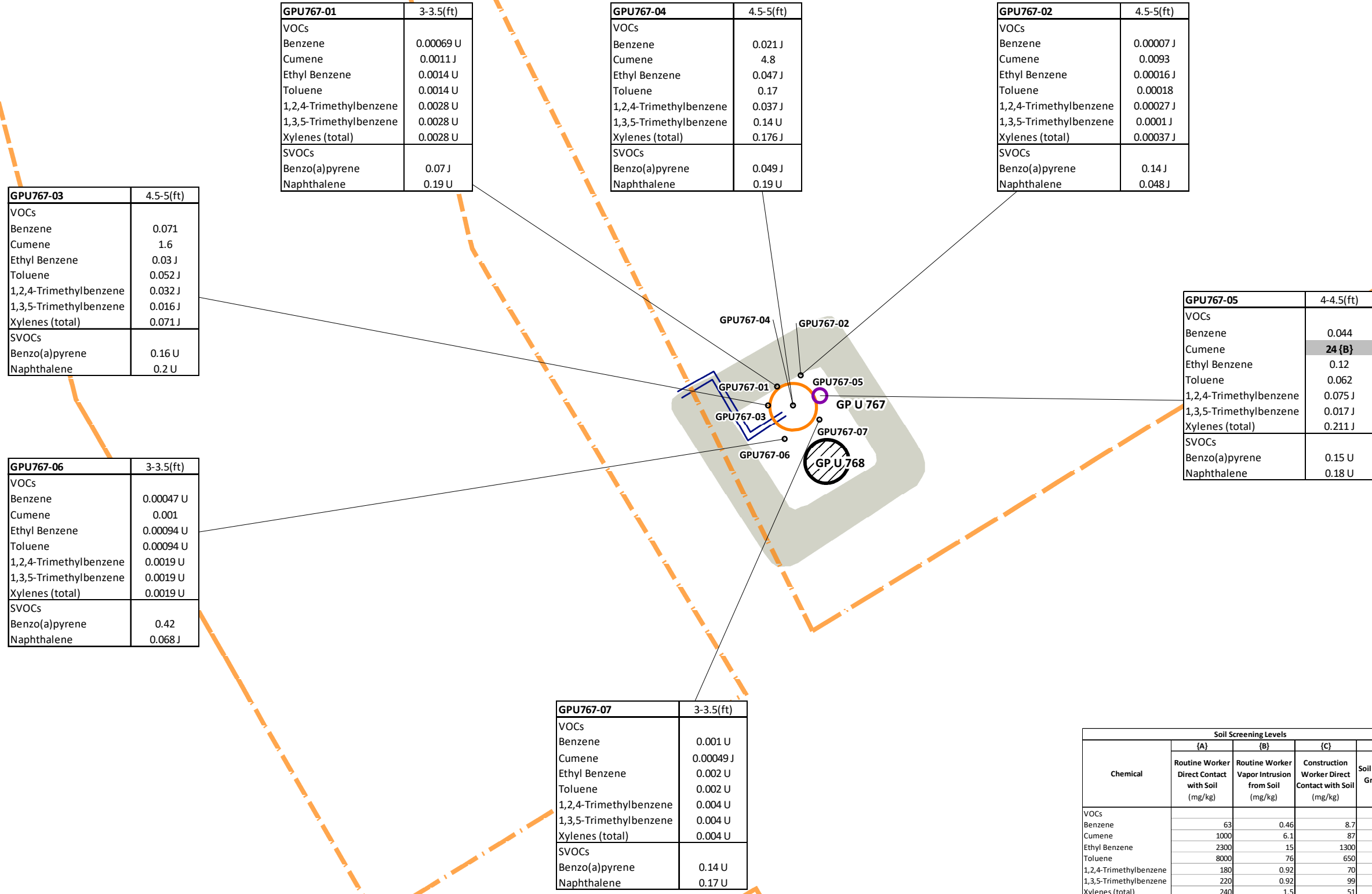
File: N:\GIS\PI\P044.001_PESRM-PES\MAXDS\AST Work\Tank Group 07\For Site Characterization Report\Figure 3 - Site Layout Map.mxd 1/10/2023 Created by: Resource Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Notes:
 1. Aboveground storage tanks GP R 250 and GP R 251 have been re-assigned to Tank Group 07A will be evaluated in a separate report
 2. Aerial imagery source Maxar 10/19/2019



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Layout Map Tank Group 07
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002	Figure 3	



GPU767-01	3-3.5(ft)
VOCs	
Benzene	0.00069 U
Cumene	0.0011 J
Ethyl Benzene	0.0014 U
Toluene	0.0014 U
1,2,4-Trimethylbenzene	0.0028 U
1,3,5-Trimethylbenzene	0.0028 U
Xylenes (total)	0.0028 U
SVOCs	
Benzo(a)pyrene	0.07 J
Naphthalene	0.19 U

GPU767-04	4.5-5(ft)
VOCs	
Benzene	0.021 J
Cumene	4.8
Ethyl Benzene	0.047 J
Toluene	0.17
1,2,4-Trimethylbenzene	0.037 J
1,3,5-Trimethylbenzene	0.14 U
Xylenes (total)	0.176 J
SVOCs	
Benzo(a)pyrene	0.049 J
Naphthalene	0.19 U

GPU767-02	4.5-5(ft)
VOCs	
Benzene	0.00007 J
Cumene	0.0093
Ethyl Benzene	0.00016 J
Toluene	0.00018
1,2,4-Trimethylbenzene	0.00027 J
1,3,5-Trimethylbenzene	0.0001 J
Xylenes (total)	0.00037 J
SVOCs	
Benzo(a)pyrene	0.14 J
Naphthalene	0.048 J

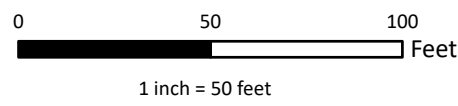
GPU767-03	4.5-5(ft)
VOCs	
Benzene	0.071
Cumene	1.6
Ethyl Benzene	0.03 J
Toluene	0.052 J
1,2,4-Trimethylbenzene	0.032 J
1,3,5-Trimethylbenzene	0.016 J
Xylenes (total)	0.071 J
SVOCs	
Benzo(a)pyrene	0.16 U
Naphthalene	0.2 U

GPU767-06	3-3.5(ft)
VOCs	
Benzene	0.00047 U
Cumene	0.001
Ethyl Benzene	0.00094 U
Toluene	0.00094 U
1,2,4-Trimethylbenzene	0.0019 U
1,3,5-Trimethylbenzene	0.0019 U
Xylenes (total)	0.0019 U
SVOCs	
Benzo(a)pyrene	0.42
Naphthalene	0.068 J

GPU767-05	4-4.5(ft)
VOCs	
Benzene	0.044
Cumene	24 [B]
Ethyl Benzene	0.12
Toluene	0.062
1,2,4-Trimethylbenzene	0.075 J
1,3,5-Trimethylbenzene	0.017 J
Xylenes (total)	0.211 J
SVOCs	
Benzo(a)pyrene	0.15 U
Naphthalene	0.18 U

GPU767-07	3-3.5(ft)
VOCs	
Benzene	0.001 U
Cumene	0.00049 J
Ethyl Benzene	0.002 U
Toluene	0.002 U
1,2,4-Trimethylbenzene	0.004 U
1,3,5-Trimethylbenzene	0.004 U
Xylenes (total)	0.004 U
SVOCs	
Benzo(a)pyrene	0.14 U
Naphthalene	0.17 U

Chemical	Soil Screening Levels			
	(A) Routine Worker Direct Contact with Soil (mg/kg)	(B) Routine Worker Vapor Intrusion from Soil (mg/kg)	(C) Construction Worker Direct Contact with Soil (mg/kg)	(D) Soil Migration to Groundwater (mg/kg)
VOCs				
Benzene	63	0.46	8.7	98
Cumene	1000	6.1	87	1000
Ethyl Benzene	2300	15	1300	820
Toluene	8000	76	650	9800
1,2,4-Trimethylbenzene	180	0.92	70	250
1,3,5-Trimethylbenzene	220	0.92	99	240
Xylenes (total)	240	1.5	51	340
SVOCs				
Benzo(a)pyrene	43	--	7.7	--
Naphthalene	41	0.54	6	27

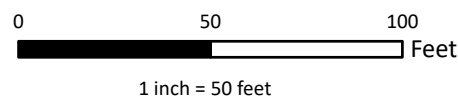
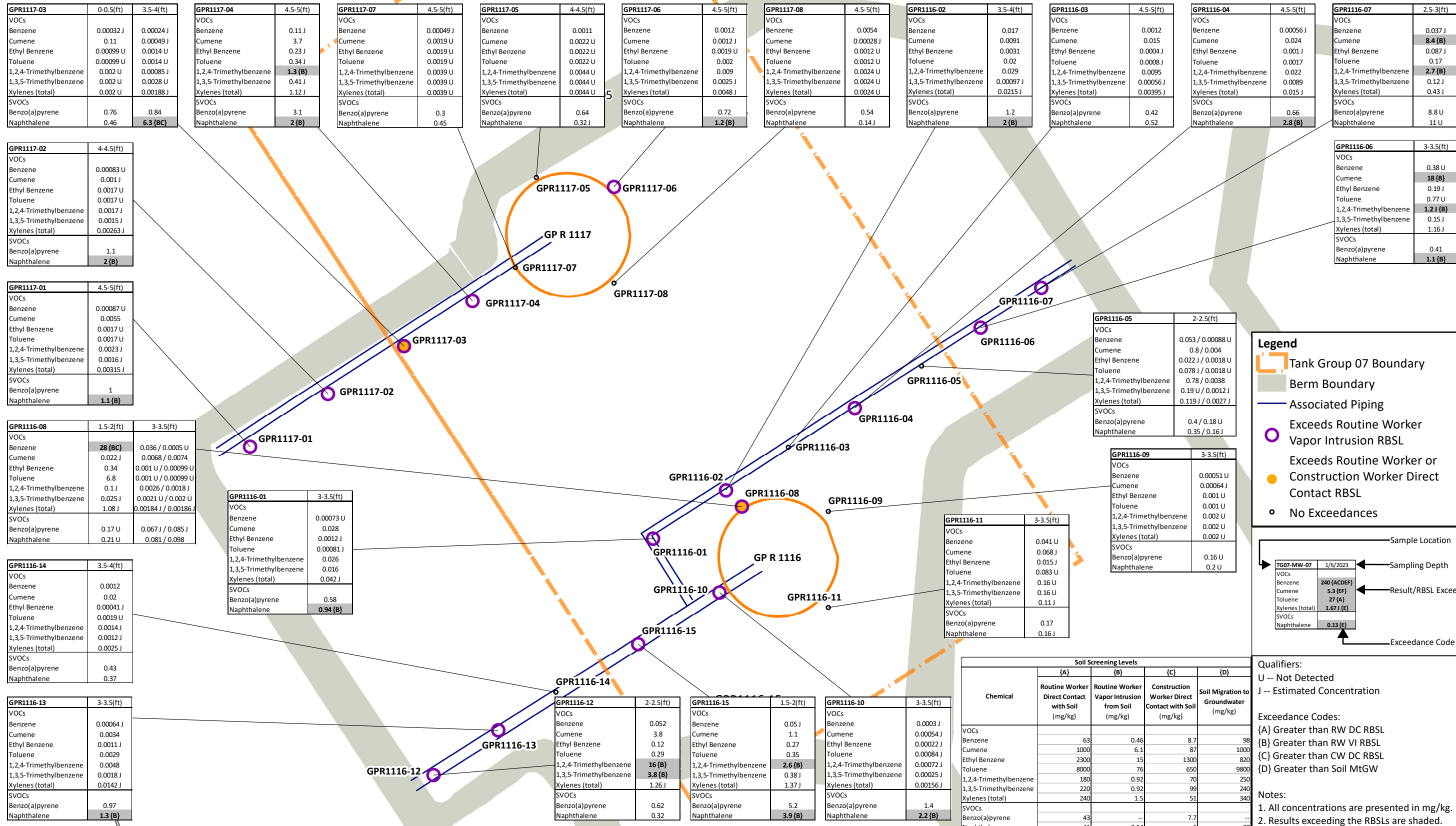


 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Soil Sample Results Tank Group 07 (AST GP U 767) Figure 4A
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	

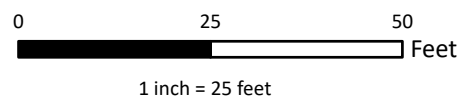
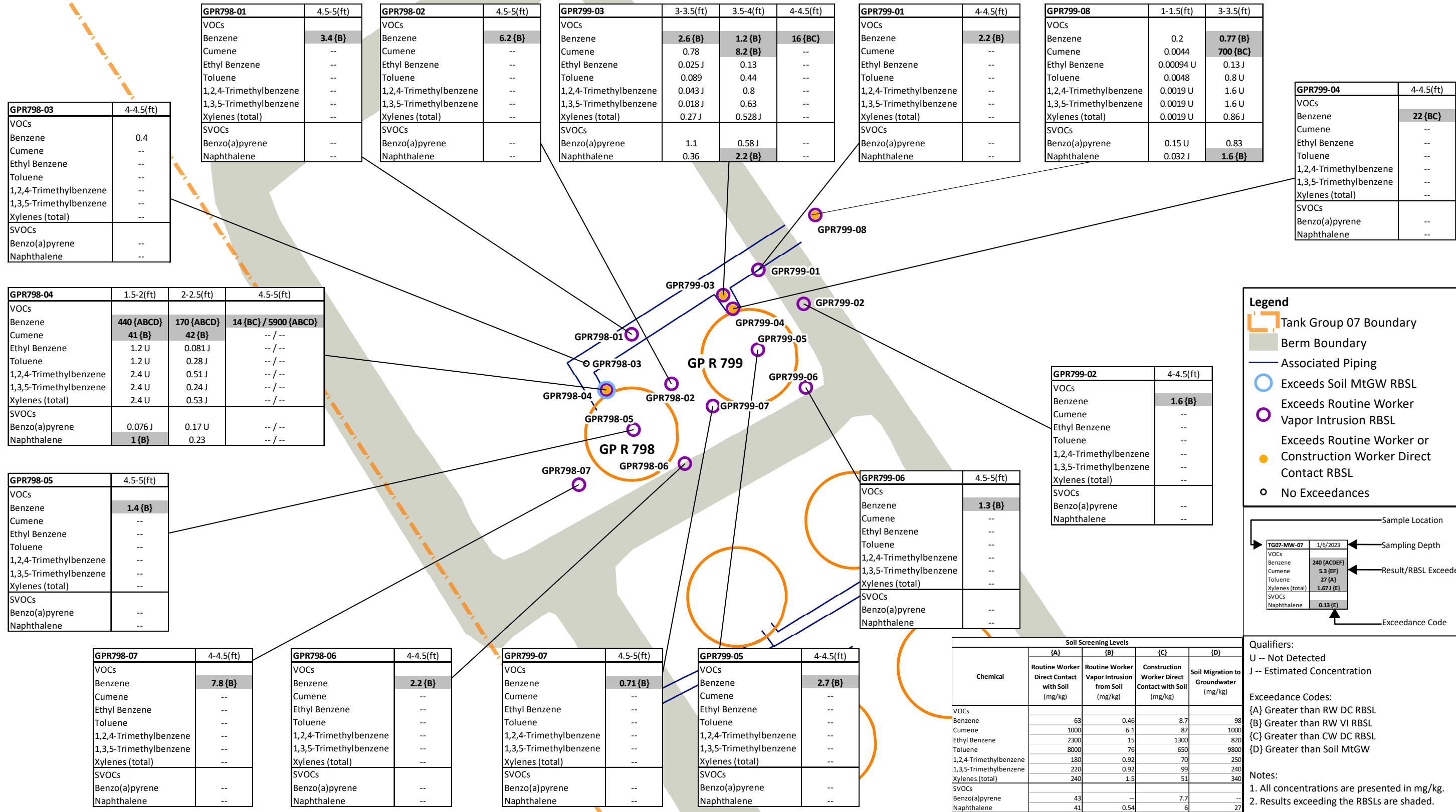
Qualifiers:
 U -- Not Detected
 J -- Estimated Concentration

Exceedance Codes:
 {A} Greater than RW DC RBSL
 {B} Greater than RW VI RBSL
 {C} Greater than CW DC RBSL
 {D} Greater than Soil MtGW

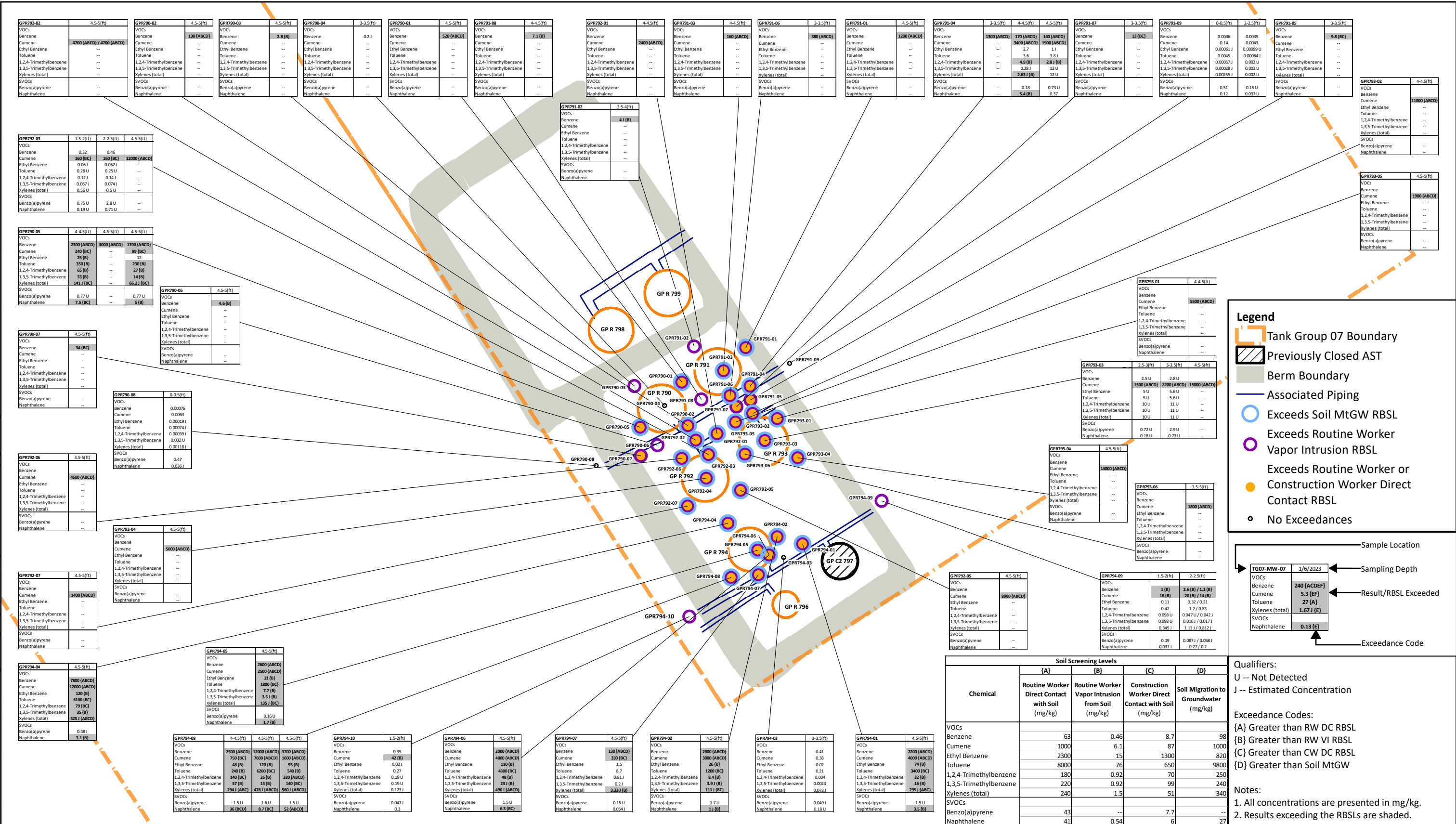
Notes:
 1. All concentrations are presented in mg/kg.
 2. Results exceeding the RBSLs are shaded.



 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Soil Sample Results Tank Group 07 (ASTs GP R 1116 and GP R 1117) Figure 4B
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Soil Sample Results Tank Group 07 (ASTs GP R 798 and GP R 799) Figure 4C
	PROJECT: Aboveground Storage Tank Closure	
	PROJECT NUMBER: P044.001.002	



Legend

- Tank Group 07 Boundary
- Previously Closed AST
- Berm Boundary
- Associated Piping
- Exceeds Soil MtGW RBSL
- Exceeds Routine Worker or Vapor Intrusion RBSL
- Construction Worker Direct Contact RBSL
- No Exceedances

Sample Location: **TG07-MW-07**

Sampling Depth: **1/6/2023**

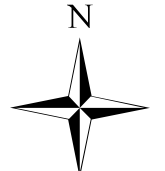
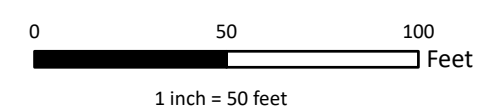
Result/RBSL Exceeded: **240 [ACDEF], 5.3 [EF], 27 [A], 1.67 [E]**

Exceedance Code: **0.13 [E]**

Qualifiers:
 U -- Not Detected
 J -- Estimated Concentration

Exceedance Codes:
 {A} Greater than RW DC RBSL
 {B} Greater than RW VI RBSL
 {C} Greater than CW DC RBSL
 {D} Greater than Soil MtGW

Notes:
 1. All concentrations are presented in mg/kg.
 2. Results exceeding the RBSLs are shaded.



SAFETY FIRST

CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

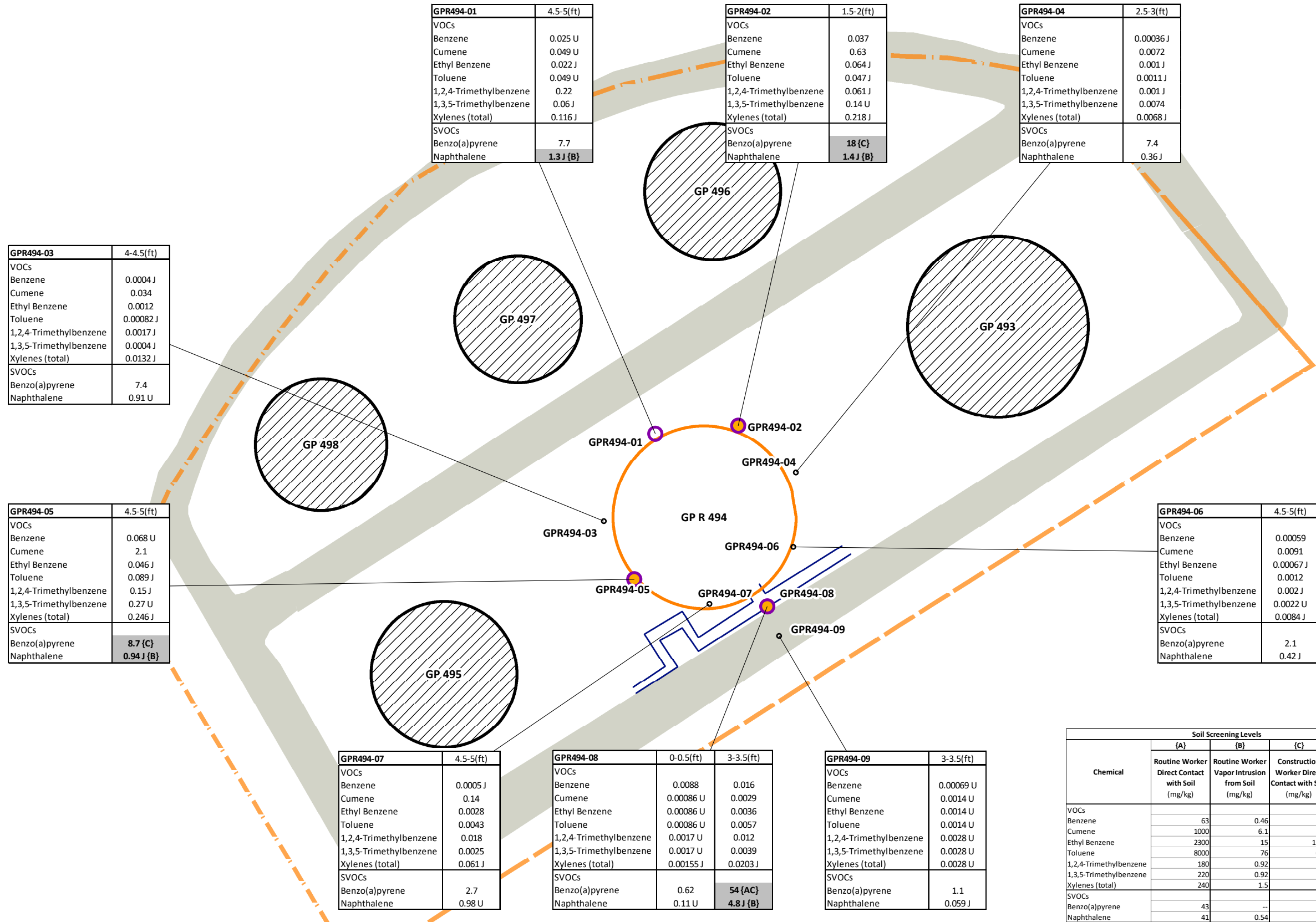
Soil Sample Results

Tank Group 07

(ASTs GP R 790, GP R 791, GP R 793, and GP R 794)

Figure 4D

File: N:\GIS\PA\044.001_PESRM-PES\MXD\AST\Work\Group 07\20230113_Databases_RBSLs.mxd 2/2/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



GPR494-03		4-4.5(ft)
VOCs		
Benzene	0.0004	J
Cumene	0.034	
Ethyl Benzene	0.0012	
Toluene	0.00082	J
1,2,4-Trimethylbenzene	0.0017	J
1,3,5-Trimethylbenzene	0.0004	J
Xylenes (total)	0.0132	J
SVOCs		
Benzo(a)pyrene	7.4	
Naphthalene	0.91	U

GPR494-05		4.5-5(ft)
VOCs		
Benzene	0.068	U
Cumene	2.1	
Ethyl Benzene	0.046	J
Toluene	0.089	J
1,2,4-Trimethylbenzene	0.15	J
1,3,5-Trimethylbenzene	0.27	U
Xylenes (total)	0.246	J
SVOCs		
Benzo(a)pyrene	8.7	{C}
Naphthalene	0.94	{B}

GPR494-07		4.5-5(ft)
VOCs		
Benzene	0.0005	J
Cumene	0.14	
Ethyl Benzene	0.0028	
Toluene	0.0043	
1,2,4-Trimethylbenzene	0.018	
1,3,5-Trimethylbenzene	0.0025	
Xylenes (total)	0.061	J
SVOCs		
Benzo(a)pyrene	2.7	
Naphthalene	0.98	U

GPR494-08		0-0.5(ft)	3-3.5(ft)
VOCs			
Benzene	0.0088	0.016	
Cumene	0.00086	0.0029	
Ethyl Benzene	0.00086	0.0036	
Toluene	0.00086	0.0057	
1,2,4-Trimethylbenzene	0.0017	0.012	
1,3,5-Trimethylbenzene	0.0017	0.0039	
Xylenes (total)	0.00155	0.0203	J
SVOCs			
Benzo(a)pyrene	0.62	54	{AC}
Naphthalene	0.11	4.8	{B}

GPR494-09		3-3.5(ft)
VOCs		
Benzene	0.00069	U
Cumene	0.0014	U
Ethyl Benzene	0.0014	U
Toluene	0.0014	U
1,2,4-Trimethylbenzene	0.0028	U
1,3,5-Trimethylbenzene	0.0028	U
Xylenes (total)	0.0028	U
SVOCs		
Benzo(a)pyrene	1.1	
Naphthalene	0.059	J

GPR494-04		2.5-3(ft)
VOCs		
Benzene	0.00036	J
Cumene	0.0072	
Ethyl Benzene	0.001	J
Toluene	0.0011	J
1,2,4-Trimethylbenzene	0.001	J
1,3,5-Trimethylbenzene	0.0074	
Xylenes (total)	0.0068	J
SVOCs		
Benzo(a)pyrene	7.4	
Naphthalene	0.36	J

GPR494-01		4.5-5(ft)
VOCs		
Benzene	0.025	U
Cumene	0.049	U
Ethyl Benzene	0.022	J
Toluene	0.049	U
1,2,4-Trimethylbenzene	0.22	
1,3,5-Trimethylbenzene	0.06	J
Xylenes (total)	0.116	J
SVOCs		
Benzo(a)pyrene	7.7	
Naphthalene	1.3	{B}

GPR494-02		1.5-2(ft)
VOCs		
Benzene	0.037	
Cumene	0.63	
Ethyl Benzene	0.064	J
Toluene	0.047	J
1,2,4-Trimethylbenzene	0.061	J
1,3,5-Trimethylbenzene	0.14	U
Xylenes (total)	0.218	J
SVOCs		
Benzo(a)pyrene	18	{C}
Naphthalene	1.4	{B}

GPR494-06		4.5-5(ft)
VOCs		
Benzene	0.00059	
Cumene	0.0091	
Ethyl Benzene	0.00067	J
Toluene	0.0012	
1,2,4-Trimethylbenzene	0.002	J
1,3,5-Trimethylbenzene	0.0022	U
Xylenes (total)	0.0084	J
SVOCs		
Benzo(a)pyrene	2.1	
Naphthalene	0.42	J

Chemical	Soil Screening Levels			
	(A)	(B)	(C)	(D)
VOCs				
Benzene	63	0.46	8.7	98
Cumene	1000	6.1	87	1000
Ethyl Benzene	2300	15	1300	820
Toluene	8000	76	650	9800
1,2,4-Trimethylbenzene	180	0.92	70	250
1,3,5-Trimethylbenzene	220	0.92	99	240
Xylenes (total)	240	1.5	51	340
SVOCs				
Benzo(a)pyrene	43	--	7.7	--
Naphthalene	41	0.54	6	27

Legend

- Tank Group 06 Boundary
- Tank Group 07 Boundary
- Previously Closed AST
- Berm Boundary
- Associated Piping
- Exceeds Routine Worker Vapor Intrusion RBSL
- Exceeds Routine Worker or Construction Worker Direct Contact RBSL
- No Exceedances

Sample Location

Sampling Depth

Result/RBSL Exceeded

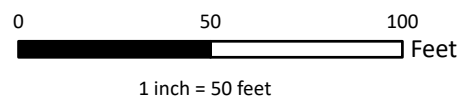
Exceedance Code

Sample ID	Date	Chemical	Result	Code
TG07-MW-07	1/6/2023	VOCs	240	{ACDEF}
		Benzene	5.3	{EF}
		Toluene	27	{A}
		Xylenes (total)	1.67	{E}
		SVOCs	0.13	{E}
		Naphthalene		

Qualifiers:
 U -- Not Detected
 J -- Estimated Concentration

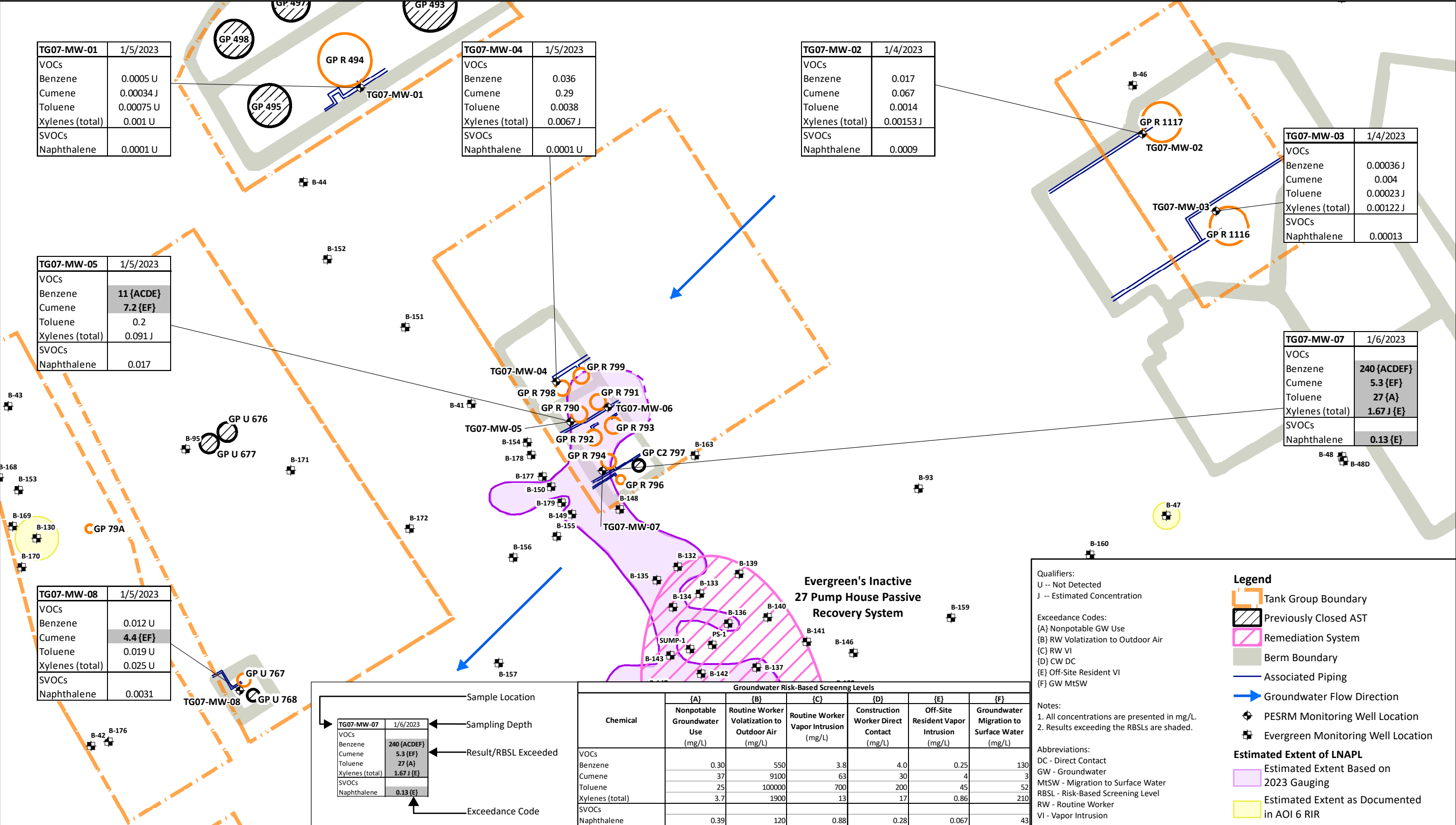
Exceedance Codes:
 {A} Greater than RW DC RBSL
 {B} Greater than RW VI RBSL
 {C} Greater than CW DC RBSL
 {D} Greater than Soil MtGW

Notes:
 1. All concentrations are presented in mg/kg.
 2. Results exceeding the RBSLs are shaded.



<p>SAFETY FIRST</p>	CLIENT:	Philadelphia Energy Solutions Refining and Marketing LLC	<p>Soil Sample Results Tank Group 07 (ASTs GP R 494)</p> <p>Figure 4E</p>
	PROJECT:	Aboveground Storage Tank Closure	
	PROJECT NUMBER:	P044.001.002	

File: N:\GIS\PA\P044.001_PESRM-PES\MXD\AST\Work\Tank Group 07\20230112_Databases_RBSL_GW\20230112_TG07-Databases_RBSL_GW.mxd 2/1/2023 Created by: Mia Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



TG07-MW-01	1/5/2023
VOCs	
Benzene	0.0005 U
Cumene	0.00034 J
Toluene	0.00075 U
Xylenes (total)	0.001 U
SVOCs	
Naphthalene	0.0001 U

TG07-MW-04	1/5/2023
VOCs	
Benzene	0.036
Cumene	0.29
Toluene	0.0038
Xylenes (total)	0.0067 J
SVOCs	
Naphthalene	0.0001 U

TG07-MW-02	1/4/2023
VOCs	
Benzene	0.017
Cumene	0.067
Toluene	0.0014
Xylenes (total)	0.00153 J
SVOCs	
Naphthalene	0.0009

TG07-MW-03	1/4/2023
VOCs	
Benzene	0.00036 J
Cumene	0.004
Toluene	0.00023 J
Xylenes (total)	0.00122 J
SVOCs	
Naphthalene	0.00013

TG07-MW-05	1/5/2023
VOCs	
Benzene	11 {ACDE}
Cumene	7.2 {EF}
Toluene	0.2
Xylenes (total)	0.091 J
SVOCs	
Naphthalene	0.017

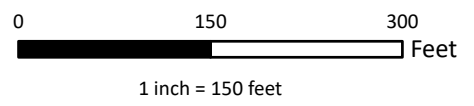
TG07-MW-07	1/6/2023
VOCs	
Benzene	240 {ACDEF}
Cumene	5.3 {EF}
Toluene	27 {A}
Xylenes (total)	1.67 J {E}
SVOCs	
Naphthalene	0.13 {E}

TG07-MW-08	1/5/2023
VOCs	
Benzene	0.012 U
Cumene	4.4 {EF}
Toluene	0.019 U
Xylenes (total)	0.025 U
SVOCs	
Naphthalene	0.0031

TG07-MW-07	1/6/2023
VOCs	
Benzene	240 {ACDEF}
Cumene	5.3 {EF}
Toluene	27 {A}
Xylenes (total)	1.67 J {E}
SVOCs	
Naphthalene	0.13 {E}

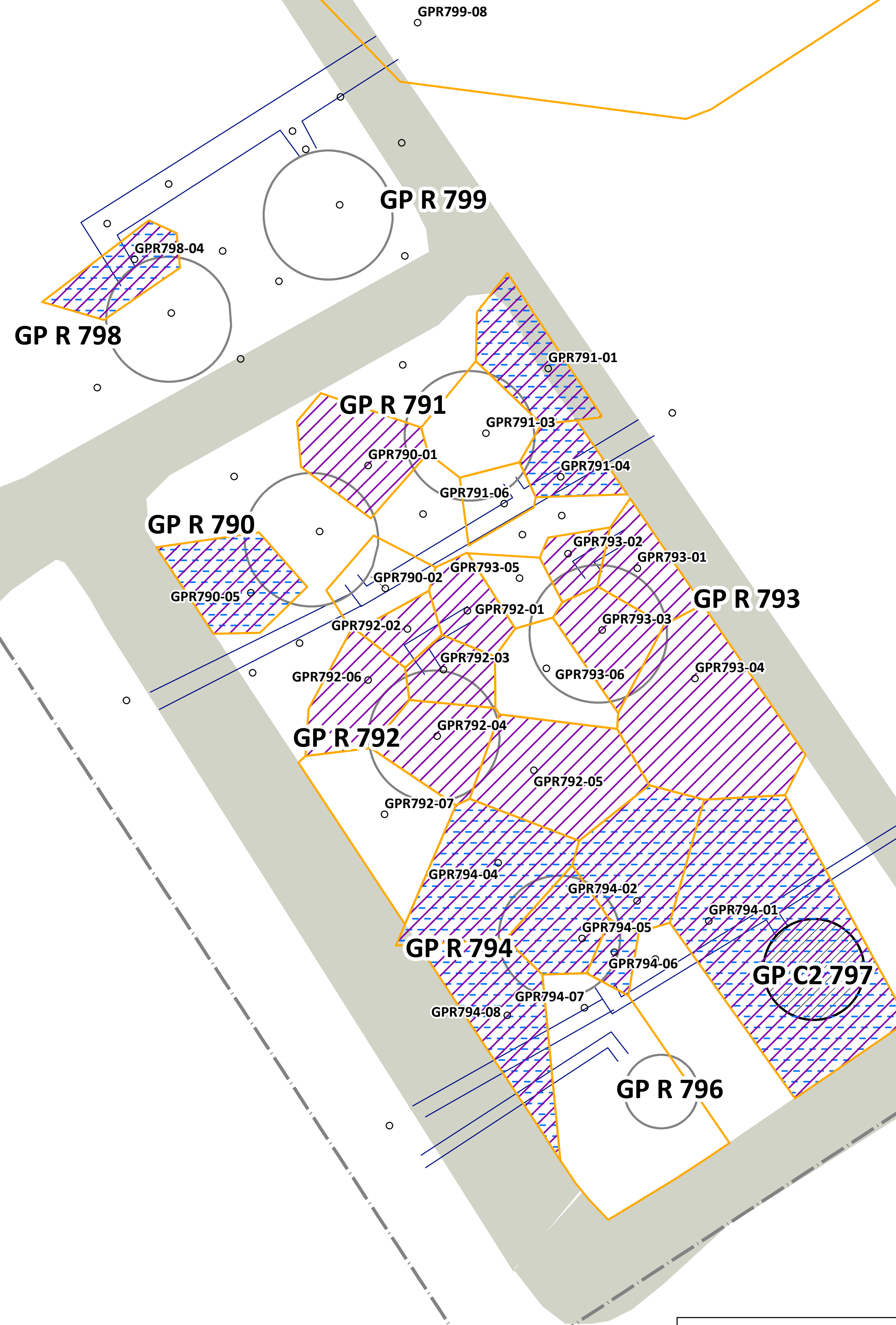
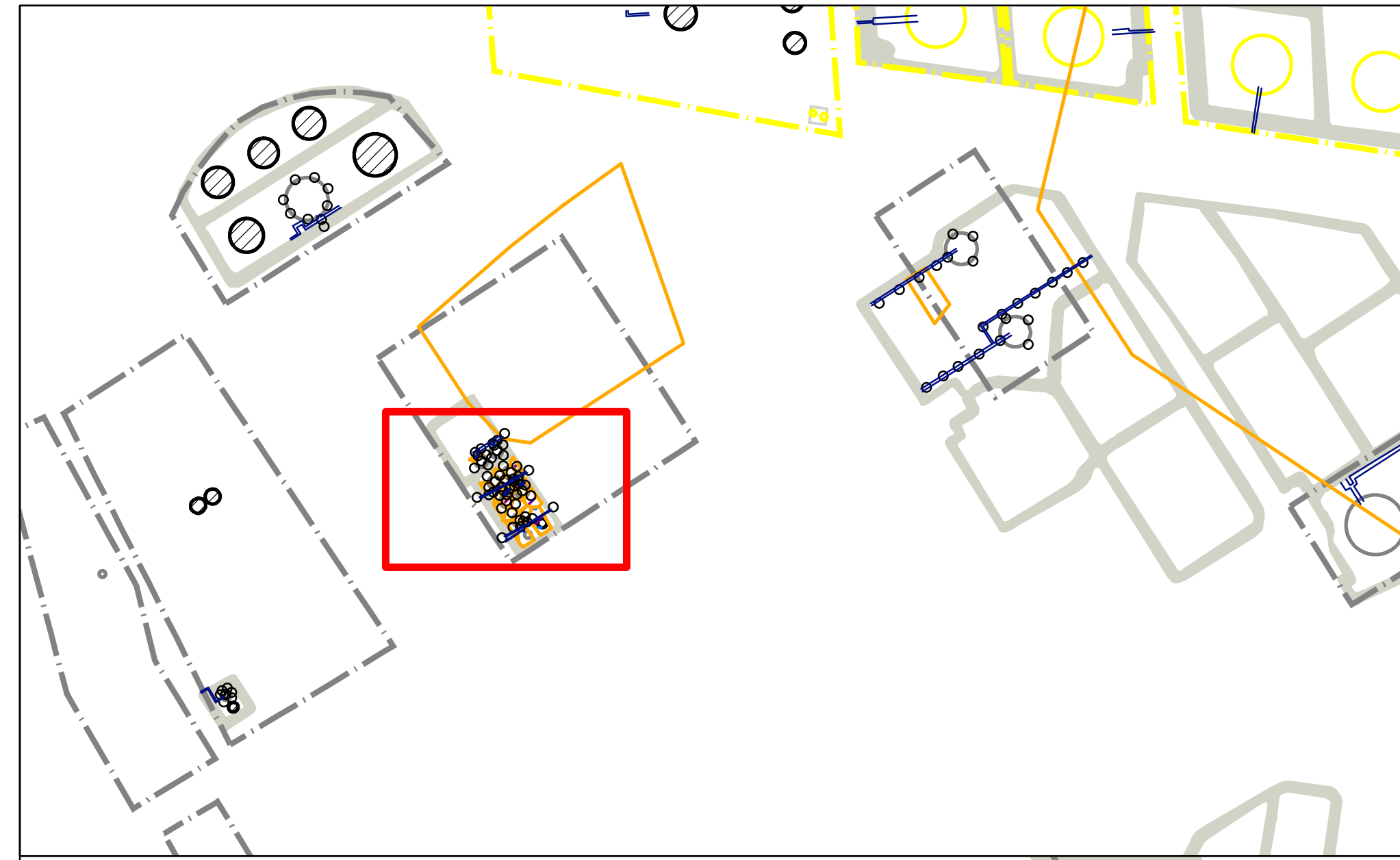
Chemical	Groundwater Risk-Based Screening Levels					
	{A}	{B}	{C}	{D}	{E}	{F}
	Nonpotable Groundwater Use (mg/L)	Routine Worker Volatilization to Outdoor Air (mg/L)	Routine Worker Vapor Intrusion (mg/L)	Construction Worker Direct Contact (mg/L)	Off-Site Resident Vapor Intrusion (mg/L)	Groundwater Migration to Surface Water (mg/L)
VOCs						
Benzene	0.30	550	3.8	4.0	0.25	130
Cumene	37	9100	63	30	4	3
Toluene	25	100000	700	200	45	52
Xylenes (total)	3.7	1900	13	17	0.86	210
SVOCs						
Naphthalene	0.39	120	0.88	0.28	0.067	43

Note:
 1. GW was not sampled in TG07-MW-06 due to the presence of LNAPL.



CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
 PROJECT: Aboveground Storage Tank Closure
 PROJECT NUMBER: P044.001.002

Source Area Groundwater Results Tank Group 07
Figure 5

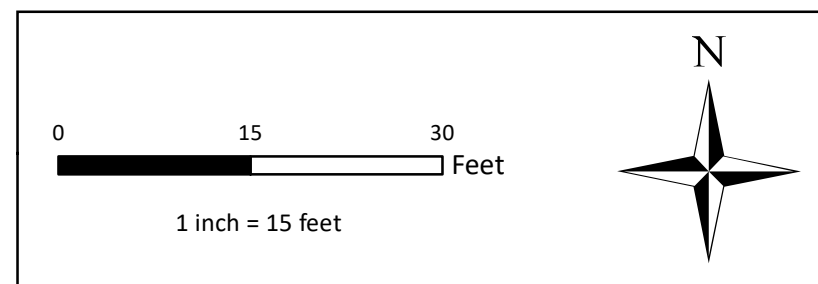


Legend

- Tank Group Boundary
- Previously Closed AST
- Berm Boundary
- Associated Piping
- Soil Sample Location

Soil Cancer Risk > 10⁻⁴ and/or HI > 1:

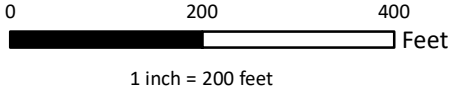
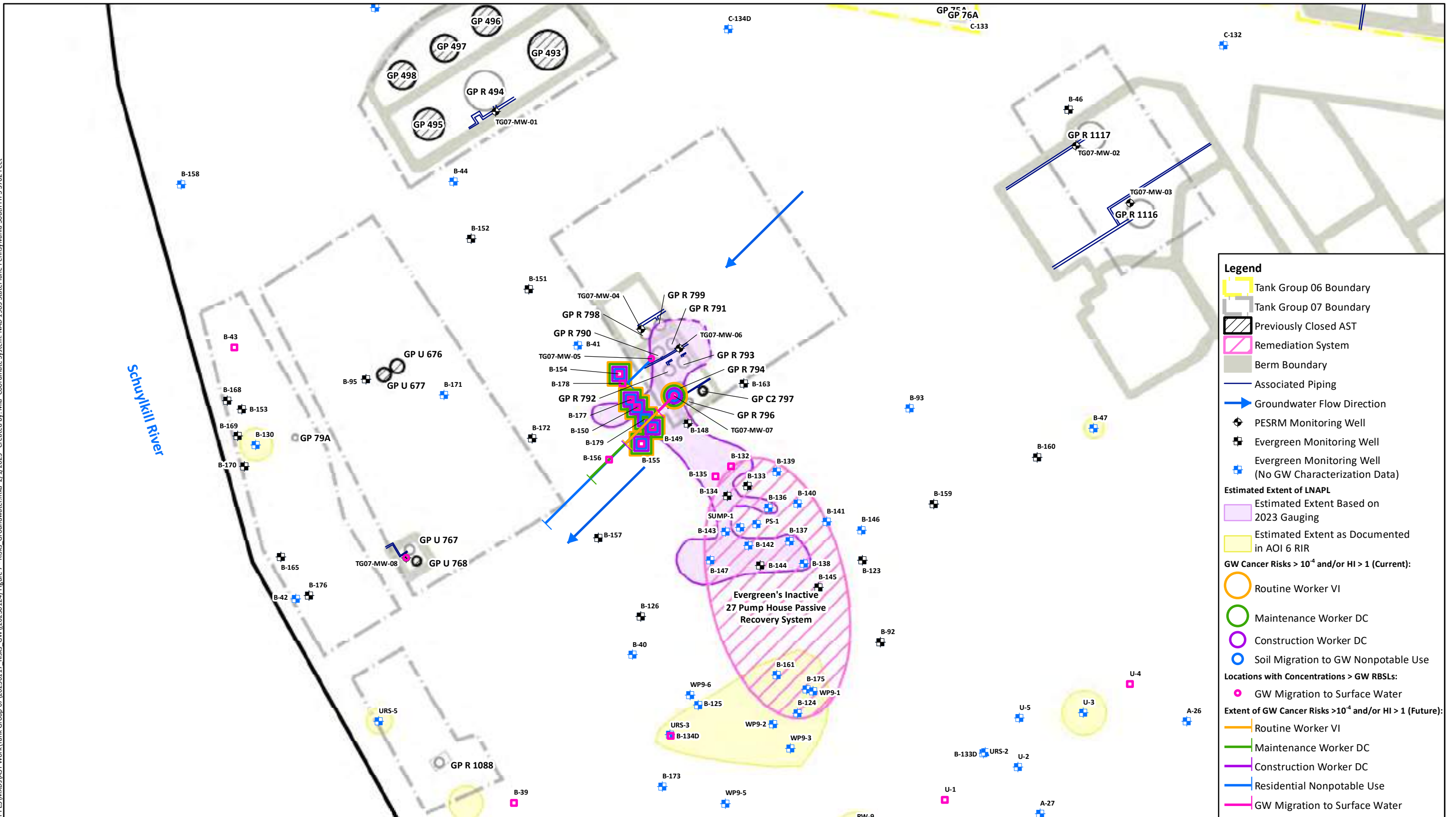
- Routine Worker VI
- Construction Worker DC
- Soil Migration to GW Nonpotable Use



	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Risk Assessment Results (Soil)
Tank Group 07
Figure 6

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	SAFETY FIRST	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Risk Assessment Results (Groundwater) Tank Group 07
		PROJECT: Aboveground Storage Tank Closure	
		PROJECT NUMBER: P044.001.002	
Figure 7			

Appendix A

Human Health Risk Assessment Supporting Information and Calculations



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1 Introduction

This appendix provides supplemental information supporting the human health risk assessment presented in Section 5 of the *Site-Specific Human Health Risk Assessment* (the Risk Assessment). The methods used in the human health risk assessment are based on Pennsylvania Department of Environmental Protection (PADEP) and the United States Environmental Protection Agency (USEPA) risk assessment guidance.

Section 5.3.1 of the Risk Assessment describes how cumulative cancer risks and noncancer hazardous Indexes (HIs) are calculated for each of the receptors potentially exposed to constituents of potential concerns (COPCs) at the Site. Several key elements of the risk assessment calculations are presented and discussed in the Risk Assessment and not repeated in this appendix. This includes the selection of COPCs (Section 3.1), the compilation of toxicity values (Section 5.2), the identification of receptors and scenarios for potential human exposure (Section 5.1.1), exposure factors used (Section 5.1.4), and the calculation of receptor specific exposure concentrations (Section 5.1.2).

This appendix provides additional details regarding how the risk calculations are performed for each receptor. This includes the fate and transport modeling needed to estimate exposure concentrations for specific receptors and specific exposure scenarios. The chemical properties used in these fate and transport modeling are provided in Attachment 1, Table 1.

The appendix is organized into sections corresponding to the following potentially exposed populations discussed in Section 5.1 of the Risk Assessment:

- Routine Workers
- Maintenance Workers
- Construction Workers

2 Risk Estimation Methodology

Section 5.3.1 of the Risk Assessment describes how cancer risk and noncancer HI are calculated for receptors potentially exposed to COPCs in soil and groundwater at the Site. The exposure factors used in the risk calculations and their bases are presented in Section 5.1.4 of the Risk Assessment and are not repeated herein.

The cancer risk associated with potential exposure to a carcinogenic constituent via ingestion and dermal contact is calculated by multiplying an estimate of the *LADD* for a particular exposure scenario by the cancer *SF* for the constituent as follows:

$$Risk = LADD \cdot SF$$



For the inhalation route, the cancer risk is calculated using the constituent concentration in air (C_{air}) and the URF, as follows:

$$Risk = URF \cdot C_{air} \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

Where ET is exposure time, EF is exposure frequency, ED is exposure duration, and AT_c is the averaging time for carcinogens.

The noncancer hazard quotient (HQ) associated with potential exposure via incidental ingestion and dermal contact was calculated by dividing an estimate of the ADD by the RfD for the constituent as follows:

$$HQ = \frac{ADD}{RfD}$$

For the inhalation route, the HQ was calculated using C_{air} and the RfC , as follows:

$$HQ = \frac{C_{air}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

In this risk assessment, unit cancer risks and unit HQs are calculated for a unit constituent concentration (C_{unit}). C_{unit} is 1 mg/kg for soil and 1 mg/L for groundwater. Because risk estimates scale directly with the constituent concentration (except for cancer risk estimates at very high doses), these unit risks and unit HQs can be calculated once and used to calculate cancer and noncancer risk estimates efficiently for a large number of locations by multiplying the constituent concentrations for each location by the unit risks and unit HQs. The unit risks and unit HQs for all routes of exposure (incidental ingestion, dermal contact, vapor inhalation, and/or particulate inhalation) for a given receptor to constituents in a given environmental medium are conservatively summed to produce a single unit risk and unit HQ for each constituent. The cancer risk and noncancer HQ for a particular constituent i at a particular location are calculated as follows:

$$Risk_i = \frac{C_i \cdot UnitRisk_i}{C_{unit}}$$

$$HQ_i = \frac{C_i \cdot UnitHQ_i}{C_{unit}}$$

The media-specific cumulative cancer risk and noncancer HI from exposure to the combination of COPC are estimated following USEPA (1989) guidance, as follows:

$$Cumulative\ Risk = \sum_i Risk_i$$

$$Hazard\ Index = \sum_i HQ_i$$

Where $Risk_i$ is the estimated cancer risk for the i^{th} constituent and HQ_i is the HQ for the i^{th} constituent. This approach may result in estimates of media-specific cumulative cancer risk and HI that are more



conservative than necessary. For example, different COPC may cause different and unrelated noncancer health effects, so summing the HQs for their individual effects would overestimate the significance of their combined effects. Nonetheless, this approach is used here as a conservative assessment tool.

Estimated media-specific cumulative cancer risks for each receptor population are compared to PADEP's risk management goals established in Section 250.402(b). Specifically, cumulative cancer risks are compared to an incremental increased cancer risk goal of 1×10^{-4} while noncancer HIs are compared to an HI of 1. For constituents with different and unrelated noncancer health effects, summing the HQs would overestimate the significance of their combined effects. When such a summation results in an HI that exceeds 1, the HQs may be segregated by target organ and/or critical health effects (USEPA 1989). Risk estimates equal to or below these goals represent levels which would not warrant risk management action.

The following sections discuss the calculation of unit risks/HQs for each receptor exposure scenario.

2.1 Routine Workers

The risk assessment evaluates nonresidential exposures to COPC via: (1) soil contact and inhalation during outdoor activities, (2) vapor intrusion from soil and groundwater, (3) volatilization into outdoor air from groundwater, and (4) nonpotable use of groundwater (discussed in Section 2.5).

2.1.1 Exposure to Soil During Outdoor Activities

Routine workers could be exposed to surface soil via incidental ingestion, dermal contact, and inhalation of vapors and particulates during outdoor activities. Risk estimates are calculated using unit risks and unit HQs as discussed above and in Section 5.3 of the Risk Assessment. The receptor specific calculations are discussed in this section.

Lifetime Average Daily Dose

The lifetime average daily doses for soil ingestion ($LADD_{ing}$) and soil dermal contact ($LADD_{derm}$) are calculated as follows, using the exposure factors for resident soil contact (Section 5.1.4 of the Risk Assessment):

$$LADD_{ing} = C_{soil} \cdot \frac{IR \cdot FC \cdot EF \cdot ED}{BW \cdot AT_c}$$

$$LADD_{derm} = C_{soil} \cdot \frac{SA \cdot AF \cdot ABS_{derm} \cdot FC \cdot EF \cdot ED}{BW \cdot AT_c}$$

where C_{soil} is the constituent concentration in soil, IR is the ingestion rate, FC is the fraction of the soil that is contaminated, SA is the exposed skin surface area, AF is the soil-to-skin adherence factor, and ABS_{derm} is the constituent-specific dermal absorption factor.

Average Daily Dose

The average daily doses for soil ingestion (ADD_{ing}) and soil dermal contact (ADD_{derm}) are calculated as follows:



$$ADD_{ing} = C_{soil} \cdot \frac{IR \cdot FC \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

$$ADD_{derm} = C_{soil} \cdot \frac{SA \cdot AF \cdot ABS_{derm} \cdot FC \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

Estimating Air Concentrations

For the inhalation route, the air concentrations of vapors and particulates from soil are calculated as follows:

$$C_{air} = J \cdot \frac{C}{Q}$$

where $J \cdot C/Q$ is an air concentration that is normalized to unit concentration in soil. The J term is the normalized average vapor (J_v) or particulate flux ($J_{10,w}$), and the C/Q term is the air concentration normalized to a unit flux (i.e., C/Q is an air dispersion factor).

The normalized average vapor flux J_v of a constituent from unsaturated soil is conservatively estimated using an unsteady-state model derived by Jury et al. (1983). This model conservatively assumes that volatile constituents are present in the soil to a finite depth equal to the approximate depth to groundwater at the Site of 16 ft bgs. The equation for J_v is given by:

$$J_v = \frac{C_0}{T} \left[Z_1 \operatorname{erfc} \left(\frac{Z_1}{2\sqrt{D_E T}} \right) + 2 \sqrt{\frac{D_E T}{\pi}} \left(1 - e^{-\frac{Z_1^2}{4D_E T}} \right) \right]$$

where,

$$D_E = \frac{D_G H + D_L}{\rho_b K_d + \theta_w + \theta_a H}$$

$$D_G = D_{air} \cdot \frac{\theta_a^{10/3}}{n^2}$$

$$D_L = D_{water} \cdot \frac{\theta_w^{10/3}}{n^2}$$

$C_{s,0}$ is the concentration in soil, ρ_b is the soil bulk density, T is the averaging period (equivalent to ED), H is the Henry's law constant, K_d is the equilibrium-partitioning coefficient, θ_w is the water-filled soil porosity, θ_a is the air-filled soil porosity, D_{air} is diffusion rate through air, D_{water} is the diffusion rate through water, and n is total porosity. For this risk assessment, Henry's law constants have been adjusted to reflect a specific subsurface temperature of 18°C, which is conservative (PADEP 2021).

Derivation of these equations and definition of the equation parameters can be found in the Jury et al. 1983 journal article and in USEPA guidance (1996a, 1996b), and therefore, are not repeated here. The calculation of J_v was performed using values for constituent-specific parameters and default soil parameters recommended in the USEPA guidance (2004a), using a soil type of sand, which is representative of the soil type found at the Site. The calculation of J_v is shown in Attachment 2, Table 1.



The normalized average particulate flux $J_{10,w}$ of a constituent from soil is conservatively estimated using the “unlimited reservoir” model that USEPA has adapted for screening-level analysis of particulate emissions from soil (USEPA 1996a, 1996b). This model assumes that particulate emissions are created by wind erosion. The equation for $J_{10,w}$ is given by:

$$J_{10,w} = 0.036 \cdot (1 - G) \cdot \left(\frac{u_m}{u_t}\right)^3 \cdot F(x) \frac{g}{m^2 hr} \cdot \frac{hr}{60^2 sec} \cdot \frac{10^{-3} kg}{g}$$

where G is fraction of ground/vegetative cover, u_m is the mean annual wind speed at the nearest weather station which is located in Philadelphia, Pennsylvania (NOAA 2018), u_t is the equivalent threshold wind speed at the anemometer height at which u_m was measured in Philadelphia, Pennsylvania, and $F(x)$ is a function dependent on u_m/u_t . The details of this model can be found in USEPA guidance (1996a, 1996b), and are not repeated here. The default parameter values recommended in the USEPA guidance (1996a, 1996b) are used with site-specific wind speed in calculating $J_{10,w}$. The calculation of $J_{10,w}$ is shown in Attachment 2, Table 2.

The C/Q term is estimated using the empirical correlation in USEPA’s *Supplemental Soil Screening Guidance* (2002), using the correlation coefficients for Philadelphia, Pennsylvania, and assuming a source area of 0.4 acre. This source area size is a conservative estimate of the area potentially impacted by the release. The calculation of C/Q is shown in Attachment 2, Table 3.

The unit risk and unit HQ calculations are shown in Attachment 2 of this appendix, and the computation of the upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7 of this appendix.

2.1.2 Vapor Intrusion

To evaluate potential future vapor intrusion exposures to soil and shallow groundwater in a hypothetical building, vapor intrusion risk estimates are developed using the following modeling approaches and input parameters discussed below.

2.1.2.1 Soil

For the vapor intrusion inhalation exposure pathway, estimates of cancer risk and noncancer HQ/HI are calculated using unit risks and unit HQs as discussed above and in Section 5.3 of the Risk Assessment.

Modeling Vapor Intrusion from Soil

For the indoor air exposure pathway, estimates of cancer risk and noncancer HQ are calculated as follows:

$$Risk = C_{building} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

$$HQ = \frac{C_{building}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$



where $C_{building}$ is the concentration in indoor air. For assessing routine worker exposures, chronic $RfCs$ are used. The indoor air concentration is estimated using the modeling approach and input parameter values discussed below.

The indoor air concentrations are estimated using the following relationships described by Johnson and Ettinger (1991):

$$C_{building} = \alpha \cdot C_{source}$$

where α is an attenuation coefficient and C_{source} is the source vapor concentration that is given by the following equation:

$$C_{source} = C_{soil} \left(\frac{K_d}{H} + \frac{\theta_w}{\rho_b H} + \frac{\theta_a}{\rho_b} \right)^{-1}$$

The attenuation coefficient, assuming that constituents are present in the soil at constant concentrations, is given by the following equation:

$$\alpha = \frac{\left[\frac{D_T^{eff} A_B}{Q_{building} L_T} \right] \exp \left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right)}{\exp \left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right) + \left[\frac{D_T^{eff} A_B}{Q_{building} L_T} \right] + \left[\frac{D_T^{eff} A_B}{Q_{soil} L_T} \right] \left[\exp \left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right) - 1 \right]}$$

Derivation of this equation and definition of the equation parameters can be found in Johnson and Ettinger's 1991 journal article and therefore are not repeated here.

The effective diffusion coefficient term D_T^{eff} in the equation for the attenuation coefficient α is calculated using a soil-water profile that is estimated using a soil type of sand, which is representative of the soil type found at the Site. The soil-water profile in the vadose zone is estimated using the van Genuchten soil-water retention equation with default water retention parameters appropriate for sand (USEPA 2004a). It is conservatively assumed that the building cracks are filled with sand. These parameters and the resulting soil-water profile in the vadose zone are shown in Attachment 2 of this appendix.

The remaining parameters in the equation for the attenuation coefficient α , which relate to building characteristics, are conservatively based on the default values for a slab-on-grade nonresidential building with an air exchange rate of 0.60 per hour as recommended by PADEP (2021). The values used in the calculations are shown in Attachment 2 of this appendix and their bases are discussed in PADEP (2021) and USEPA (2004a) guidance.

Mass Limit Check

Indoor air concentrations from the soil vapor intrusion are calculated with a mass balance check. The mass balance check ensures that the assumed mass of a constituent infiltrating into the building over the assumed exposure period does not exceed an upper-bound estimate of the constituent's mass in the vadose zone underlying the building. The upper-bound estimate of the constituent's mass in the vadose zone is conservatively estimated using the highest concentration of the constituent from any depth at



each area and assuming this concentration represents the soil concentration from slab to the water table. The attenuation coefficient α_{ML} used in the mass balance check is given by the following equation:

$$\alpha_{ML} = \left(\frac{\rho_b K_d}{H} + \frac{\theta_w}{H} + \theta_a \right) \cdot \left(\frac{L_B \cdot W_B \cdot \Delta H}{Q_{building} \cdot ED} \right)$$

where L_B is the length of the building, W_B is the width of the building, ΔH is the contaminant thickness (conservatively assumed to be the distance between groundwater and a building foundation [L_{T-gw}]), and $Q_{building}$ is the air flow rate through the building. The depth to groundwater in the area of the Site is approximately 16 ft bgs. All parameters are shown in Attachment 2 of this appendix.

$Q_{building}$ is a function of the size of the building (or unit) and the amount of air exchanges that occur as a result of operating the air handling and ventilation system. It can be calculated as follows (USEPA 2004a, 2017b):

$$Q_{building} = L_B \cdot W_B \cdot H_B \cdot ER$$

where H_B is the occupied height of the building and ER is the air exchange rate.

For $Q_{building}$, the length (10 m), width (10 m), and height (2.44 m) of the generic nonresidential building are assumed, consistent with PADEP's recommended default assumptions for generic slab-on-grade nonresidential buildings (PADEP 2021). A conservative estimate of ER (i.e., 0.60/hr) was assumed based upon PADEP's (2021) recommended default for a generic nonresidential building.

The unit risk and unit HQ calculations are shown in Attachment 2 of this appendix, and the computation of the upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7 of this appendix.

2.1.2.2 Groundwater

For the vapor intrusion inhalation exposure pathway, estimates of cancer risk and noncancer HQ/HI are calculated using unit risks and unit HQs as discussed above and in Section 5.3 of the Risk Assessment.

Modeling Vapor Intrusion from Groundwater

The chemical-specific cancer risk and noncancer HQ estimates for exposure to COPC via vapor intrusion from groundwater are calculated in a manner analogous to the approach discussed in Section 2.1.2.1, except for the calculation of source vapor concentration.

The source vapor concentration for a chemical in groundwater is calculated from the chemical's concentration in groundwater C_{gw} using Henry's law as follows:

$$C_{source} = C_{gw} \cdot H$$

In calculating the attenuation coefficient α , the depth to groundwater was assumed to be 3 ft bgs below the basement slab. The calculation of α is shown in Attachment 2 of this appendix.



The unit risk and unit HQ calculations are shown in Attachment 2 of this appendix, and the computation of the upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7 of this appendix.

2.1.3 Volatilization to Outdoor Air

To evaluate potential exposure to COPC in outdoor vapors from shallow groundwater, risk estimates are developed using the following modeling approaches and input parameters discussed below.

2.1.3.1 Groundwater

The concentration (C_{air}) of groundwater chemicals that migrate through the vadose zone to outdoor air is calculated as follows:

$$C_{air} = J \cdot C/Q$$

where J is the vapor flux, and C/Q is the normalized, annual-average, air concentration at ground level (as discussed in Section 2.1.1).

The vapor flux J is calculated by using the steady-state diffusion equation in one-dimension with a constant source concentration and the maximum concentration gradient, as follows:

$$J = D_e \cdot \frac{C_v}{L}$$

where D_e is the effective diffusion coefficient of the chemical in the vapor phase, C_v is the vapor concentration in equilibrium with the groundwater concentration, and L is the distance from the water table to the ground surface. The equilibrium vapor concentration in the above equations is related to the groundwater concentration using Henry's law as discussed in Section 2.1.2.2.

The effective diffusion coefficient for the vapor phase is calculated in a manner analogous to the approach discussed in Section 2.1.2.2. The depth to water is assumed to be 3 ft bgs, the average depth to groundwater in Tank Group 07. The parameters used to calculate the effective diffusion coefficient are shown in Attachment 2 of this appendix.

The estimated outdoor air concentrations are used in the inhalation risk equations discussed in Section 2 to calculate single-chemical inhalation cancer risk and HQ. The unit risk and unit HQ calculations, and the computation of the upper-bound single-chemical cancer risk and HQ estimates, which were summed to estimate the cumulative cancer risk and HI, are shown in Attachment 7 of this appendix.

2.2 Maintenance Worker

Risk estimates for maintenance workers are calculated for potential exposures to soil and groundwater.



2.2.1 Exposure to Soil During Maintenance Activities

This human health risk assessment evaluates maintenance worker exposures to soil via incidental ingestion, soil contact, and inhalation during outdoor activities. The calculation of the risk estimates is analogous to those for routine workers except for (1) the use of soil exposure factors for maintenance workers and (2) the calculation of airborne vapor and dust concentrations which are described in this section.

The calculation of airborne vapor concentrations is analogous to those for routine workers except for the use of a shorter averaging period (T). For maintenance workers, an averaging period, T , of 10 years is used consistent with their exposure period. The calculation of J_v is shown in Attachment 3, Table 1.

As noted in Section 5.1.3.3 of the Risk Assessment, during maintenance activities the PM_{10} level is set at 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). This PM_{10} level is based on a time-weighted average assuming maintenance workers spend 1/3 of their exposure period excavating into the subsurface and 2/3 of their exposure period conducting maintenance activities that do not involve excavation into the subsurface. In calculating the time-weighted average, the 24-hour average National Ambient Air Quality Standards for PM_{10} of $150 \mu\text{g}/\text{m}^3$ is used as the PM_{10} concentration during excavations and a PM_{10} concentration of $1 \mu\text{g}/\text{m}^3$ is used for the time during maintenance activities that do not involve excavation. The PM_{10} concentration during non-excavation maintenance activities is expected to be less than $1 \mu\text{g}/\text{m}^3$, based on the wind erosion model recommended by USEPA (1996a) using site-specific wind speed from Philadelphia, Pennsylvania (NOAA 2018).

Attachment 3, Table 3 presents the air concentrations estimated for particulates and vapors.

The unit risk and unit HQ calculations are shown in Attachment 3. The upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7.

2.2.2 Exposure to Groundwater During Maintenance Activities

As discussed in Section 5.1.1 of the Risk Assessment, maintenance workers could be exposed to groundwater via incidental ingestion, dermal contact, and inhalation of vapors during excavations that extend into the water table. The cancer risk and noncancer HQ estimates for the ingestion and dermal exposure routes are calculated in a manner analogous to the method discussed in Section 2.1.1, except the exposure factors for maintenance worker contact with groundwater are used, as presented in Section 5.1.4 of the Risk Assessment, and the $LADD$ and ADD for the dermal route of exposure and the vapor flux are calculated as discussed below.

Lifetime Average Daily Dose

The $LADD$ for groundwater ingestion ($LADD_{ing}$) and groundwater dermal contact ($LADD_{derm}$) were calculated as follows:

$$LADD_{ing} = C_{gw} \frac{IR \cdot EF \cdot ED}{BW \cdot AT_c}$$



$$LADD_{derm} = C_{gw} \frac{DA_{event} \cdot SA \cdot EV \cdot EF \cdot ED}{BW \cdot AT_c}$$

where C_{gw} is the chemical concentration in groundwater (assumed to be a unit concentration of 1 mg/L), IR is the groundwater ingestion rate, DA_{event} is the absorbed dose per event, SA is the exposed skin surface area, and EV is the event frequency.

The DA_{event} for organic chemicals is estimated using an unsteady-state approach (USEPA 2004b, Equations 3.2 and 3.3), which is more conservative than the steady-state approach (USEPA 1989), particularly for hydrophobic chemicals. The DA_{event} for inorganic chemicals is estimated using a steady-state approach (USEPA 2004b, Equation 3.4). The details of the calculation of DA_{event} for organic and inorganic chemicals are provided by USEPA (2004b) and not repeated here.

Average Daily Dose

Average daily dose (ADD) for groundwater ingestion (ADD_{ing}) and groundwater dermal contact (ADD_{derm}) were calculated as follows:

$$ADD_{ing} = C_{gw} \frac{IR \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

$$ADD_{derm} = C_{gw} \frac{DA_{event} \cdot SA \cdot EV \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Groundwater Ingestion and Dermal Exposure Routes

For the groundwater ingestion and dermal exposure routes, the unit cancer risk and unit noncancer HQ were calculated as follows:

$$Unit\ Risk = LADD \cdot SF$$

$$Unit\ HQ = \frac{ADD}{RfD}$$

The unit risk and unit HQ calculations for each COPC for the groundwater ingestion and dermal exposure routes are presented in Attachment 3. The exposure factors used for maintenance workers are presented in Section 5.1.4. of the Risk Assessment.

Estimating Air Concentrations

For the inhalation route, the air concentrations (C_{air}) resulting from the volatilization of COCs from groundwater in an excavation were calculated as follows:

$$C_{air} = J \cdot C / Q$$



Where $J \cdot C/Q$ is an air concentration that is normalized to unit concentration (i.e., 1 mg/L) in groundwater. The J term is the normalized average vapor and the C/Q term is the air concentration normalized to a unit flux (i.e., C/Q is an air dispersion factor).

The normalized vapor flux J of a chemical from groundwater was estimated using an overall mass transfer coefficient that is recommended by USEPA (1995b):

$$J = \left(\frac{1}{k_l} + \frac{1}{Hk_g} \right)^{-1} \left(\frac{m}{10^2 cm} \right) \left(\frac{10^3 L}{m^3} \right)$$

Where k_l and k_g are the liquid-phase and gas-phase mass transfer coefficients given by the following:

$$k_l = \left(\frac{MW_o}{MW} \right)^{0.5} \left(\frac{T}{298K} \right) k_{l,o}$$

$$k_g = \left(\frac{MW_w}{MW} \right)^{0.335} \left(\frac{T}{298K} \right)^{1.005} k_{g,w}$$

Where MW , MW_o , and MW_w are the molecular weights of the chemical, oxygen, and water, respectively, T is the absolute temperature of the groundwater, $k_{l,o}$ is the liquid-phase mass transfer coefficient for oxygen (0.002 centimeters per second), and $k_{g,w}$ is the gas-phase mass transfer coefficient for water vapor (0.833 centimeters per second).

For groundwater exposures during excavations to the water table, C/Q is based on a source area of a 15-by 15-foot excavation area, and an averaging period of 24 hours. The maximum 24-hour average air concentration is estimated from the annual average air concentration by using a conservative factor of 0.4/0.19 or 2.1 (USEPA 2002).

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Inhalation Route

For the inhalation route, the inhalation cancer unit risk and noncancer unit HQ are calculated using the chemical concentration in air (C_{air}), as follows:

$$Unit Risk_{inh} = C_{air} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

$$Unit HQ_{inh} = \frac{C_{air}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

The unit risk and unit HQ calculations for each COPC for the inhalation route are presented in Attachment 3. The exposure factors used for maintenance workers are presented in Section 5.1.4. of the Risk Assessment. The computation of the upper-bound single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the cumulative cancer risk and noncancer HI, are shown in Attachment 7 of this appendix.



2.3 Construction Worker

Risk estimates for construction workers are calculated for potential exposures to soil and groundwater.

2.3.1 Exposure to Soil During Construction Activities

This human health risk assessment evaluates construction worker exposures via incidental ingestion, soil contact, and inhalation during outdoor activities. The calculation of the risk estimates is analogous to those for routine workers except for (1) the use of soil exposure factors for construction workers and (2) the calculation of airborne vapor and dust concentrations which are described in this section.

The calculation of airborne vapor concentrations is analogous to those for residents except for the use of a shorter averaging period (T). For construction workers, an averaging period, T , of 1 year is used consistent with their exposure period. The calculation of J_v is shown in Attachment 4, Table 1.

As noted in Section 5.1.3.3 of the Risk Assessment, during construction activities the PM_{10} level is set at $50 \mu\text{g}/\text{m}^3$, which is the former annual average National Ambient Air Quality Standards for PM_{10} since construction workers are assumed to be performing excavations for a work year. It is conservatively assumed that the PM_{10} concentration would be at this limit every day for the entire period of construction worker exposure.

Attachment 4, Table 3 presents the air concentrations estimated for particulates and vapors.

The unit risk and unit HQ calculations are shown in Attachment 4. The upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7.

2.3.2 Exposure to Groundwater During Construction Activities

As discussed in Section 5.1.1 of the Risk Assessment, construction workers could be exposed to groundwater via incidental ingestion, dermal contact, and inhalation of vapors during excavations that extend into shallow groundwater. The computation of risk estimates for worker exposure to groundwater via incidental ingestion, dermal contact, and inhalation of vapors during construction activities is analogous to the computations discussed in Section 2.2.2 for maintenance workers, except the groundwater exposure factors for construction workers are used, as presented in Section 5.1.4. of the Risk Assessment, and subchronic noncancer toxicity values are used instead of chronic values since this exposure scenario represents a subchronic exposure.

The unit risk and unit HQ calculations are shown in Attachment 4. The upper-bound site-related single-chemical cancer risk and noncancer HQ estimates, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7.

2.4 Soil Migration-to-Groundwater

Cancer and noncancer risk estimates were calculated by scaling off of the soil migration-to-groundwater RBSLs. RBSLs developed to conservatively evaluate the potential for COPC in soil to leach to



groundwater at concentrations that may pose an unacceptable risk to human health or the environment are calculated using the methodologies described in the *Soil Screening Guidance: User's Guide* (USEPA 1996a).

RBSLs were calculated using both an “equilibrium partitioning” (also called soil/water partitioning [USEPA 1996a]) and a “leach test” methodology, as described below. For each COPC, the soil screening level corresponding to the more realistic of the two calculation methods is used as a soil migration-to-groundwater screening level. For COPC that are relatively immobile in the subsurface (e.g., semivolatile organic compounds), the equilibrium partitioning method provides a more realistic, yet conservative, soil leachate concentration because it assumes that the chemical concentration in soil remains constant over time (since the chemical is immobile, its concentration in soil does not significantly decrease over time). For chemicals that are relatively mobile (e.g., volatile organic compounds), the leach test method provides a more realistic, yet conservative, soil leachate concentration because it accounts for a finite amount of chemical mass in the soil. These two approaches of estimating soil leachate concentrations are conservative since they ignore attenuation of the chemical concentration in the vadose zone and dilution at the water table.

Equilibrium Partitioning

The soil/water partition equation, which assumes an infinite source of the chemical, can be used to estimate concentrations of chemicals in soil leachate for a given soil concentration.

$$C_{soil} = C_{pw} \left(K_d + \frac{\theta_w + \theta_a H}{\rho_b} \right)$$

In this relationship, C_{soil} is the soil concentration (mg/kg), C_{pw} is the soil leachate concentration (milligrams per liter [mg/L]), K_d is the chemical specific soil-water partition coefficient (liter per kilogram), θ_w is the water-filled soil porosity (unitless), θ_a is the air-filled soil porosity (unitless), H is the chemical-specific Henry's Law constant (unitless), and ρ_b is the dry soil bulk density (kilogram per liter [kg/L]). For organic chemicals, K_d is equal to the product of the chemical-specific soil organic carbon/water partition coefficient, K_{oc} (liter per kg), and the fraction organic carbon in soil, f_{oc} (unitless). For this analysis, the soil properties are based upon sand, the most conservative soil type identified at the Site. Specifically, θ_w is assumed to be 0.05 (liters per liter), θ_a is assumed to be 0.32 (liters per liter), and ρ_b is assumed to be 1.66 kg/L (USEPA 2004a).¹ The f_{oc} is assumed to be 0.005 (grams per gram) (USEPA 1996a). The chemical-specific K_d , and K_{oc} , and H (and their sources) used are presented in Attachment 5.

Leach Test Method

USEPA's leach test method (SW-846, Method 1312)² can be simulated by assuming a hypothetical worst-case leach test outcome in which the entire mass of the chemical in soil is extracted into the leaching

¹ Water-filled and air-filled porosity were estimated using the soil properties for sand (USEPA 2004) and the van Genuchten equation (van Genuchten 1980), assuming a depth to groundwater of 19 ft.

² Method 1312: Synthetic Precipitation Leaching Procedure, <https://www.epa.gov/sites/production/files/2015-12/documents/1312.pdf>.



fluid. With this assumption, the concentration of the COPC in soil can be divided by 20 (which is the ratio of the mass of leaching fluid to the mass of soil in the leaching test protocol) to estimate its leachate concentration as follows:

$$C_{soil} = C_{pw} \times \frac{mr_{fluid:solid}}{\rho_{fluid}}$$

In the relationship above, C_{soil} is the soil concentration (mg/kg), C_{pw} is the soil leachate concentration (mg/L), $mr_{fluid:solid}$ (kilogram per kilogram) is the mass ratio of the extraction fluid to soil used in the leach test (i.e., 20 kg fluid per 1 kg soil), and ρ_{fluid} (kg/L) is the density of the extraction fluid (assumed to be 1 kg/L).

Dilution Attenuation Factor and Calculation of Soil Migration to Groundwater Screening Levels

As soil leachate moves through soil and groundwater, chemical concentrations are attenuated. The reduction in concentrations can be expressed by a dilution attenuation factor (DAF) defined as a ratio of soil leachate concentration to receptor point concentration (USEPA 1996a).

Rather than independently model leachate migration to calculate a site-specific *DAF*, a generic *DAF* of 20 was conservatively used in the development of the RBSLs. This default *DAF* is recommended by USEPA (1996a) for contaminated soil sources up to 0.5 acres.

To calculate soil migration to groundwater screening levels, the equations presented above can be further refined as follows:

$$C_{soil-SPLP} = C_{pw} \times \frac{mr_{fluid:solid}}{\rho_{fluid}} \times DAF$$

$$C_{soil-Kd} = C_{pw} \left(K_d + \frac{\theta_w + \theta_a H}{\rho_b} \right) \times DAF$$

By substituting target groundwater concentrations for C_{pw} in the leach test method and equilibrium-partitioning method equations, and assuming a *DAF*, two possible soil screening levels are calculated. The higher of the two estimated values was used as the RBSL as the higher represents the more realistic, yet conservative, soil screening level for this pathway.

Soil migration-to-groundwater RBSLs were calculated using the target groundwater concentrations based on groundwater RBSLs for the following scenarios:

- Routine worker exposure to COPC in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPC in groundwater via direct contact
- Receptor exposure to COPC in groundwater via nonpotable groundwater use

The acceptable groundwater concentrations are presented in Attachment 5. The soil migration-to-groundwater screening levels are presented in Appendix B of the Risk Assessment.



2.5 Nonpotable Groundwater Use

Potential exposures to COPC in groundwater via nonpotable groundwater use are evaluated using a hypothetical scenario where groundwater is used to fill a backyard wading pool (“kiddie” pool). This scenario represents a reasonable worst case exposure scenario in which the estimated exposure is expected to be higher than those associated with other nonpotable uses (e.g., watering lawns, washing cars). Potential routes of exposure in this scenario include incidental ingestion, dermal contact, and inhalation of vapors.

Estimates of cancer risk and noncancer HQ/HI are calculated using unit risks and unit HQs as discussed above and in Section 5.3 of the Risk Assessment and using the exposure factors as presented in Section 5.1.4. of the Risk Assessment.

Water Concentration in Kiddie Pool

The model for estimating vapor emission from a residential kiddie pool is based on models for estimating vapor emissions from open-top batch tanks (USEPA 1995a, 1995b). The residential kiddie pool is modeled as a 6-ft diameter tank that is 9 inches deep and is assumed to be filled with groundwater once per day. The concentration of volatile organic chemicals in the kiddie pool water decreases over time as the chemicals volatilize into the air. The average concentration over a period t is given by:

$$\bar{C}_w = C_{w,o} \frac{d}{K \cdot t} (1 - e^{-Kt/d})$$

where $C_{w,o}$ is the initial concentration, d is the depth of water in the pool and K is the chemical’s overall mass transfer coefficient (USEPA 1995b). K is calculated as follows:

$$K = \frac{k_l \cdot H k_g}{k_l + H k_g}$$

where H is the Henry’s law constant, and k_l and k_g are the liquid-phase and gas-phase mass transfer coefficients given by the following equations (USEPA 1995a):

$$k_l = 10^{-6} + 144 \cdot 10^{-4} (0.01 u_{10} \sqrt{6.1 + 0.63 u_{10}})^{2.2} S_{c_l}^{-0.5}$$

$$k_g = 4.82 \cdot 10^{-3} u_{10}^{0.78} S_{c_g}^{-0.67} d_e^{-0.11}$$

where S_{c_l} and S_{c_g} are liquid-phase and gas-phase Schmidt numbers, d_e is the effective diameter of the water surface (m), and u_{10} is wind speed at 10 m above the water surface, which is 4.2 m/s based on the annual average wind speed in Philadelphia, Pennsylvania (NOAA 2018).

Air Concentration from Kiddie Pool

The concentration of the chemical in air at the water surface is given by the following:

$$C_{air} = \bar{C}_w \cdot K \cdot (C/Q)$$



The C/Q term is estimated using the empirical correlation in USEPA's *Supplemental Soil Screening Guidance* (2002), using the correlation coefficients for Philadelphia, Pennsylvania, and assuming a source area of a 6 by 6 foot kiddie pool. This air concentration is expected to be higher than actual air concentrations to which individuals would be exposed while in the kiddie pool.

Unit Cancer Risk, Unit Noncancer HQ, and RBSL

The unit risk and unit HQ calculations are shown in Attachment 6. The upper-bound site-related single-chemical cancer risk and noncancer HQ estimates for each sampling location, which are summed to estimate the media-specific cumulative cancer risk and noncancer HI, are shown in Attachment 7.

2.6 Groundwater Contaminant Transport

Where unacceptable risk via exposure to groundwater has been identified in Site Characterization samples collected from groundwater monitoring wells, a 2-dimensional fate and transport model was used to calculate the maximum potential downgradient extent of the unacceptable risk in groundwater. The PADEP's spreadsheet application of the analytical model developed by P.A. Domenico (Quick Domenico; QD) was used to conduct the evaluation. PADEP recommends the use of this as a screening model.

The QD spreadsheet application can conservatively calculate the concentration of a COPC at a point and time downgradient of source area of known size and strength. Given the conservative nature of this model, the results it generates represent the maximum estimated horizontal extent of a COPC in groundwater from an individual source area.

The QD model will be used to predict the potential downgradient extent of the unacceptable risk in groundwater in the future (i.e., 30 years) in the absence of risk management action. The input parameters and assumptions which will be used in this model have been determined in accordance with the *User's Manual for the Quick Domenico Groundwater Fate-and-Transport Model* (PADEP 2014).

Because the assumptions and input parameters used in this model represent conservative assumptions (e.g., steady-state source concentration, conservative generic parameter assumptions), the results of this screening model in this case will represent conservative high-end outcomes. For this reason, detailed calibration and sensitivity analyses are not warranted (i.e., such efforts would result in less conservative conclusions regarding the nature and extent of AST-related groundwater contamination). Despite this, a discussion of potential uncertainties in the modeling performed is included.

The model is used in combination with an evaluation of the COPCs driving the unacceptable risk and/or HI. The fate and transport of chemicals in groundwater that have no material contribution to unacceptable risk/HI are not evaluated.

The models presented are based on concentrations of benzene that drive unacceptable risks for the following scenarios:

- Resident Nonpotable Use of groundwater at wells TG07-MW-05 and TG07-MW-07
- Routine Worker Vapor Intrusion of groundwater at TG07-MW-07



- Maintenance Worker Groundwater Contact of groundwater at TG07-MW-07
- Construction Worker Groundwater Contact of groundwater at TG07-MW-07
- Resident Nonpotable Use of groundwater at TG07-MW-07

Additionally, models were developed to evaluate groundwater concentrations exceeding the groundwater MtSW RBSL, which represents an assessment of the potential of ecological impacts to surface water of the Schuylkill River.

Source Concentration

The QD model assumes a uniform, constant aqueous phase source concentration and is not assumed to decay with time. Source concentrations used in these models include:

Monitoring Well	COPC	Source Concentration
TG07-MW-05	Benzene	11 mg/L
	Cumene	7.2 mg/L
TG07-MW-07	Benzene	240 mg/L
	Cumene	5.3 mg/L

Dispersivities

The longitudinal dispersivity (α_x) has been estimated using the following relationship:

$$\alpha_x = 0.1x$$

Where, x is the distance from the source well to the property boundary (i.e., conservatively assumed to be the nearest receptor point). The downgradient distance between the monitoring wells and the Schuylkill River (i.e., x) has been measured to be approximately 1,000 feet.

The transverse dispersivity (α_y) is estimated using the following relationship:

$$\alpha_y = 0.1\alpha_x$$

The vertical dispersivity (α_z) is conservatively estimated as 0.001 ft.

Decay Constant

First-order transport decay rates (λ) for each COPC are equal to the chemical-specific values provided in Ch. 250, Appendix A, Table 5A (PADEP 2021).

Source Width

The source width for groundwater contamination was inferred based upon the width of the specific source area (i.e., aerial extent of soil posing unacceptable risk for migration to groundwater) in the vicinity of each well, measured perpendicular the groundwater flow direction. For models evaluating groundwater concentrations exceeding the groundwater MtSW RBSL, a similar, COPC-specific source



width (i.e., aerial extent of soil concentrations exceeding the Migration to Groundwater RBSL) has been measured.

Monitoring Well	Assessment	COPC	Source Width
TG07-MW-05	Unacceptable Risk/HI	Benzene	50 ft
	> GW MtSW RBSL	Cumene	100 ft
TG07-MW-07	Unacceptable Risk/HI	Benzene	80 ft
	> GW MtSW RBSL	Benzene	85 ft
		Cumene	100 ft

Source Thickness

A source thickness of 30 ft has been used. This is the upper end of the range of the saturated thickness of the unconfined aquifer in AOI 6 as noted in the *Remedial Investigation Report, AOI 6* (AOI 6 RIR; GHD 2017).

Time

The modeling conservatively assumes that the source concentration will not change with time (i.e., steady-state). For this parameter, t , a 30-year (i.e., 11,000 days) time period assumption has been used.

Hydraulic Conductivity

For Tank Group 07, a hydraulic conductivity, K_h , of 12.1 ft/day has been used. This is the upper end of the estimated range of K_h in the unconfined aquifer in nearby Evergreen monitoring wells as noted in the AOI 6 RIR (GHD 2017).

Hydraulic Gradient

The hydraulic gradient, i , is estimated to be 0.00244 using the groundwater elevations measured prior to groundwater sampling.

Effective Porosity

The effective porosity, n_e , is assumed to equal 0.3. This is PADEP's (2014) recommended default for porous media.

Bulk Density

The bulk density, ρ_b , for the aquifer is assumed to be 1.7 g/cm³. This is PADEP's (2014) recommended default for QD modeling in unconsolidated materials.

Organic Carbon Partition Coefficient



Chemical-specific organic carbon partition coefficients, K_{oc} , are equal to the values provided in Ch. 250, Appendix A, Table 5A (PADEP 2021).

Fraction of Organic Carbon

The fraction of organic carbon, f_{oc} , is assumed to equal 0.002. This is PADEP's (2014) recommended default for QD modeling.

Target Concentrations

The target concentrations for each model are:

The results of the QD modeling are depicted in **Figure 7 of the Risk Assessment** and **Attachment 8**.

Monitoring Well	COPC	Unacceptable Risk/Hi				> RBSL
		R. Worker VI	Maint. Worker GW Contact	Const. Worker GW Contact	Nonpotable Use	GW MtSW
		Exposure Concentration (mg/L)				
TG07-MW-05	Benzene	-	-	-	2.9	-
	Cumene	-	-	-	-	3.0
TG07-MW-07	Benzene	36	11	35	2.7	130
	Cumene	-	-	-	-	3.0

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Attachment 1

Toxicity Values and Physical and Chemical Properties

Table 1 – Toxicity Values

Table 2 – Physical and Chemical Properties



Attachment 1

Table 1

Toxicity Values

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Classification			SF _{oral} (mg/kg/d) ⁻¹			SF _{dermal} (mg/kg/d) ⁻¹			URF (mg/m ³) ⁻¹			RfD _{oral} (mg/kg/d)				RfD _{dermal} (mg/kg/d)				RfC (mg/m ³)				SRfD _{oral} (mg/kg/d)				SRfD _{dermal} (mg/kg/d)				SRfC (mg/m ³)				
			Group	Ref	Note	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes	Value	UF	Ref	Notes	
VOC	Benzene	71-43-2	A	1		5.5E-02	1	68	5.5E-02	125	104	7.8E-03	1	60	4.0E-03	300	1		4.0E-03	300	125	104	3.0E-02	300	1		1.0E-02	100	126		1.0E-02	100	125	104	9.0E-02	100	1	110	
VOC	Cumene	98-82-8	D	1											1.0E-01	1,000	1		1.0E-01	1,000	125	104	4.0E-01	1,000	1		4.0E-01	300	2		4.0E-01	300	125	104	4.0E-01	1,000	1	62	
VOC	1,2-Dibromoethane	106-93-4	LC	1		2.0E+00	1		2.0E+00	125	104	6.0E-01	1		9.0E-03	3,000	1		9.0E-03	3,000	125	104	9.0E-03	300	1	62	9.0E-03	3,000	1	62	9.0E-03	3000	125	104	9.0E-03	300	1	62	
VOC	1,2-Dichloroethane	107-06-2	B2	1		9.1E-02	1		9.1E-02	125	104	2.6E-02	1		2.0E-02	3,000	126	116	2.0E-02	3,000	125	104	7.0E-03	3,000	126		2.0E-02	3,000	126		2.0E-02	3000	125	104	7.0E-02	300	126		
VOC	Ethyl Benzene	100-41-4	D	1											1.0E-01	1,000	1		1.0E-01	1,000	125	104	1.0E+00	300	1	62	1.0E-01	1,000	1	62	1.0E-01	1000	125	104	9.0E+00	100	126		
VOC	Methyl tert-butyl ether	1634-04-4	C	142		1.8E-03	147		1.8E-03	125	104	2.6E-04	147		3.0E-01	300	129	111, 116	3.0E-01	300	125	104	3.0E+00	100	1		3.0E-01	300	129	111	3.0E-01	300	125	104	3.0E+00	100	1	62	
VOC	Toluene	108-88-3	ID	1											8.0E-02	3,000	1		8.0E-02	3,000	125	104	5.0E+00	10	1		8.0E-01	300	1	110	8.0E-01	300	125	104	5.0E+00	10	126		
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1											1.0E-02	300	1		1.0E-02	300	125	104	6.0E-02	300	1		4.0E-02	100	1		4.0E-02	100	125	104	2.0E-01	100	1		
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1											1.0E-02	300	1		1.0E-02	300	125	104	6.0E-02	300	1		4.0E-02	100	1		4.0E-02	100	125	104	2.0E-01	100	1		
VOC	Xylenes (total)	1330-20-7	ID	1											2.0E-01	1,000	1		2.0E-01	1,000	125	104	1.0E-01	300	1		2.0E-01	1,000	1	110	2.0E-01	1000	125	104	3.0E-01	100	1	110	
SVOC	Anthracene	120-12-7	ID	1											3.0E-01	3,000	1		3.0E-01	3,000	125	104			2	90	1.0E+00	1,000	126		1.0E+00	1000	125	104			2	90, 62	
SVOC	Benzo(a)anthracene	56-55-3	B2	1		1.0E-01	10	5, 159	1.0E-01	125	104	6.0E-02	10	5, 159			126	90			125	104			126	90			126	90		125	104			126	90		
SVOC	Benzo(a)pyrene	50-32-8	HC	1		1.0E+00	1	159	1.0E+00	125	104	6.0E-01	1	159	3.0E-04	300	1		3.0E-04	300	125	104	2.0E-06	3,000	1		3.0E-04	300	1	62	3.0E-04	300	125	104	2.0E-06	3,000	1	62	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1		1.0E-01	10	5, 159	1.0E-01	125	104	6.0E-02	10	5, 159																									
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1											3.0E-02	3,000	1	20	3.0E-02	3,000	125	104					3.0E-01	300	126	20	3.0E-01	300	125	104					
SVOC	Chrysene	218-01-9	B2	1		1.0E-03	10	5, 159	1.0E-03	125	104	6.0E-04	10	5, 159														3.0E-01	300	126	20	3.0E-01	300	125	104				
SVOC	Ethanol	64-17-5													6.2E+01		910		6.2E+01		125	104	1.9E+01		910		6.2E+01		910		6.2E+01		125	104	1.9E+01		910		
SVOC	Fluorene	86-73-7	D	1											4.0E-02	3,000	1		4.0E-02	3,000	125	104					4.0E-01	300	129	111	4.0E-01	300	125	104					
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1		1.0E-01	10	5, 159	1.0E-01	125	104	6.0E-02	10	5, 159																									
SVOC	Naphthalene	91-20-3	C	1		1.2E-01	147		1.2E-01	125	104	3.4E-02	147		2.0E-02	3,000	1		2.0E-02	3,000	125	104	3.0E-03	3,000	1		2.0E-01	300	1	110	2.0E-01	300	125	104	3.0E-03	3,000	1	62	
SVOC	Phenanthrene	85-01-8	D	1											3.0E-02	3,000	1	20	3.0E-02	3,000	125	104					3.0E-01	300	126	20	3.0E-01	300	125	104					
SVOC	Pyrene	129-00-0	NC	126											3.0E-02	3,000	1		3.0E-02	3,000	125	104					3.0E-01	300	126		3.0E-01	300	125	104					
SVOC	Tetraethylene Glycol	112-60-7													2.0E+00	30	126	210	2.0E+00	30	125	104			126	90, 210	2.0E+00	30	126	210	2.0E+00	30	125	104			126	90, 210	
INORG	Lead	7439-92-1	B2	1																																			

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Notes:

- 5 Based on potency relative to Benzo(a)pyrene [CASRN 50-32-8], as described in the indicated reference.
- 20 Terraphase used Pyrene [CASRN 129-00-0] value from the indicated reference as a surrogate.
- 62 Terraphase used chronic value as a surrogate for the subchronic value.
- 68 IRIS provides a range of 1.5E-2 to 5.5E-2 (mg/kg/d)-1 as the oral Slope Factor for Benzene.
- 90 Inadequate data exist to derive a toxicity value, according to the indicated reference.
- 104 Dermal toxicity value is extrapolated from oral toxicity value in accordance with the referenced USEPA guidance.
- 110 The value is based on discussion in the indicated reference regarding the principal study USEPA used in extrapolating from subchronic to chronic.
- 111 Value as published is an MRL in the indicated reference.
- 116 Terraphase used subchronic value as a surrogate for the chronic value.
- 159 Because the chemical has a mutagenic mode of action according to USEPA, the SF and URF are adjusted by the following age-dependent adjustment factors (ADAFs) before use: 10 for ages 0 to 2; 3 for ages 2 to 16; and 1 for ages 16 and older (USEPA 2005).
- 210 Terraphase used Triethylene glycol [CASRN 112-27-6] value from the indicated reference as a surrogate.
This extract was prepared on 1/9/2023.

Attachment 1

Table 2

Physical and Chemical Properties

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	MW (g/mole)			K _{ow} (unitless)			K _{oc} (L/kg)			K _d (L/kg)			H (unitless)				D _{air} (m ² /d)			D _{water} (m ² /d)			K _p (cm/hr)			ABS _d (unitless)			FA (unitless)		
			Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Adjust	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes	Value	Ref	Notes
VOC	Benzene	71-43-2	7.8E+01	50.3		1.3E+02	44		5.8E+01	44	111			2.3E-01	1.7E-01	44		7.6E-01	44		8.5E-05	44		1.5E-02	44	115	0.0E+00	62		1.0E+00	62		
VOC	Cumene	98-82-8	1.2E+02	50.3		3.1E+03	69		7.1E+02	69	111			5.3E-01	3.3E-01	69		5.6E-01	69		6.1E-05	69		69	115	0.0E+00	62		1.0E+00	62	114		
VOC	1,2-Dibromoethane	106-93-4	1.9E+02	50.3		4.0E+01	1		2.2E+01	1	111			2.7E-02	2.4E-02	50.3	123	3.7E-01	69		7.3E-05	69		1.6E-03	1	115	0.0E+00	62		1.0E+00	62		
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	50.3		3.0E+01	44		1.7E+01	44	111			4.0E-02	2.9E-02	44		9.0E-01	44		8.6E-05	44		4.1E-03	44	115	0.0E+00	62		1.0E+00	62		
VOC	Ethyl Benzene	100-41-4	1.1E+02	50.3		1.4E+03	44		3.7E+02	44	111			3.2E-01	2.2E-01	44		6.5E-01	44		6.7E-05	44		4.8E-02	44	115	0.0E+00	62		1.0E+00	62		
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1		1.7E+01	39		1.1E+01	39	111			2.4E-02	1.8E-02	69		7.4E-01	69		8.7E-05	69		3.3E-03	39	115	0.0E+00	62		1.0E+00	62	114	
VOC	Toluene	108-88-3	9.2E+01	50.3		5.6E+02	44		2.7E+01	44	111			2.7E-01	1.9E-01	44		7.5E-01	44		7.4E-05	44		3.2E-02	44	115	0.0E+00	62		1.0E+00	62		
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	46		4.3E+03	69		9.0E+02	69	111			2.5E-01	1.6E-01	69		5.2E-01	69		6.8E-05	69		69	115	0.0E+00	62		1.0E+00	62			
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	39		1.0E+04	69		1.8E+03	69	111			2.4E-01	1.5E-01	69		5.2E-01	69		7.5E-05	69		69	115	0.0E+00	62		1.0E+00	62			
VOC	Xylenes (total)	1330-20-7	1.1E+02	50.3		1.5E+03	44		3.9E+02	44	111			2.8E-01	2.5E-01	44		6.7E-01	44		7.6E-05	44		5.0E-02	44	115	0.0E+00	62		1.0E+00	62	114	
SVOC	Anthracene	120-12-7	1.8E+02	50.3		3.5E+04	44		3.0E+04	44	82			2.7E-03	1.3E-03	44		2.8E-01	44		6.7E-05	44		44	115	1.3E-01	62		1.0E+00	62	117		
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	50.3		5.0E+05	44		4.0E+05	44	82			1.4E-04	5.6E-05	44		4.4E-01	44		7.8E-05	44		44	115	1.3E-01	62		9.0E-01	62	117		
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	50.3		1.3E+06	44		1.0E+06	44	82			4.6E-05	1.5E-05	44		3.7E-01	44		7.8E-05	44		44	115	1.3E-01	62		8.0E-01	62	117		
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	50.1		1.6E+06	44		1.2E+06	44	82			4.6E-03	1.7E-03	44		2.0E-01	44		4.8E-05	44		44	115	1.3E-01	62		8.0E-01	62	117		
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	50.3		1.7E+07	69		1.3E+07	69	82			1.4E-05	1.1E-05	50.3	123	1.9E-01	69		4.5E-05	69		69	115	1.3E-01	62		7.0E-01	62	117		
SVOC	Chrysene	218-01-9	2.3E+02	50.3		5.0E+05	44		4.0E+05	44	82			3.9E-03	1.5E-03	44		2.1E-01	44		5.4E-05	44		44	115	1.3E-01	62		9.0E-01	62	117		
SVOC	Ethanol	64-17-5	4.6E+01	62		4.9E-01	62		6.8E-01	62	111			2.2E-04	1.7E-04	69		1.1E+00	69		1.1E-04	69		5.5E-04	62	115	0.0E+00	62		1.0E+00	62		
SVOC	Fluorene	86-73-7	1.7E+02	50.3		1.6E+04	44		1.4E+04	44	82			2.6E-03	1.4E-03	44		3.1E-01	44		6.8E-05	44		44	115	1.3E-01	62		1.0E+00	62	117		
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	50.3		4.5E+06	44		3.0E+06	44	82			6.6E-05	2.0E-05	44		1.6E-01	44		4.9E-05	44		44	115	1.3E-01	62		7.0E-01	62	117		
SVOC	Naphthalene	91-20-3	1.3E+02	50.3		2.3E+03	44		2.0E+03	44	82			2.0E-02	1.2E-02	44		5.1E-01	44		6.5E-05	44		44	115	1.3E-01	62		1.0E+00	62			
SVOC	Phenanthrene	85-01-8	1.8E+02	50.3		2.9E+04	69		2.4E+04	69	82			1.7E-03	1.4E-03	50.3	123	3.2E-01	69		6.5E-05	69		69	115	1.3E-01	62		1.0E+00	62	117		
SVOC	Pyrene	129-00-0	2.0E+02	50.3		1.3E+05	44		1.1E+05	44	82			4.5E-04	2.0E-04	44		2.4E-01	44		6.3E-05	44		44	115	1.3E-01	62		1.0E+00	62	117		
SVOC	Tetraethylene Glycol	112-60-7	1.9E+02	69		2.8E-02	78		3.0E-02	78	82			2.0E-11	1.6E-11	69		4.4E-01	69	125	7.0E-05	69	125	78	115	1.0E-01	62		1.0E+00	62	114		
INORG	Lead	7439-92-1	2.1E+02	50.3									9.0E+02	35					40	48		40	48	1.0E-04	62		0.0E+00	62					

References:

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- 62 USEPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. July.
- 69 USEPA. 2004. WATER9. Version 2.0.0. Office of Air Quality Planning and Standards. July.
- 78 USEPA. 2022. COMPTox Chemicals Dashboard. September 28.

Notes:

- 48 Not Available or Not Applicable
- 82 Used Equation (70) from Reference 44 to calculate Koc value using Log Kow value from indicated reference.
- 111 Used Equation (71) from Reference 44 to calculate Koc value using Log Kow value from indicated reference.
- 114 A value of 1 is conservatively used because EPA guidance does not provide a default value.
- 115 Calculated Kp value using equation 3.8 (p.3-7) in reference 62 with log Kow from the indicated reference and the MW presented in table.
- 117 Derived the FA based on Exhibit A-4 in the indicated reference.
- 123 Value has been assigned a default reference temperature.
- 125 Used Triethylene glycol [CASRN 112-27-6] value from the indicated reference as a surrogate.

Attachment 2

Routine Worker Risk Calculations

Table 1 – Normalized Average Vapor Flux from Soil to Outdoor Air

Table 2 – Soil PM₁₀ Emission from Wind Erosion (Unlimited Reservoir Model)

Table 3 – Dispersion Factor to Outdoor Air

Table 4 – Concentrations in Outdoor Air from Soil

Table 5a – Unit Risk Calculations for Exposure of Routine Workers to Soil

Table 5b – Unit Hazard Quotient Calculations for Exposure of Routine Workers to Soil

Figure 1 – Soil Moisture Profile for Default PADEP Nonresidential Building (Slab-On-Grade)

Table 6 – Normalized Indoor Air Concentrations in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Table 7 – Unit Risk and Hazard Quotient Calculations for Soil Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Table 8 – Normalized Vapor Flux to Outdoor Air from Groundwater

Table 9 – Unit Risk and Hazard Quotient Calculations for Exposure of Routine Workers to Groundwater-derived Vapors in Outdoor Air

Table 10 – Normalized Indoor Air Concentrations in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Table 11 – Unit Risk and Hazard Quotient Calculations for Groundwater Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Table 12 – ProUCL Input

Table 13 – ProUCL Output



Attachment 2

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	D _G (m ² /d)	D _L (m ² /d)	D _E (m ² /d)	J _v (kg/m ² -s)
VOC	Benzene	71-43-2	5.82E+01		1.68E-01	7.60E-01	8.47E-05	9.47E-02	1.21E-07	2.61E-02	1.89E-06
VOC	Cumene	98-82-8	7.05E+02		3.28E-01	5.62E-01	6.13E-05	6.99E-02	8.79E-08	3.80E-03	1.84E-06
VOC	1,2-Dibromoethane	106-93-4	2.22E+01		2.37E-02	3.72E-01	7.29E-05	4.63E-02	1.05E-07	4.09E-03	1.84E-06
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.92E-02	8.99E-01	8.55E-05	1.12E-01	1.23E-07	1.41E-02	1.88E-06
VOC	Ethyl Benzene	100-41-4	3.67E+02		2.20E-01	6.48E-01	6.74E-05	8.07E-02	9.66E-08	5.56E-03	1.86E-06
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.83E-02	7.42E-01	8.73E-05	9.24E-02	1.25E-07	9.49E-03	1.87E-06
VOC	Toluene	108-88-3	1.80E+02		1.93E-01	7.52E-01	7.43E-05	9.36E-02	1.06E-07	1.11E-02	1.88E-06
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.61E-01	5.24E-01	6.84E-05	6.52E-02	9.81E-08	1.39E-03	1.79E-06
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.54E-01	5.20E-01	7.49E-05	6.48E-02	1.07E-07	6.76E-04	1.73E-06
VOC	Xylenes (total)	1330-20-7	3.86E+02		2.52E-01	6.74E-01	7.56E-05	8.39E-02	1.08E-07	6.29E-03	1.86E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.30E-03	2.80E-01	6.69E-05	3.49E-02	9.58E-08	1.85E-07	9.75E-08
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		5.55E-05	4.41E-01	7.78E-05	5.49E-02	1.11E-07	9.48E-10	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		1.49E-05	3.72E-01	7.78E-05	4.63E-02	1.11E-07	9.53E-11	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		1.66E-03	1.95E-01	4.80E-05	2.43E-02	6.88E-08	3.91E-09	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		1.10E-05	1.88E-01	4.54E-05	2.33E-02	6.51E-08	3.03E-12	
SVOC	Chrysene	218-01-9	4.01E+05		1.48E-03	2.14E-01	5.37E-05	2.67E-02	7.69E-08	1.19E-08	
SVOC	Ethanol	64-17-5	6.81E-01		1.75E-04	1.06E+00	1.12E-04	1.32E-01	1.61E-07	2.79E-04	
SVOC	Fluorene	86-73-7	1.38E+04		1.39E-03	3.14E-01	6.81E-05	3.90E-02	9.76E-08	4.75E-07	1.56E-07
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		2.03E-05	1.64E-01	4.89E-05	2.04E-02	7.01E-08	1.70E-11	
SVOC	Naphthalene	91-20-3	2.01E+03		1.20E-02	5.10E-01	6.48E-05	6.35E-02	9.29E-08	4.56E-05	1.21E-06
SVOC	Phenanthrene	85-01-8	2.42E+04		1.41E-03	3.24E-01	6.45E-05	4.03E-02	9.25E-08	2.82E-07	1.21E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.00E-04	2.35E-01	6.26E-05	2.93E-02	8.96E-08	6.79E-09	
SVOC	Tetraethylene Glycol	112-60-7	3.00E-02		1.62E-11	4.39E-01	6.96E-05	5.46E-02	9.97E-08	1.28E-06	
INORG	Lead	7439-92-1		9.00E+02							

Attachment 2

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Soil bulk density	kg/L	ρ_b	1.66
Soil porosity	L/L-soil	θ	0.38
Soil water content	L/L-soil	θ_w	0.08
Soil air-filled porosity	L/L-soil	θ_a	0.30
Soil organic carbon fraction	unitless	f_{oc}	0.005
Averaging period (Exposure Duration)	years	T	25
	days	T	9125
Temperature	$^{\circ}\text{C}$	Temp	18
Clean soil above source	m	Z_1	
Bottom of source depth	m	Z_2	0.91

Based on the volatilization model developed by Jury et. al. (1983) for finite sources as described in USEPA's (1996) Soil Screening Guidance: Technical Background Document. The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 2

Table 2

Soil PM₁₀ Emission from Wind Erosion

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Unlimited Reservoir Model

Parameter	Units	Variable	Value
Aerodynamic particle size multiplier			0.036
Ground cover fraction		G	0.5
Mode of aggregate size distribution	mm		0.50
Threshold friction velocity	m/s	u'_t	0.50
Correction factor			1.25
Corrected friction velocity	m/s	u*_t	0.6252
Roughness height	m	z₀	0.005
Anemometer height	m		8.0
Friction velocity at anemometer height	m/s	u_t	11.53
Mean annual wind speed	mph	u_m	9.3
Mean annual wind speed	m/s	u_m	4.16
u_m/u_t			0.361
$x = 0.886 u_t/u_m$			2.46
F(x)			0.064
Annual average PM₁₀ flux	kg-soil/m²-s	J_{10,w}	1.5E-11

Model described in more detail in USEPA's (1996) *Soil Screening Guidance: Technical Background Document*.

Attachment 2

Table 3

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Soil source area	acres	20.6
		Annual
Soil C/Q averaging time		Max
Conversion factor from 1-Hr Max for soil		0.19
C/Q for soil	(kg/m³)/(kg/m²-s)	21.04

Groundwater source area	acres	20.6000
		Annual
Groundwater averaging time for C/Q		Max
Conversion factor from 1-Hr Max for groundwater		0.19
C/Q for Groundwater	(L/m³)/(L/m²-s)	21.04

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 2

Table 4

Concentrations in Outdoor Air from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Chem	Chemical	CASRN	Vapor		PM ₁₀	
			C _{soil} (mg/kg)	C _{air} (mg/m ³)	C _{soil} (mg/kg)	C _{air} (mg/m ³)
			C/Q (kg/m ³ per kg/m ² -s): 2.1E+01			
VOC	Benzene	71-43-2	1.00E+00	3.98E-05	1.00E+00	3.14E-10
VOC	Cumene	98-82-8	1.00E+00	3.87E-05	1.00E+00	3.14E-10
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	3.88E-05	1.00E+00	3.14E-10
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	3.96E-05	1.00E+00	3.14E-10
VOC	Ethyl Benzene	100-41-4	1.00E+00	3.90E-05	1.00E+00	3.14E-10
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	3.94E-05	1.00E+00	3.14E-10
VOC	Toluene	108-88-3	1.00E+00	3.95E-05	1.00E+00	3.14E-10
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	3.76E-05	1.00E+00	3.14E-10
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	3.63E-05	1.00E+00	3.14E-10
VOC	Xylenes (total)	1330-20-7	1.00E+00	3.91E-05	1.00E+00	3.14E-10
SVOC	Anthracene	120-12-7	1.00E+00	2.05E-06	1.00E+00	3.14E-10
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.00E+00	3.14E-10
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.00E+00	3.14E-10
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.00E+00	3.14E-10
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.00E+00	3.14E-10
SVOC	Chrysene	218-01-9	1.00E+00		1.00E+00	3.14E-10
SVOC	Ethanol	64-17-5	1.00E+00		1.00E+00	3.14E-10
SVOC	Fluorene	86-73-7	1.00E+00	3.29E-06	1.00E+00	3.14E-10
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.00E+00	3.14E-10
SVOC	Naphthalene	91-20-3	1.00E+00	2.55E-05	1.00E+00	3.14E-10
SVOC	Phenanthrene	85-01-8	1.00E+00	2.54E-06	1.00E+00	3.14E-10
SVOC	Pyrene	129-00-0	1.00E+00		1.00E+00	3.14E-10
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.00E+00	3.14E-10
INORG	Lead	7439-92-1	1.00E+00		1.00E+00	3.14E-10

Attachment 2

Table 5a

Unit Risk Calculations for Exposure of Routine Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes Risk
					RBA	LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	ABS _{derm}	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	
VOC	Benzene	71-43-2	A	1.00E+00		1.10E-07	5.5E-02	6.1E-09			5.5E-02		3.98E-05	7.8E-03	1.8E-08	3.14E-10	7.8E-03	1.4E-13	2.4E-08
VOC	Cumene	98-82-8	D	1.00E+00		1.10E-07							3.87E-05			3.14E-10			
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00		1.10E-07	2.0E+00	2.2E-07			2.0E+00		3.88E-05	6.0E-01	1.4E-06	3.14E-10	6.0E-01	1.1E-11	1.6E-06
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00		1.10E-07	9.1E-02	1.0E-08			9.1E-02		3.96E-05	2.6E-02	6.0E-08	3.14E-10	2.6E-02	4.8E-13	7.0E-08
VOC	Ethyl Benzene	100-41-4	D	1.00E+00		1.10E-07							3.90E-05			3.14E-10			
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00		1.10E-07	1.8E-03	2.0E-10			1.8E-03		3.94E-05	2.6E-04	6.0E-10	3.14E-10	2.6E-04	4.8E-15	8.0E-10
VOC	Toluene	108-88-3	ID	1.00E+00		1.10E-07							3.95E-05			3.14E-10			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00		1.10E-07							3.76E-05			3.14E-10			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00		1.10E-07							3.63E-05			3.14E-10			
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00		1.10E-07							3.91E-05			3.14E-10			
SVOC	Anthracene	120-12-7	ID	1.00E+00		1.10E-07			1.30E-01	1.21E-07			2.05E-06			3.14E-10			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	1.30E-01	1.21E-07	1.0E-01	1.2E-08		6.0E-02		3.14E-10	6.0E-02	1.1E-12	2.3E-08
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		1.10E-07	1.0E+00	1.1E-07	1.30E-01	1.21E-07	1.0E+00	1.2E-07		6.0E-01		3.14E-10	6.0E-01	1.1E-11	2.3E-07
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	1.30E-01	1.21E-07	1.0E-01	1.2E-08		6.0E-02		3.14E-10	6.0E-02	1.1E-12	2.3E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00		1.10E-07			1.30E-01	1.21E-07						3.14E-10			
SVOC	Chrysene	218-01-9	B2	1.00E+00		1.10E-07	1.0E-03	1.1E-10	1.30E-01	1.21E-07	1.0E-03	1.2E-10		6.0E-04		3.14E-10	6.0E-04	1.1E-14	2.3E-10
SVOC	Ethanol	64-17-5		1.00E+00		1.10E-07										3.14E-10			
SVOC	Fluorene	86-73-7	D	1.00E+00		1.10E-07			1.30E-01	1.21E-07			3.29E-06			3.14E-10			
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	1.30E-01	1.21E-07	1.0E-01	1.2E-08		6.0E-02		3.14E-10	6.0E-02	1.1E-12	2.3E-08
SVOC	Naphthalene	91-20-3	C	1.00E+00		1.10E-07	1.2E-01	1.3E-08	1.30E-01	1.21E-07	1.2E-01	1.5E-08	2.55E-05	3.4E-02	5.1E-08	3.14E-10	3.4E-02	6.3E-13	7.9E-08
SVOC	Phenanthrene	85-01-8	D	1.00E+00		1.10E-07			1.30E-01	1.21E-07			2.54E-06			3.14E-10			
SVOC	Pyrene	129-00-0	NC	1.00E+00		1.10E-07			1.30E-01	1.21E-07						3.14E-10			
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00		1.10E-07			1.00E-01	9.32E-08						3.14E-10			
INORG	Lead	7439-92-1	B2	1.00E+00		1.10E-07										3.14E-10			

Attachment 2

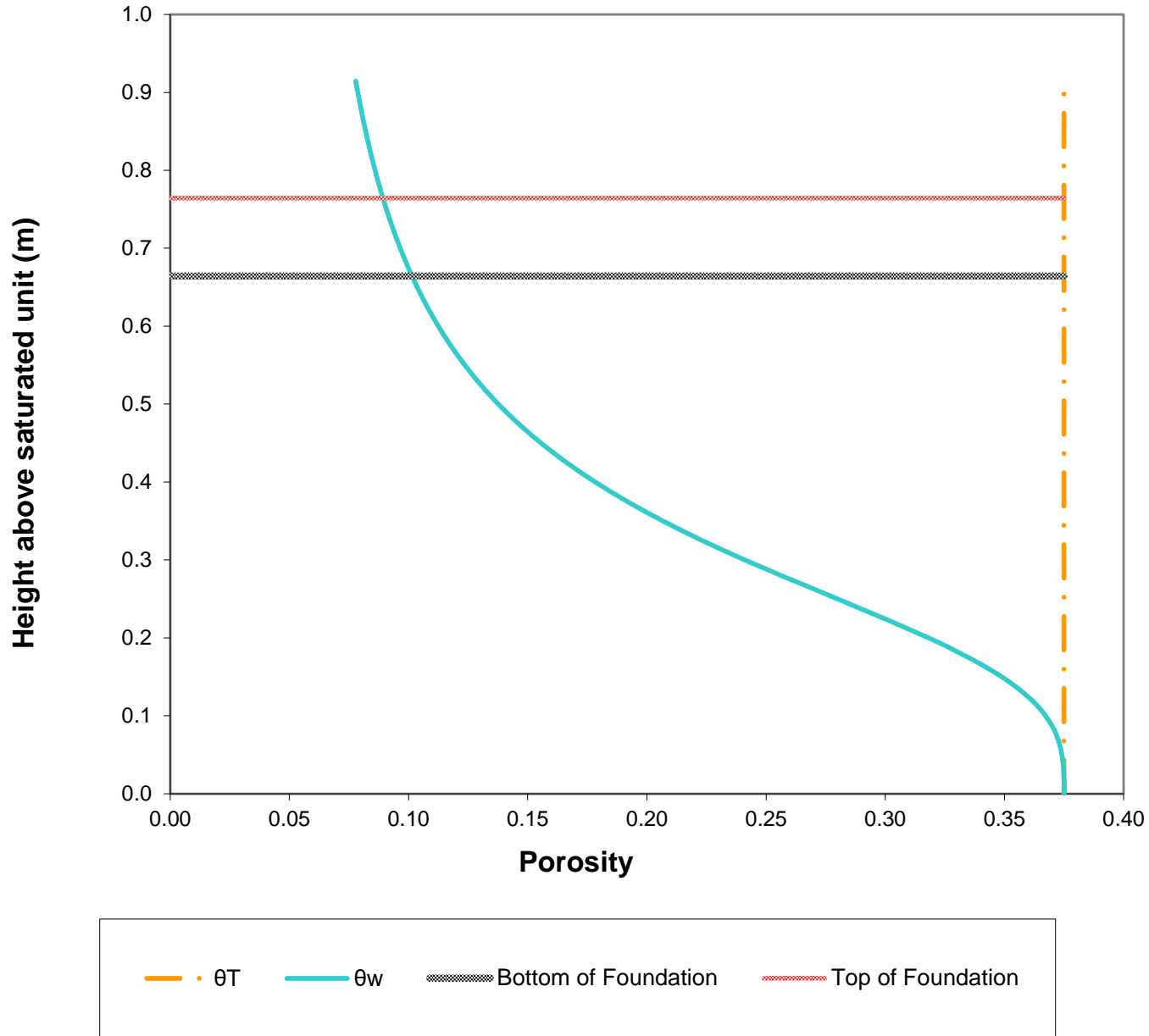
Table 5b

Unit Hazard Quotient Calculations for Exposure of Routine Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes
				RBA	ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	ABS _{derm}	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ
VOC	Benzene	71-43-2	1.00E+00		3.08E-07	4.0E-03	7.7E-05			4.0E-03		3.98E-05	3.0E-02	2.2E-04	3.14E-10	3.0E-02	1.7E-09	3.0E-04
VOC	Cumene	98-82-8	1.00E+00		3.08E-07	1.0E-01	3.1E-06			1.0E-01		3.87E-05	4.0E-01	1.6E-05	3.14E-10	4.0E-01	1.3E-10	1.9E-05
VOC	1,2-Dibromoethane	106-93-4	1.00E+00		3.08E-07	9.0E-03	3.4E-05			9.0E-03		3.88E-05	9.0E-03	7.1E-04	3.14E-10	9.0E-03	5.7E-09	7.4E-04
VOC	1,2-Dichloroethane	107-06-2	1.00E+00		3.08E-07	2.0E-02	1.5E-05			2.0E-02		3.96E-05	7.0E-03	9.3E-04	3.14E-10	7.0E-03	7.4E-09	9.5E-04
VOC	Ethyl Benzene	100-41-4	1.00E+00		3.08E-07	1.0E-01	3.1E-06			1.0E-01		3.90E-05	1.0E+00	6.4E-06	3.14E-10	1.0E+00	5.2E-11	9.5E-06
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00		3.08E-07	3.0E-01	1.0E-06			3.0E-01		3.94E-05	3.0E+00	2.2E-06	3.14E-10	3.0E+00	1.7E-11	3.2E-06
VOC	Toluene	108-88-3	1.00E+00		3.08E-07	8.0E-02	3.9E-06			8.0E-02		3.95E-05	5.0E+00	1.3E-06	3.14E-10	5.0E+00	1.0E-11	5.2E-06
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00		3.08E-07	1.0E-02	3.1E-05			1.0E-02		3.76E-05	6.0E-02	1.0E-04	3.14E-10	6.0E-02	8.6E-10	1.3E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00		3.08E-07	1.0E-02	3.1E-05			1.0E-02		3.63E-05	6.0E-02	1.0E-04	3.14E-10	6.0E-02	8.6E-10	1.3E-04
VOC	Xylenes (total)	1330-20-7	1.00E+00		3.08E-07	2.0E-01	1.5E-06			2.0E-01		3.91E-05	1.0E-01	6.4E-05	3.14E-10	1.0E-01	5.2E-10	6.6E-05
SVOC	Anthracene	120-12-7	1.00E+00		3.08E-07	3.0E-01	1.0E-06	1.30E-01	3.39E-07	3.0E-01	1.1E-06	2.05E-06			3.14E-10			2.2E-06
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		3.08E-07			1.30E-01	3.39E-07						3.14E-10			
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		3.08E-07	3.0E-04	1.0E-03	1.30E-01	3.39E-07	3.0E-04	1.1E-03		2.0E-06		3.14E-10	2.0E-06	2.6E-05	2.2E-03
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		3.08E-07			1.30E-01	3.39E-07						3.14E-10			
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		3.08E-07	3.0E-02	1.0E-05	1.30E-01	3.39E-07	3.0E-02	1.1E-05				3.14E-10			2.2E-05
SVOC	Chrysene	218-01-9	1.00E+00		3.08E-07			1.30E-01	3.39E-07						3.14E-10			
SVOC	Ethanol	64-17-5	1.00E+00		3.08E-07	6.2E+01	5.0E-09			6.2E+01			1.9E+01		3.14E-10	1.9E+01	2.7E-12	5.0E-09
SVOC	Fluorene	86-73-7	1.00E+00		3.08E-07	4.0E-02	7.7E-06	1.30E-01	3.39E-07	4.0E-02	8.5E-06	3.29E-06			3.14E-10			1.6E-05
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		3.08E-07			1.30E-01	3.39E-07						3.14E-10			
SVOC	Naphthalene	91-20-3	1.00E+00		3.08E-07	2.0E-02	1.5E-05	1.30E-01	3.39E-07	2.0E-02	1.7E-05	2.55E-05	3.0E-03	1.4E-03	3.14E-10	3.0E-03	1.7E-08	1.4E-03
SVOC	Phenanthrene	85-01-8	1.00E+00		3.08E-07	3.0E-02	1.0E-05	1.30E-01	3.39E-07	3.0E-02	1.1E-05	2.54E-06			3.14E-10			2.2E-05
SVOC	Pyrene	129-00-0	1.00E+00		3.08E-07	3.0E-02	1.0E-05	1.30E-01	3.39E-07	3.0E-02	1.1E-05				3.14E-10			2.2E-05
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		3.08E-07	2.0E+00	1.5E-07	1.00E-01	2.61E-07	2.0E+00	1.3E-07				3.14E-10			2.8E-07
INORG	Lead	7439-92-1	1.00E+00		3.08E-07										3.14E-10			

Attachment 2
Figure 1: Soil Moisture Profile for Default PADEP Nonresidential Building (Slab-On-Grade)
PESRM Philadelphia Refining Complex, Philadelphia, Pennsylvania



Attachment 2

Table 6

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	D _{air} (m ² /day)	D _{water} (m ² /day)	H (unitless)	D _{crack} (m ² /day)	D _{eff} ^T (m ² /day)	α _∞	K _{oc} (L/kg)	K _d (L/kg)	C _{s, vap} (kg-soil/m ³)	C _{b, ∞} (kg-soil/m ³)	α _{ML}	C _{b, ML} (kg-soil/m ³)	C _{b, norm} (kg-soil/m ³)
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.68E-01	8.24E-02	7.17E-02	2.05E-03	5.82E+01	2.91E-01	4.43E+02	9.07E-01	7.75E-06	3.43E-03	3.43E-03
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	3.28E-01	6.09E-02	5.30E-02	2.05E-03	7.05E+02	3.53E+00	9.00E+01	1.84E-01	3.82E-05	3.43E-03	3.43E-03
VOC	1,2-Dibromoethane	106-93-4	3.72E-01	7.29E-05	2.37E-02	4.03E-02	3.50E-02	2.05E-03	2.22E+01	1.11E-01	1.35E+02	2.76E-01	2.54E-05	3.43E-03	3.43E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.92E-02	9.74E-02	8.48E-02	2.05E-03	1.75E+01	8.74E-02	1.90E+02	3.89E-01	1.81E-05	3.43E-03	3.43E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	2.20E-01	7.02E-02	6.11E-02	2.05E-03	3.67E+02	1.84E+00	1.14E+02	2.33E-01	3.02E-05	3.43E-03	3.43E-03
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.83E-02	8.04E-02	7.00E-02	2.05E-03	1.15E+01	5.75E-02	1.51E+02	3.09E-01	2.28E-05	3.43E-03	3.43E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.93E-01	8.15E-02	7.09E-02	2.05E-03	1.80E+02	9.02E-01	1.94E+02	3.97E-01	1.77E-05	3.43E-03	3.43E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.61E-01	5.67E-02	4.94E-02	2.05E-03	8.97E+02	4.49E+00	3.52E+01	7.20E-02	9.76E-05	3.43E-03	3.43E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.54E-01	5.64E-02	4.91E-02	2.05E-03	1.76E+03	8.81E+00	1.73E+01	3.54E-02	1.98E-04	3.43E-03	3.43E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	2.52E-01	7.30E-02	6.35E-02	2.05E-03	3.86E+02	1.93E+00	1.24E+02	2.54E-01	2.77E-05	3.43E-03	3.43E-03
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.30E-03	3.05E-02	2.66E-02	2.04E-03	2.97E+04	1.49E+02	8.77E-03	1.79E-05	3.92E-01	3.43E-03	1.79E-05
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	5.55E-05	5.10E-02	4.64E-02	2.05E-03	4.01E+05	2.01E+03	2.77E-05	5.66E-08	1.24E+02	3.43E-03	
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	1.49E-05	5.23E-02	5.31E-02	2.05E-03	1.01E+06	5.07E+03	2.95E-06	6.03E-09	1.17E+03	3.43E-03	
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	1.66E-03	2.12E-02	1.85E-02	2.04E-03	1.24E+06	6.22E+03	2.67E-04	5.44E-07	1.29E+01	3.43E-03	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	1.10E-05	2.99E-02	3.21E-02	2.04E-03	1.28E+07	6.40E+04	1.72E-07	3.51E-10	2.00E+04	3.43E-03	
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.48E-03	2.33E-02	2.03E-02	2.04E-03	4.01E+05	2.01E+03	7.38E-04	1.51E-06	4.66E+00	3.43E-03	
SVOC	Ethanol	64-17-5	1.06E+00	1.12E-04	1.75E-04	1.17E-01	1.02E-01	2.05E-03	6.81E-01	3.40E-03	2.70E+00	5.54E-03	1.27E-03	3.43E-03	
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.39E-03	3.41E-02	2.97E-02	2.04E-03	1.38E+04	6.88E+01	2.01E-02	4.12E-05	1.70E-01	3.43E-03	4.12E-05
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	2.03E-05	2.34E-02	2.39E-02	2.04E-03	3.45E+06	1.72E+04	1.18E-06	2.41E-09	2.92E+03	3.43E-03	
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	1.20E-02	5.53E-02	4.81E-02	2.05E-03	2.01E+03	1.00E+01	1.19E+00	2.44E-03	2.88E-03	3.43E-03	2.44E-03
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	1.41E-03	3.52E-02	3.07E-02	2.04E-03	2.42E+04	1.21E+02	1.16E-02	2.37E-05	2.96E-01	3.43E-03	2.37E-05
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.00E-04	2.62E-02	2.33E-02	2.04E-03	1.06E+05	5.28E+02	3.79E-04	7.75E-07	9.05E+00	3.43E-03	
SVOC	Tetraethylene Glycol	112-60-7	4.39E-01	6.96E-05	1.62E-11	9.95E+03	1.49E+04	5.32E-01	3.00E-02	1.50E-04	2.64E-07	1.41E-07	1.30E+04	3.43E-03	
INORG	Lead	7439-92-1								9.00E+02					

Attachment 2

Table 6

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes: Subsurface and Building Characteristics			Crack Soil
SCS Soil texture class			Sand
Bulk density	kg/L	ρ_b	1.66
Total porosity	L/L-soil	θ_T	0.375
Water-filled porosity	L/L-soil	θ_w	0.090
Air-filled porosity	L/L-soil	θ_a	0.285
Organic carbon fraction	unitless	f_{OC}	NA
Residual saturation	L/L-soil	θ_r	0.053
Hydraulic conductivity	cm/s	K	7.4E-03
Dynamic viscosity of water	g/cm-s	μ_w	0.01307
Density of water	g/cm ³	ρ_w	1.0
Gravitational acceleration	cm/s ²	g	980.7
Intrinsic permeability	cm ²	k	9.9E-08
Relative saturation	unitless	S_e	0.115
van Genuchten N	unitless	N	3.18
van Genuchten M	unitless	M	0.685
Relative air permeability	unitless	k_{rg}	0.887
Permeability to vapor	cm ²	k_v	8.8E-08
Distance from building foundation to source	m	L_{T-soil}	0.001
Bldg foundation thickness	m	L_{crack}	0.1
Bldg foundation length	m		10.00
Bldg foundation width	m		10.00
Bldg occupied height	m		2.44
Bldg occupied volume	m ³		244.00
Occupied depth below ground	m		0.2
Bldg area for vapor intrusion	m ²	A_B	106.0
Ratio of A_{crack} to A_B		η	4E-04
Area of cracks	m ²	A_{crack}	4.00E-02
Air exchange rate	hour ⁻¹	ach	0.6
Building ventilation rate	m ³ /day	Q_{bldg}	3.51E+03
Pressure difference between outdoors-indoors	kg/m-s ²	ΔP	1.0
Viscosity of air	kg/m-s	μ_a	1.8E-05
Crack length (bldg perimeter)	m	X_{crack}	40
Crack depth below ground	m	Z_{crack}	0.25
Crack radius	m	r_{crack}	1E-03
Soil gas flow rate into bldg	m ³ /day	Q_{soil}	7.20E+00
Averaging period	d	ED	9.13E+03
Contaminant thickness	m	ΔH	0.7

Attachment 2

Table 7

Unit Risk and Hazard Quotient Calculations for Soil Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)
Routine Worker

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{soil} (mg/kg)	C _{air} (mg/m ³)	Cancer		Noncancer	
						URF (mg/m ³) ⁻¹	Risk	RfC (mg/m ³)	HQ
VOC	Benzene	71-43-2	A	1.00E+00	3.43E-03	7.8E-03	2.2E-06	3.0E-02	2.6E-02
VOC	Cumene	98-82-8	D	1.00E+00	3.43E-03			4.0E-01	2.0E-03
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	3.43E-03	6.0E-01	1.7E-04	9.0E-03	8.7E-02
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	3.43E-03	2.6E-02	7.3E-06	7.0E-03	1.1E-01
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	3.43E-03			1.0E+00	7.8E-04
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	3.43E-03	2.6E-04	7.3E-08	3.0E+00	2.6E-04
VOC	Toluene	108-88-3	ID	1.00E+00	3.43E-03			5.0E+00	1.6E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	3.43E-03			6.0E-02	1.3E-02
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	3.43E-03			6.0E-02	1.3E-02
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	3.43E-03			1.0E-01	7.8E-03
SVOC	Anthracene	120-12-7	ID	1.00E+00	1.79E-05				
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02			
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01		2.0E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04			
SVOC	Ethanol	64-17-5		1.00E+00				1.9E+01	
SVOC	Fluorene	86-73-7	D	1.00E+00	4.12E-05				
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02			
SVOC	Naphthalene	91-20-3	C	1.00E+00	2.44E-03	3.4E-02	6.8E-06	3.0E-03	1.9E-01
SVOC	Phenanthrene	85-01-8	D	1.00E+00	2.37E-05				
SVOC	Pyrene	129-00-0	NC	1.00E+00					
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00					
INORG	Lead	7439-92-1	B2	1.00E+00					

Attachment 2

Table 8

Normalized Vapor Flux to Outdoor Air from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	D _{eff} ^T (m ² /day)	J (L/m ² -s)	C _{air} (L/m ³)
VOC	Benzene	71-43-2	1.68E-01	6.25E-04	1.33E-06	2.80E-05
VOC	Cumene	98-82-8	3.28E-01	2.57E-04	1.06E-06	2.24E-05
VOC	1,2-Dibromoethane	106-93-4	2.37E-02	2.38E-03	7.16E-07	1.51E-05
VOC	1,2-Dichloroethane	107-06-2	2.92E-02	2.78E-03	1.03E-06	2.16E-05
VOC	Ethyl Benzene	100-41-4	2.20E-01	4.00E-04	1.11E-06	2.34E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.83E-02	3.92E-03	9.10E-07	1.91E-05
VOC	Toluene	108-88-3	1.93E-01	4.97E-04	1.21E-06	2.55E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.61E-01	5.12E-04	1.04E-06	2.20E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.54E-01	5.74E-04	1.12E-06	2.35E-05
VOC	Xylenes (total)	1330-20-7	2.52E-01	3.95E-04	1.26E-06	2.65E-05
SVOC	Anthracene	120-12-7	1.30E-03	1.31E-02	2.15E-07	4.53E-06
SVOC	Benzo(a)anthracene	56-55-3	5.55E-05	6.47E-02	4.55E-08	
SVOC	Benzo(a)pyrene	50-32-8	1.49E-05	9.62E-02	1.82E-08	
SVOC	Benzo(b)fluoranthene	205-99-2	1.66E-03	8.18E-03	1.72E-07	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.10E-05	5.98E-02	8.33E-09	
SVOC	Chrysene	218-01-9	1.48E-03	9.60E-03	1.80E-07	
SVOC	Ethanol	64-17-5	1.75E-04	8.47E-02	1.87E-07	
SVOC	Fluorene	86-73-7	1.39E-03	1.35E-02	2.37E-07	4.99E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.03E-05	4.34E-02	1.11E-08	
SVOC	Naphthalene	91-20-3	1.20E-02	3.93E-03	5.99E-07	1.26E-05
SVOC	Phenanthrene	85-01-8	1.41E-03	1.33E-02	2.36E-07	4.96E-06
SVOC	Pyrene	129-00-0	2.00E-04	2.53E-02	6.41E-08	
SVOC	Tetraethylene Glycol	112-60-7	1.62E-11	2.39E+04	4.90E-09	
INORG	Lead	7439-92-1				

Parameters

Depth to groundwater	m	DTW	0.91
Dispersion coefficient	(L/m ³) / (L/m ² /s)	C/Q	21.0

Attachment 2

Table 9

Unit Risk and Hazard Quotient Calculations for Exposure of Routine Workers to Groundwater-derived Vapors in Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{GW} (mg/L)	C _{air} (mg/m ³)	Cancer		Noncancer	
						URF (mg/m ³) ⁻¹	Risk	RfC (mg/m ³)	HQ
VOC	Benzene	71-43-2	A	1.00E+00	2.80E-05	7.8E-03	1.3E-08	3.0E-02	1.5E-04
VOC	Cumene	98-82-8	D	1.00E+00	2.24E-05			4.0E-01	9.2E-06
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	1.51E-05	6.0E-01	5.3E-07	9.0E-03	2.8E-04
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	2.16E-05	2.6E-02	3.3E-08	7.0E-03	5.1E-04
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	2.34E-05			1.0E+00	3.9E-06
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	1.91E-05	2.6E-04	2.9E-10	3.0E+00	1.0E-06
VOC	Toluene	108-88-3	ID	1.00E+00	2.55E-05			5.0E+00	8.4E-07
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	2.20E-05			6.0E-02	6.0E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	2.35E-05			6.0E-02	6.4E-05
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	2.65E-05			1.0E-01	4.4E-05
SVOC	Anthracene	120-12-7	ID	1.00E+00	4.53E-06				
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02			
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01		2.0E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04			
SVOC	Ethanol	64-17-5		1.00E+00				1.9E+01	
SVOC	Fluorene	86-73-7	D	1.00E+00	4.99E-06				
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02			
SVOC	Naphthalene	91-20-3	C	1.00E+00	1.26E-05	3.4E-02	2.5E-08	3.0E-03	6.9E-04
SVOC	Phenanthrene	85-01-8	D	1.00E+00	4.96E-06				
SVOC	Pyrene	129-00-0	NC	1.00E+00					
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00					
INORG	Lead	7439-92-1	B2	1.00E+00					

Attachment 2

Table 10

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	D _{air} (m ² /day)	D _{water} (m ² /day)	H (unitless)	D _{crack} (m ² /day)	D _{eff} ^T (m ² /day)	α _{soil}	α _{slab}	α _∞	C _{b, norm} (L-water/m ³)
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.68E-01	8.24E-02	4.54E-04	9.96E-03	2.05E-03	2.04E-05	3.44E-03
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	3.28E-01	6.09E-02	1.86E-04	4.11E-03	2.05E-03	8.43E-06	2.76E-03
VOC	1,2-Dibromoethane	106-93-4	3.72E-01	7.29E-05	2.37E-02	4.03E-02	1.76E-03	3.75E-02	2.05E-03	7.68E-05	1.82E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.92E-02	9.74E-02	2.03E-03	4.31E-02	2.05E-03	8.84E-05	2.58E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	2.20E-01	7.02E-02	2.91E-04	6.40E-03	2.05E-03	1.31E-05	2.88E-03
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.83E-02	8.04E-02	2.88E-03	6.00E-02	2.05E-03	1.23E-04	2.25E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.93E-01	8.15E-02	3.61E-04	7.94E-03	2.05E-03	1.63E-05	3.14E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.61E-01	5.67E-02	3.72E-04	8.18E-03	2.05E-03	1.68E-05	2.70E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.54E-01	5.64E-02	4.17E-04	9.16E-03	2.05E-03	1.88E-05	2.89E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	2.52E-01	7.30E-02	2.87E-04	6.32E-03	2.05E-03	1.30E-05	3.26E-03
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.30E-03	3.05E-02	1.07E-02	1.92E-01	2.05E-03	3.93E-04	5.12E-04
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	5.55E-05	5.10E-02	7.14E-02	6.13E-01	2.05E-03	1.26E-03	
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	1.49E-05	5.23E-02	1.40E-01	7.56E-01	2.05E-03	1.55E-03	
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	1.66E-03	2.12E-02	6.62E-03	1.28E-01	2.05E-03	2.62E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	1.10E-05	2.99E-02	9.63E-02	6.81E-01	2.05E-03	1.40E-03	
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.48E-03	2.33E-02	7.83E-03	1.48E-01	2.05E-03	3.03E-04	
SVOC	Ethanol	64-17-5	1.06E+00	1.12E-04	1.75E-04	1.17E-01	7.63E-02	6.28E-01	2.05E-03	1.29E-03	
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.39E-03	3.41E-02	1.10E-02	1.95E-01	2.05E-03	4.00E-04	5.56E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	2.03E-05	2.34E-02	6.38E-02	5.86E-01	2.05E-03	1.20E-03	
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	1.20E-02	5.53E-02	2.91E-03	6.05E-02	2.05E-03	1.24E-04	1.49E-03
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	1.41E-03	3.52E-02	1.07E-02	1.92E-01	2.05E-03	3.93E-04	5.52E-04
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.00E-04	2.62E-02	2.48E-02	3.55E-01	2.05E-03	7.27E-04	
SVOC	Tetraethylene Glycol	112-60-7	4.39E-01	6.96E-05	1.62E-11	9.95E+03	6.72E+04	1.00E+00	5.32E-01	5.32E-01	
INORG	Lead	7439-92-1									

Attachment 2

Table 10

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Subsurface and Building Characteristics			Crack Soil
SCS Soil texture class			Sand
Bulk density	kg/L	ρ_b	1.66
Total porosity	L/L-soil	θ_T	0.375
Water-filled porosity	L/L-soil	θ_w	0.090
Air-filled porosity	L/L-soil	θ_a	0.285
Residual saturation	L/L-soil	θ_r	0.053
Hydraulic conductivity	cm/s	K	7.4E-03
Dynamic viscosity of water	g/cm-s	μ_w	0.01307
Density of water	g/cm ³	ρ_w	1.0
Gravitational acceleration	cm/s ²	g	980.7
Intrinsic permeability	cm ²	k	9.9E-08
Relative saturation	unitless	S_e	0.115
van Genuchten N	unitless	N	3.177
van Genuchten M	unitless	M	0.685
Relative air permeability	unitless	k_{rg}	0.887
Permeability to vapor	cm ²	k_v	8.79E-08
Distance from foundation to source	m	L_{T-gw}	0.66
Bldg foundation thickness	m	L_{crack}	0.1
Bldg foundation length	m		10.00
Bldg foundation width	m		10.00
Bldg occupied height	m		2.44
Bldg occupied volume	m ³		244.00
Occupied depth below ground	m		0.2
Bldg area for vapor intrusion	m ²	A_B	106.0
Ratio of A_{crack} to A_B		η	4E-04
Area of cracks	m ²	A_{crack}	4E-02
Air exchange rate	hour ⁻¹	ach	0.60
Building ventilation rate	m ³ /day	Q_{bldg}	3.5E+03
Pressure diff. outdoors-indoors	kg/m-s ²	ΔP	1.0
Viscosity of air	kg/m-s	μ_a	1.8E-05
Crack length (bldg perimeter)	m	X_{crack}	40
Crack depth below ground	m	Z_{crack}	0.25
Crack radius	m	r_{crack}	1E-03
Soil gas flow rate into bldg	m ³ /day	Q_{soil}	7.20

Attachment 2

Table 11

Unit Risk and Hazard Quotient Calculations for Groundwater Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Routine Worker

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{gw} (mg/L)	C _{air} (mg/m ³)	Cancer		Noncancer	
						URF (mg/m ³) ⁻¹	Risk	RfC (mg/m ³)	HQ
VOC	Benzene	71-43-2	A	1.00E+00	3.44E-03	7.8E-03	2.2E-06	3.0E-02	2.6E-02
VOC	Cumene	98-82-8	D	1.00E+00	2.76E-03			4.0E-01	1.6E-03
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	1.82E-03	6.0E-01	8.9E-05	9.0E-03	4.6E-02
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	2.58E-03	2.6E-02	5.5E-06	7.0E-03	8.4E-02
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	2.88E-03			1.0E+00	6.6E-04
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	2.25E-03	2.6E-04	4.8E-08	3.0E+00	1.7E-04
VOC	Toluene	108-88-3	ID	1.00E+00	3.14E-03			5.0E+00	1.4E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	2.70E-03			6.0E-02	1.0E-02
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	2.89E-03			6.0E-02	1.1E-02
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	3.26E-03			1.0E-01	7.4E-03
SVOC	Anthracene	120-12-7	ID	1.00E+00	5.12E-04				
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02			
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01		2.0E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02			
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04			
SVOC	Ethanol	64-17-5		1.00E+00				1.9E+01	
SVOC	Fluorene	86-73-7	D	1.00E+00	5.56E-04				
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02			
SVOC	Naphthalene	91-20-3	C	1.00E+00	1.49E-03	3.4E-02	4.1E-06	3.0E-03	1.1E-01
SVOC	Phenanthrene	85-01-8	D	1.00E+00	5.52E-04				
SVOC	Pyrene	129-00-0	NC	1.00E+00					
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00					
INORG	Lead	7439-92-1	B2	1.00E+00					

Table 12

ProUCL Input

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

TMB124	D_TMB124	Benz	D_Benz	Cumene	D_Cumene	Tol	D_Tol	Xyl	D_Xyl	BaP	D_BaP	Nap	D_Nap
0.026	1	0.00073	0	0.028	1	0.00081	1	0.042	1	0.58	1	0.94	1
0.029	1	0.017	1	0.0091	1	0.02	1	0.0215	1	1.2	1	2	1
0.0095	1	0.0012	1	0.015	1	0.0008	1	0.00395	1	0.42	1	0.52	1
0.022	1	0.00056	1	0.024	1	0.0017	1	0.015	1	0.66	1	2.8	1
0.3919	1	0.02672	1	0.402	1	0.03945	1	0.06085	1	0.245	1	0.255	1
1.2	1	0.38	0	18	1	0.77	0	1.16	1	0.41	1	1.1	1
2.7	1	0.037	1	8.4	1	0.17	1	0.43	1	8.8	0	11	0
0.1	1	28	1	0.022	1	6.8	1	1.075	1	0.076	1	0.0895	1
0.002	0	0.00051	0	0.00064	1	0.001	0	0.002	0	0.16	0	0.2	0
0.00072	1	0.0003	1	0.00054	1	0.00084	1	0.00156	1	1.4	1	2.2	1
0.16	0	0.041	0	0.068	1	0.083	0	0.11	1	0.17	1	0.16	1
16	1	0.052	1	3.8	1	0.29	1	1.26	1	0.62	1	0.32	1
0.0048	1	0.00064	1	0.0034	1	0.0029	1	0.0142	1	0.97	1	1.3	1
0.0014	1	0.0012	1	0.02	1	0.0019	0	0.0025	1	0.43	1	0.37	1
2.6	1	0.05	1	1.1	1	0.35	1	1.37	1	5.2	1	3.9	1
0.0023	1	0.00087	0	0.0055	1	0.0017	0	0.00315	1	1	1	1.1	1
0.0017	1	0.00083	0	0.001	1	0.0017	0	0.00263	1	1.1	1	2	1
0.00085	1	0.00032	1	0.11	1	0.0014	0	0.00188	1	0.84	1	6.3	1
1.3	1	0.11	1	3.7	1	0.34	1	1.12	1	3.1	1	2	1
0.0044	0	0.0011	1	0.0022	0	0.0022	0	0.0044	0	0.64	1	0.32	1
0.009	1	0.0012	1	0.0012	1	0.002	1	0.0048	1	0.72	1	1.2	1
0.0039	0	0.00049	1	0.0019	0	0.0019	0	0.0039	0	0.3	1	0.45	1
0.0024	0	0.0054	1	0.00028	1	0.0012	0	0.0024	0	0.54	1	0.14	1
0.22	1	0.025	0	0.049	0	0.049	0	0.116	1	7.7	1	1.3	1
0.061	1	0.037	1	0.63	1	0.047	1	0.218	1	18	1	1.4	1
0.0017	1	0.0004	1	0.034	1	0.00082	1	0.0132	1	7.4	1	0.91	0
0.001	1	0.00036	1	0.0072	1	0.0011	1	0.0068	1	7.4	1	0.36	1
0.15	1	0.068	0	2.1	1	0.089	1	0.246	1	8.7	1	0.94	1
0.002	1	0.00059	1	0.0091	1	0.0012	1	0.0084	1	2.1	1	0.42	1
0.018	1	0.0005	1	0.14	1	0.0043	1	0.061	1	2.7	1	0.98	0
0.012	1	0.016	1	0.0029	1	0.0057	1	0.0203	1	54	1	4.8	1
0.0028	0	0.00069	0	0.0014	0	0.0014	0	0.0028	0	1.1	1	0.059	1
65	1	520	1	240	1	350	1	141	1	0.77	0	7.5	1
0.00039	1	130	1	0.0063	1	0.00074	1	0.00118	1	0.47	1	0.036	1
4.9	1	2.8	1	3400	1	3.8	1	2.63	1	0.18	1	5.4	1
0.00067	1	0.2	1	0.14	1	0.0045	1	0.00255	1	0.51	1	0.12	1
0.14	1	3000	1	2400	1	0.28	0	0.56	0	2.8	0	0.71	0
11	0	4.6	1	4700	1	5.6	0	11	0	2.9	0	0.73	0
32	1	34	1	12000	1	3400	1	295	1	1.5	0	3.5	1
8.4	1	0.00076	1	5000	1	1200	1	111	1	1.7	0	1	1
0.004	1	1200	1	8900	1	0.21	1	0.073	1	0.049	1	0.18	0
79	1	4	1	4600	1	6100	1	525	1	0.48	1	3.1	1
7.7	1	160	1	1400	1	1800	1	135	1	0.16	0	1.7	1
48	1	1300	1	5500	1	4300	1	490	1	1.5	0	6.3	1
0.81	1	9.8	1	11000	1	8.7	1	3.325	1	0.15	0	0.054	1
330	1	380	1	15000	1	6200	1	560	1	1.6	0	52	1
0.0445	1	13	1	14000	1	1.265	1	0.961	1	0.19	1	0.235	1
0.19	0	7.1	1	1900	1	0.27	1	0.123	1	0.047	1	0.3	1
0.51	1	0.0046	1	1800	1	0.28	1	0.53	1	0.076	1	1	1
0.8	1	0.46	1	4000	1	0.44	1	0.528	1	1.1	1	2.2	1
1.6	0	2.8	0	3000	1	0.0048	1	0.86	1	0.83	1	1.6	1
0.0028	0	2200	1	0.38	1	0.0014	0	0.0028	0	0.07	1	0.19	0
0.00027	1	2800	1	12000	1	0.00018	1	0.00037	1	0.14	1	0.048	1
0.032	1	0.41	1	2500	1	0.052	1	0.071	1	0.16	0	0.2	0
0.037	1	7800	1	4800	1	0.17	1	0.1755	1	0.049	1	0.19	0
0.075	1	2600	1	330	1	0.062	1	0.211	1	0.15	0	0.18	0
0.0019	0	2000	1	7600	1	0.00094	0	0.0019	0	0.42	1	0.068	1
0.004	0	130	1	18	1	0.002	0	0.004	0	0.14	0	0.17	0
		12000	1	42	1								
		1.85	1	42	1								
		0.35	1	8.2	1								
		3.4	1	700	1								

Table 12

ProUCL Input

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

TMB124	D_TMB124	Benz	D_Benz	Cumene	D_Cumene	Tol	D_Tol	Xyl	D_Xyl	BaP	D_BaP	Nap	D_Nap
		6.2	1	0.0011	1								
		0.4	1	0.0093	1								
		2957	1	1.6	1								
		1.4	1	4.8	1								
		2.2	1	24	1								
		7.8	1	0.001	1								
		2.2	1	0.00049	1								
		1.6	1										
		16	1										
		22	1										
		2.7	1										
		1.3	1										
		0.71	1										
		0.77	1										
		0.00069	0										
		0.00007	1										
		0.071	1										
		0.021	1										
		0.044	1										
		0.00047	0										
		0.001	0										

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.11/12/2023 1:42:19 PM								
5	From File			20230112_TG07_Soil_Input_b.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10	TMB124											
11												
12	General Statistics											
13	Total Number of Observations				58		Number of Distinct Observations				54	
14	Number of Detects				46		Number of Non-Detects				12	
15	Number of Distinct Detects				45		Number of Distinct Non-Detects				11	
16	Minimum Detect				2.7000E-4		Minimum Non-Detect				0.0019	
17	Maximum Detect				330		Maximum Non-Detect				11	
18	Variance Detects				2561		Percent Non-Detects				20.69%	
19	Mean Detects				13.09		SD Detects				50.6	
20	Median Detects				0.0528		CV Detects				3.865	
21	Skewness Detects				5.777		Kurtosis Detects				35.96	
22	Mean of Logged Detects				-2.353		SD of Logged Detects				3.767	
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic				0.296		Shapiro Wilk GOF Test					
26	5% Shapiro Wilk Critical Value				0.945		Detected Data Not Normal at 5% Significance Level					
27	Lilliefors Test Statistic				0.407		Lilliefors GOF Test					
28	5% Lilliefors Critical Value				0.129		Detected Data Not Normal at 5% Significance Level					
29	Detected Data Not Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	KM Mean				10.4		KM Standard Error of Mean				5.959	
33	KM SD				44.89		95% KM (BCA) UCL				21.95	
34	95% KM (t) UCL				20.36		95% KM (Percentile Bootstrap) UCL				22.12	
35	95% KM (z) UCL				20.2		95% KM Bootstrap t UCL				43.98	
36	90% KM Chebyshev UCL				28.28		95% KM Chebyshev UCL				36.37	
37	97.5% KM Chebyshev UCL				47.61		99% KM Chebyshev UCL				69.69	
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic				3.36		Anderson-Darling GOF Test					
41	5% A-D Critical Value				0.954		Detected Data Not Gamma Distributed at 5% Significance Level					
42	K-S Test Statistic				0.207		Kolmogorov-Smirnov GOF					
43	5% K-S Critical Value				0.147		Detected Data Not Gamma Distributed at 5% Significance Level					
44	Detected Data Not Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)				0.155		k star (bias corrected MLE)				0.16	
48	Theta hat (MLE)				84.33		Theta star (bias corrected MLE)				82.02	

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
49					nu hat (MLE)	14.28				nu star (bias corrected)		14.69
50					Mean (detects)	13.09						
51												
52	Gamma ROS Statistics using Imputed Non-Detects											
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	2.7000E-4				Mean		10.39
59					Maximum	330				Median		0.02
60					SD	45.28				CV		4.359
61					k hat (MLE)	0.149				k star (bias corrected MLE)		0.153
62					Theta hat (MLE)	69.67				Theta star (bias corrected MLE)		67.94
63					nu hat (MLE)	17.3				nu star (bias corrected)		17.73
64					Adjusted Level of Significance (β)	0.0459						
65					Approximate Chi Square Value (17.73, α)	9.199				Adjusted Chi Square Value (17.73, β)		9.042
66					95% Gamma Approximate UCL (use when $n \geq 50$)	20.02				95% Gamma Adjusted UCL (use when $n < 50$)		20.37
67												
68	Estimates of Gamma Parameters using KM Estimates											
69					Mean (KM)	10.4				SD (KM)		44.89
70					Variance (KM)	2015				SE of Mean (KM)		5.959
71					k hat (KM)	0.0537				k star (KM)		0.0624
72					nu hat (KM)	6.226				nu star (KM)		7.238
73					theta hat (KM)	193.7				theta star (KM)		166.7
74					80% gamma percentile (KM)	2.795				90% gamma percentile (KM)		20.32
75					95% gamma percentile (KM)	58.75				99% gamma percentile (KM)		206.3
76												
77	Gamma Kaplan-Meier (KM) Statistics											
78					Approximate Chi Square Value (7.24, α)	2.302				Adjusted Chi Square Value (7.24, β)		2.232
79					95% Gamma Approximate KM-UCL (use when $n \geq 50$)	32.7				95% Gamma Adjusted KM-UCL (use when $n < 50$)		33.73
80												
81	Lognormal GOF Test on Detected Observations Only											
82					Shapiro Wilk Test Statistic	0.95				Shapiro Wilk GOF Test		
83					5% Shapiro Wilk Critical Value	0.945				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.0799				Lilliefors GOF Test		
85					5% Lilliefors Critical Value	0.129				Detected Data appear Lognormal at 5% Significance Level		
86	Detected Data appear Lognormal at 5% Significance Level											
87												
88	Lognormal ROS Statistics Using Imputed Non-Detects											
89					Mean in Original Scale	10.39				Mean in Log Scale		-3.146
90					SD in Original Scale	45.28				SD in Log Scale		3.745
91					95% t UCL (assumes normality of ROS data)	20.33				95% Percentile Bootstrap UCL		21.66
92					95% BCA Bootstrap UCL	28.5				95% Bootstrap t UCL		45.23
93					95% H-UCL (Log ROS)	1294						
94												
95	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
96					KM Mean (logged)	-3.162				KM Geo Mean		0.0423

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
97	KM SD (logged)					3.768	95% Critical H Value (KM-Log)					6.688
98	KM Standard Error of Mean (logged)					0.51	95% H-UCL (KM -Log)					1443
99	KM SD (logged)					3.768	95% Critical H Value (KM-Log)					6.688
100	KM Standard Error of Mean (logged)					0.51						
101												
102	DL/2 Statistics											
103	DL/2 Normal						DL/2 Log-Transformed					
104	Mean in Original Scale					10.5	Mean in Log Scale					-2.827
105	SD in Original Scale					45.26	SD in Log Scale					3.717
106	95% t UCL (Assumes normality)					20.43	95% H-Stat UCL					1530
107	DL/2 is not a recommended method, provided for comparisons and historical reasons											
108												
109	Nonparametric Distribution Free UCL Statistics											
110	Detected Data appear Lognormal Distributed at 5% Significance Level											
111												
112	Suggested UCL to Use											
113	99% KM (Chebyshev) UCL					69.69						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120	Benz											
121												
122	General Statistics											
123	Total Number of Observations					83	Number of Distinct Observations					76
124	Number of Detects					70	Number of Non-Detects					13
125	Number of Distinct Detects					65	Number of Distinct Non-Detects					12
126	Minimum Detect					7.0000E-5	Minimum Non-Detect					4.7000E-4
127	Maximum Detect					12000	Maximum Non-Detect					2.8
128	Variance Detects					3297215	Percent Non-Detects					15.66%
129	Mean Detects					562.2	SD Detects					1816
130	Median Detects					1.035	CV Detects					3.23
131	Skewness Detects					4.788	Kurtosis Detects					25.93
132	Mean of Logged Detects					-0.375	SD of Logged Detects					5.244
133												
134	Normal GOF Test on Detects Only											
135	Shapiro Wilk Test Statistic					0.37	Normal GOF Test on Detected Observations Only					
136	5% Shapiro Wilk P Value					0	Detected Data Not Normal at 5% Significance Level					
137	Lilliefors Test Statistic					0.416	Lilliefors GOF Test					
138	5% Lilliefors Critical Value					0.106	Detected Data Not Normal at 5% Significance Level					
139	Detected Data Not Normal at 5% Significance Level											
140												
141	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
142	KM Mean					474.1	KM Standard Error of Mean					184.4
143	KM SD					1668	95% KM (BCA) UCL					789.7
144	95% KM (t) UCL					781	95% KM (Percentile Bootstrap) UCL					819.4

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
145	95% KM (z) UCL					777.5	95% KM Bootstrap t UCL					1151
146	90% KM Chebyshev UCL					1027	95% KM Chebyshev UCL					1278
147	97.5% KM Chebyshev UCL					1626	99% KM Chebyshev UCL					2309
148												
149	Gamma GOF Tests on Detected Observations Only											
150	A-D Test Statistic				4.047	Anderson-Darling GOF Test						
151	5% A-D Critical Value				0.996	Detected Data Not Gamma Distributed at 5% Significance Level						
152	K-S Test Statistic				0.205	Kolmogorov-Smirnov GOF						
153	5% K-S Critical Value				0.121	Detected Data Not Gamma Distributed at 5% Significance Level						
154	Detected Data Not Gamma Distributed at 5% Significance Level											
155												
156	Gamma Statistics on Detected Data Only											
157	k hat (MLE)				0.118	k star (bias corrected MLE)				0.123		
158	Theta hat (MLE)				4746	Theta star (bias corrected MLE)				4575		
159	nu hat (MLE)				16.58	nu star (bias corrected)				17.2		
160	Mean (detects)				562.2							
161												
162	Gamma ROS Statistics using Imputed Non-Detects											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168	Minimum				7.0000E-5	Mean				474.1		
169	Maximum				12000	Median				0.2		
170	SD				1678	CV				3.54		
171	k hat (MLE)				0.111	k star (bias corrected MLE)				0.115		
172	Theta hat (MLE)				4261	Theta star (bias corrected MLE)				4113		
173	nu hat (MLE)				18.47	nu star (bias corrected)				19.14		
174	Adjusted Level of Significance (β)				0.0471							
175	Approximate Chi Square Value (19.14, α)				10.22	Adjusted Chi Square Value (19.14, β)				10.1		
176	95% Gamma Approximate UCL (use when $n \geq 50$)				888	95% Gamma Adjusted UCL (use when $n < 50$)				898.2		
177												
178	Estimates of Gamma Parameters using KM Estimates											
179	Mean (KM)				474.1	SD (KM)				1668		
180	Variance (KM)				2782802	SE of Mean (KM)				184.4		
181	k hat (KM)				0.0808	k star (KM)				0.0859		
182	nu hat (KM)				13.41	nu star (KM)				14.26		
183	theta hat (KM)				5869	theta star (KM)				5520		
184	80% gamma percentile (KM)				257.6	90% gamma percentile (KM)				1173		
185	95% gamma percentile (KM)				2762	99% gamma percentile (KM)				8116		
186												
187	Gamma Kaplan-Meier (KM) Statistics											
188	Approximate Chi Square Value (14.26, α)				6.749	Adjusted Chi Square Value (14.26, β)				6.657		
189	95% Gamma Approximate KM-UCL (use when $n \geq 50$)				1002	95% Gamma Adjusted KM-UCL (use when $n < 50$)				1016		
190												
191	Lognormal GOF Test on Detected Observations Only											
192	Shapiro Wilk Approximate Test Statistic				0.939	Shapiro Wilk GOF Test						

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
193	5% Shapiro Wilk P Value					0.00297	Detected Data Not Lognormal at 5% Significance Level					
194	Lilliefors Test Statistic					0.101	Lilliefors GOF Test					
195	5% Lilliefors Critical Value					0.106	Detected Data appear Lognormal at 5% Significance Level					
196	Detected Data appear Approximate Lognormal at 5% Significance Level											
197												
198	Lognormal ROS Statistics Using Imputed Non-Detects											
199	Mean in Original Scale					474.1	Mean in Log Scale					-1.48
200	SD in Original Scale					1678	SD in Log Scale					5.5
201	95% t UCL (assumes normality of ROS data)					780.6	95% Percentile Bootstrap UCL					781.9
202	95% BCA Bootstrap UCL					934.7	95% Bootstrap t UCL					1151
203	95% H-UCL (Log ROS)					1.215E+8						
204												
205	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
206	KM Mean (logged)					-1.462	KM Geo Mean					0.232
207	KM SD (logged)					5.452	95% Critical H Value (KM-Log)					8.112
208	KM Standard Error of Mean (logged)					0.607	95% H-UCL (KM -Log)					87168674
209	KM SD (logged)					5.452	95% Critical H Value (KM-Log)					8.112
210	KM Standard Error of Mean (logged)					0.607						
211												
212	DL/2 Statistics											
213	DL/2 Normal						DL/2 Log-Transformed					
214	Mean in Original Scale					474.1	Mean in Log Scale					-1.239
215	SD in Original Scale					1678	SD in Log Scale					5.336
216	95% t UCL (Assumes normality)					780.6	95% H-Stat UCL					47847276
217	DL/2 is not a recommended method, provided for comparisons and historical reasons											
218												
219	Nonparametric Distribution Free UCL Statistics											
220	Detected Data appear Approximate Lognormal Distributed at 5% Significance Level											
221												
222	Suggested UCL to Use											
223	99% KM (Chebyshev) UCL					2309						
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness.											
227	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
228	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
229												
230	Cumene											
231												
232	General Statistics											
233	Total Number of Observations					69	Number of Distinct Observations					63
234	Number of Detects					65	Number of Non-Detects					4
235	Number of Distinct Detects					59	Number of Distinct Non-Detects					4
236	Minimum Detect					2.8000E-4	Minimum Non-Detect					0.0014
237	Maximum Detect					15000	Maximum Non-Detect					0.049
238	Variance Detects					14040769	Percent Non-Detects					5.797%
239	Mean Detects					1953	SD Detects					3747
240	Median Detects					3.7	CV Detects					1.919

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
241	Skewness Detects					2.169	Kurtosis Detects					3.951
242	Mean of Logged Detects					1.254	SD of Logged Detects					5.958
243												
244	Normal GOF Test on Detects Only											
245	Shapiro Wilk Test Statistic					0.594	Normal GOF Test on Detected Observations Only					
246	5% Shapiro Wilk P Value					0	Detected Data Not Normal at 5% Significance Level					
247	Lilliefors Test Statistic					0.344	Lilliefors GOF Test					
248	5% Lilliefors Critical Value					0.11	Detected Data Not Normal at 5% Significance Level					
249	Detected Data Not Normal at 5% Significance Level											
250												
251	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
252	KM Mean					1840	KM Standard Error of Mean					441.3
253	KM SD					3638	95% KM (BCA) UCL					2558
254	95% KM (t) UCL					2576	95% KM (Percentile Bootstrap) UCL					2577
255	95% KM (z) UCL					2566	95% KM Bootstrap t UCL					2758
256	90% KM Chebyshev UCL					3164	95% KM Chebyshev UCL					3764
257	97.5% KM Chebyshev UCL					4596	99% KM Chebyshev UCL					6231
258												
259	Gamma GOF Tests on Detected Observations Only											
260	A-D Test Statistic					2.85	Anderson-Darling GOF Test					
261	5% A-D Critical Value					0.988	Detected Data Not Gamma Distributed at 5% Significance Level					
262	K-S Test Statistic					0.154	Kolmogorov-Smirnov GOF					
263	5% K-S Critical Value					0.126	Detected Data Not Gamma Distributed at 5% Significance Level					
264	Detected Data Not Gamma Distributed at 5% Significance Level											
265												
266	Gamma Statistics on Detected Data Only											
267	k hat (MLE)					0.125	k star (bias corrected MLE)					0.129
268	Theta hat (MLE)					15656	Theta star (bias corrected MLE)					15111
269	nu hat (MLE)					16.22	nu star (bias corrected)					16.8
270	Mean (detects)					1953						
271												
272	Gamma ROS Statistics using Imputed Non-Detects											
273	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
274	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
275	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
276	This is especially true when the sample size is small.											
277	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
278	Minimum					2.8000E-4	Mean					1866
279	Maximum					15000	Median					4.8
280	SD					3652	CV					1.957
281	k hat (MLE)					0.131	k star (bias corrected MLE)					0.135
282	Theta hat (MLE)					14277	Theta star (bias corrected MLE)					13855
283	nu hat (MLE)					18.04	nu star (bias corrected)					18.59
284	Adjusted Level of Significance (β)					0.0465						
285	Approximate Chi Square Value (18.59, α)					9.818	Adjusted Chi Square Value (18.59, β)					9.682
286	95% Gamma Approximate UCL (use when $n \geq 50$)					3534	95% Gamma Adjusted UCL (use when $n < 50$)					3584
287												
288	Estimates of Gamma Parameters using KM Estimates											

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
289	Mean (KM)					1840	SD (KM)					3638
290	Variance (KM)					13231633	SE of Mean (KM)					441.3
291	k hat (KM)					0.256	k star (KM)					0.254
292	nu hat (KM)					35.3	nu star (KM)					35.1
293	theta hat (KM)					7192	theta star (KM)					7233
294	80% gamma percentile (KM)					2688	90% gamma percentile (KM)					5515
295	95% gamma percentile (KM)					8860	99% gamma percentile (KM)					17741
296												
297	Gamma Kaplan-Meier (KM) Statistics											
298	Approximate Chi Square Value (35.10, α)					22.55	Adjusted Chi Square Value (35.10, β)					22.33
299	95% Gamma Approximate KM-UCL (use when $n \geq 50$)					2864	95% Gamma Adjusted KM-UCL (use when $n < 50$)					2892
300												
301	Lognormal GOF Test on Detected Observations Only											
302	Shapiro Wilk Approximate Test Statistic					0.884	Shapiro Wilk GOF Test					
303	5% Shapiro Wilk P Value					1.4915E-6	Detected Data Not Lognormal at 5% Significance Level					
304	Lilliefors Test Statistic					0.15	Lilliefors GOF Test					
305	5% Lilliefors Critical Value					0.11	Detected Data Not Lognormal at 5% Significance Level					
306	Detected Data Not Lognormal at 5% Significance Level											
307												
308	Lognormal ROS Statistics Using Imputed Non-Detects											
309	Mean in Original Scale					1840	Mean in Log Scale					0.773
310	SD in Original Scale					3664	SD in Log Scale					6.109
311	95% t UCL (assumes normality of ROS data)					2575	95% Percentile Bootstrap UCL					2597
312	95% BCA Bootstrap UCL					2692	95% Bootstrap t UCL					2778
313	95% H-UCL (Log ROS)					4.730E+10						
314												
315	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
316	KM Mean (logged)					0.783	KM Geo Mean					2.187
317	KM SD (logged)					6.049	95% Critical H Value (KM-Log)					6.803
318	KM Standard Error of Mean (logged)					0.734	95% H-UCL (KM -Log)					2.843E+10
319	KM SD (logged)					6.049	95% Critical H Value (KM-Log)					6.803
320	KM Standard Error of Mean (logged)					0.734						
321												
322	DL/2 Statistics											
323	DL/2 Normal						DL/2 Log-Transformed					
324	Mean in Original Scale					1840	Mean in Log Scale					0.823
325	SD in Original Scale					3664	SD in Log Scale					6.049
326	95% t UCL (Assumes normality)					2575	95% H-Stat UCL					2.957E+10
327	DL/2 is not a recommended method, provided for comparisons and historical reasons											
328												
329	Nonparametric Distribution Free UCL Statistics											
330	Data do not follow a Discernible Distribution at 5% Significance Level											
331												
332	Suggested UCL to Use											
333	99% KM (Chebyshev) UCL					6231						
334												
335	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
336	Recommendations are based upon data size, data distribution, and skewness.											

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
337	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
338	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
339												
340	Tol											
341												
342	General Statistics											
343	Total Number of Observations				58		Number of Distinct Observations				49	
344	Number of Detects				41		Number of Non-Detects				17	
345	Number of Distinct Detects				40		Number of Distinct Non-Detects				13	
346	Minimum Detect				1.8000E-4		Minimum Non-Detect				9.4000E-4	
347	Maximum Detect				6200		Maximum Non-Detect				5.6	
348	Variance Detects				2429446		Percent Non-Detects				29.31%	
349	Mean Detects				570.1		SD Detects				1559	
350	Median Detects				0.089		CV Detects				2.734	
351	Skewness Detects				2.901		Kurtosis Detects				7.606	
352	Mean of Logged Detects				-1.654		SD of Logged Detects				5.121	
353												
354	Normal GOF Test on Detects Only											
355	Shapiro Wilk Test Statistic				0.425		Shapiro Wilk GOF Test					
356	5% Shapiro Wilk Critical Value				0.941		Detected Data Not Normal at 5% Significance Level					
357	Lilliefors Test Statistic				0.47		Lilliefors GOF Test					
358	5% Lilliefors Critical Value				0.137		Detected Data Not Normal at 5% Significance Level					
359	Detected Data Not Normal at 5% Significance Level											
360												
361	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
362	KM Mean				403		KM Standard Error of Mean				175.5	
363	KM SD				1320		95% KM (BCA) UCL				680.7	
364	95% KM (t) UCL				696.4		95% KM (Percentile Bootstrap) UCL				691.7	
365	95% KM (z) UCL				691.7		95% KM Bootstrap t UCL				965.5	
366	90% KM Chebyshev UCL				929.5		95% KM Chebyshev UCL				1168	
367	97.5% KM Chebyshev UCL				1499		99% KM Chebyshev UCL				2149	
368												
369	Gamma GOF Tests on Detected Observations Only											
370	A-D Test Statistic				5.047		Anderson-Darling GOF Test					
371	5% A-D Critical Value				1.004		Detected Data Not Gamma Distributed at 5% Significance Level					
372	K-S Test Statistic				0.328		Kolmogorov-Smirnov GOF					
373	5% K-S Critical Value				0.158		Detected Data Not Gamma Distributed at 5% Significance Level					
374	Detected Data Not Gamma Distributed at 5% Significance Level											
375												
376	Gamma Statistics on Detected Data Only											
377	k hat (MLE)				0.101		k star (bias corrected MLE)				0.11	
378	Theta hat (MLE)				5625		Theta star (bias corrected MLE)				5173	
379	nu hat (MLE)				8.311		nu star (bias corrected)				9.036	
380	Mean (detects)				570.1							
381												
382	Gamma ROS Statistics using Imputed Non-Detects											
383	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
384	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
385	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
386	This is especially true when the sample size is small.											
387	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
388		Minimum	1.8000E-4							Mean	403	
389		Maximum	6200							Median	0.01	
390		SD	1332							CV	3.304	
391		k hat (MLE)	0.0959							k star (bias corrected MLE)	0.102	
392		Theta hat (MLE)	4204							Theta star (bias corrected MLE)	3936	
393		nu hat (MLE)	11.12							nu star (bias corrected)	11.88	
394		Adjusted Level of Significance (β)	0.0459									
395		Approximate Chi Square Value (11.88, α)	5.146							Adjusted Chi Square Value (11.88, β)	5.033	
396		95% Gamma Approximate UCL (use when $n \geq 50$)	930.1							95% Gamma Adjusted UCL (use when $n < 50$)	951	
397												
398	Estimates of Gamma Parameters using KM Estimates											
399		Mean (KM)	403							SD (KM)	1320	
400		Variance (KM)	1742813							SE of Mean (KM)	175.5	
401		k hat (KM)	0.0932							k star (KM)	0.0999	
402		nu hat (KM)	10.81							nu star (KM)	11.58	
403		theta hat (KM)	4325							theta star (KM)	4036	
404		80% gamma percentile (KM)	279.1							90% gamma percentile (KM)	1072	
405		95% gamma percentile (KM)	2339							99% gamma percentile (KM)	6406	
406												
407	Gamma Kaplan-Meier (KM) Statistics											
408		Approximate Chi Square Value (11.58, α)	4.954							Adjusted Chi Square Value (11.58, β)	4.844	
409		95% Gamma Approximate KM-UCL (use when $n \geq 50$)	942.3							95% Gamma Adjusted KM-UCL (use when $n < 50$)	963.8	
410												
411	Lognormal GOF Test on Detected Observations Only											
412		Shapiro Wilk Test Statistic	0.878							Shapiro Wilk GOF Test		
413		5% Shapiro Wilk Critical Value	0.941							Detected Data Not Lognormal at 5% Significance Level		
414		Lilliefors Test Statistic	0.167							Lilliefors GOF Test		
415		5% Lilliefors Critical Value	0.137							Detected Data Not Lognormal at 5% Significance Level		
416	Detected Data Not Lognormal at 5% Significance Level											
417												
418	Lognormal ROS Statistics Using Imputed Non-Detects											
419		Mean in Original Scale	403							Mean in Log Scale	-3.419	
420		SD in Original Scale	1332							SD in Log Scale	5.19	
421		95% t UCL (assumes normality of ROS data)	695.4							95% Percentile Bootstrap UCL	689.4	
422		95% BCA Bootstrap UCL	789.8							95% Bootstrap t UCL	887.5	
423		95% H-UCL (Log ROS)	10731228									
424												
425	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
426		KM Mean (logged)	-3.165							KM Geo Mean	0.0422	
427		KM SD (logged)	4.92							95% Critical H Value (KM-Log)	8.462	
428		KM Standard Error of Mean (logged)	0.662							95% H-UCL (KM -Log)	1896979	
429		KM SD (logged)	4.92							95% Critical H Value (KM-Log)	8.462	
430		KM Standard Error of Mean (logged)	0.662									
431												
432	DL/2 Statistics											

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
433	DL/2 Normal						DL/2 Log-Transformed					
434	Mean in Original Scale					403	Mean in Log Scale					-2.807
435	SD in Original Scale					1332	SD in Log Scale					4.874
436	95% t UCL (Assumes normality)					695.4	95% H-Stat UCL					1962926
437	DL/2 is not a recommended method, provided for comparisons and historical reasons											
438												
439	Nonparametric Distribution Free UCL Statistics											
440	Data do not follow a Discernible Distribution at 5% Significance Level											
441												
442	Suggested UCL to Use											
443	99% KM (Chebyshev) UCL					2149						
444												
445	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
446	Recommendations are based upon data size, data distribution, and skewness.											
447	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
448	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
449												
450	Xyl											
451												
452	General Statistics											
453	Total Number of Observations					58	Number of Distinct Observations					57
454	Number of Detects					48	Number of Non-Detects					10
455	Number of Distinct Detects					48	Number of Distinct Non-Detects					9
456	Minimum Detect					3.7000E-4	Minimum Non-Detect					0.0019
457	Maximum Detect					560	Maximum Non-Detect					11
458	Variance Detects					18278	Percent Non-Detects					17.24%
459	Mean Detects					47.37	SD Detects					135.2
460	Median Detects					0.12	CV Detects					2.854
461	Skewness Detects					3.082	Kurtosis Detects					8.636
462	Mean of Logged Detects					-1.649	SD of Logged Detects					3.798
463												
464	Normal GOF Test on Detects Only											
465	Shapiro Wilk Test Statistic					0.404	Shapiro Wilk GOF Test					
466	5% Shapiro Wilk Critical Value					0.947	Detected Data Not Normal at 5% Significance Level					
467	Lilliefors Test Statistic					0.482	Lilliefors GOF Test					
468	5% Lilliefors Critical Value					0.127	Detected Data Not Normal at 5% Significance Level					
469	Detected Data Not Normal at 5% Significance Level											
470												
471	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
472	KM Mean					39.21	KM Standard Error of Mean					16.32
473	KM SD					123	95% KM (BCA) UCL					69.28
474	95% KM (t) UCL					66.5	95% KM (Percentile Bootstrap) UCL					67.54
475	95% KM (z) UCL					66.06	95% KM Bootstrap t UCL					85.44
476	90% KM Chebyshev UCL					88.18	95% KM Chebyshev UCL					110.4
477	97.5% KM Chebyshev UCL					141.1	99% KM Chebyshev UCL					201.6
478												
479	Gamma GOF Tests on Detected Observations Only											
480	A-D Test Statistic					5.416	Anderson-Darling GOF Test					

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L	
481	5% A-D Critical Value				0.968	Detected Data Not Gamma Distributed at 5% Significance Level							
482	K-S Test Statistic				0.321	Kolmogorov-Smirnov GOF							
483	5% K-S Critical Value				0.145	Detected Data Not Gamma Distributed at 5% Significance Level							
484	Detected Data Not Gamma Distributed at 5% Significance Level												
485													
486	Gamma Statistics on Detected Data Only												
487	k hat (MLE)				0.141	k star (bias corrected MLE)				0.146			
488	Theta hat (MLE)				336.4	Theta star (bias corrected MLE)				324.6			
489	nu hat (MLE)				13.52	nu star (bias corrected)				14.01			
490	Mean (detects)				47.37								
491													
492	Gamma ROS Statistics using Imputed Non-Detects												
493	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
494	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)												
495	For such situations, GROS method may yield incorrect values of UCLs and BTVs												
496	This is especially true when the sample size is small.												
497	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
498	Minimum				3.7000E-4	Mean				39.21			
499	Maximum				560	Median				0.0609			
500	SD				124.1	CV				3.165			
501	k hat (MLE)				0.134	k star (bias corrected MLE)				0.139			
502	Theta hat (MLE)				292.5	Theta star (bias corrected MLE)				282.9			
503	nu hat (MLE)				15.55	nu star (bias corrected)				16.08			
504	Adjusted Level of Significance (β)				0.0459								
505	Approximate Chi Square Value (16.08, α)				8.016	Adjusted Chi Square Value (16.08, β)				7.871			
506	95% Gamma Approximate UCL (use when $n \geq 50$)				78.63	95% Gamma Adjusted UCL (use when $n < 50$)				80.08			
507													
508	Estimates of Gamma Parameters using KM Estimates												
509	Mean (KM)				39.21	SD (KM)				123			
510	Variance (KM)				15131	SE of Mean (KM)				16.32			
511	k hat (KM)				0.102	k star (KM)				0.108			
512	nu hat (KM)				11.79	nu star (KM)				12.51			
513	theta hat (KM)				385.9	theta star (KM)				363.6			
514	80% gamma percentile (KM)				30.2	90% gamma percentile (KM)				107.4			
515	95% gamma percentile (KM)				226.3	99% gamma percentile (KM)				599.6			
516													
517	Gamma Kaplan-Meier (KM) Statistics												
518	Approximate Chi Square Value (12.51, α)				5.566	Adjusted Chi Square Value (12.51, β)				5.447			
519	95% Gamma Approximate KM-UCL (use when $n \geq 50$)				88.15	95% Gamma Adjusted KM-UCL (use when $n < 50$)				90.06			
520													
521	Lognormal GOF Test on Detected Observations Only												
522	Shapiro Wilk Test Statistic				0.922	Shapiro Wilk GOF Test							
523	5% Shapiro Wilk Critical Value				0.947	Detected Data Not Lognormal at 5% Significance Level							
524	Lilliefors Test Statistic				0.115	Lilliefors GOF Test							
525	5% Lilliefors Critical Value				0.127	Detected Data appear Lognormal at 5% Significance Level							
526	Detected Data appear Approximate Lognormal at 5% Significance Level												
527													
528	Lognormal ROS Statistics Using Imputed Non-Detects												

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
529	Mean in Original Scale					39.21	Mean in Log Scale					-2.539
530	SD in Original Scale					124.1	SD in Log Scale					4.034
531	95% t UCL (assumes normality of ROS data)					66.45	95% Percentile Bootstrap UCL					69.01
532	95% BCA Bootstrap UCL					74.52	95% Bootstrap t UCL					82.91
533	95% H-UCL (Log ROS)					11920						
534												
535	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
536	KM Mean (logged)					-2.416	KM Geo Mean					0.0893
537	KM SD (logged)					3.871	95% Critical H Value (KM-Log)					6.846
538	KM Standard Error of Mean (logged)					0.52	95% H-UCL (KM -Log)					5366
539	KM SD (logged)					3.871	95% Critical H Value (KM-Log)					6.846
540	KM Standard Error of Mean (logged)					0.52						
541												
542	DL/2 Statistics											
543	DL/2 Normal						DL/2 Log-Transformed					
544	Mean in Original Scale					39.3	Mean in Log Scale					-2.259
545	SD in Original Scale					124.1	SD in Log Scale					3.884
546	95% t UCL (Assumes normality)					66.54	95% H-Stat UCL					6725
547	DL/2 is not a recommended method, provided for comparisons and historical reasons											
548												
549	Nonparametric Distribution Free UCL Statistics											
550	Detected Data appear Approximate Lognormal Distributed at 5% Significance Level											
551												
552	Suggested UCL to Use											
553	99% KM (Chebyshev) UCL					201.6						
554												
555	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
556	Recommendations are based upon data size, data distribution, and skewness.											
557	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
558	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
559												
560	BaP											
561												
562	General Statistics											
563	Total Number of Observations					58	Number of Distinct Observations					47
564	Number of Detects					44	Number of Non-Detects					14
565	Number of Distinct Detects					38	Number of Distinct Non-Detects					10
566	Minimum Detect					0.047	Minimum Non-Detect					0.14
567	Maximum Detect					54	Maximum Non-Detect					8.8
568	Variance Detects					72.96	Percent Non-Detects					24.14%
569	Mean Detects					3.053	SD Detects					8.542
570	Median Detects					0.63	CV Detects					2.798
571	Skewness Detects					5.295	Kurtosis Detects					30.89
572	Mean of Logged Detects					-0.343	SD of Logged Detects					1.612
573												
574	Normal GOF Test on Detects Only											
575	Shapiro Wilk Test Statistic					0.37	Shapiro Wilk GOF Test					
576	5% Shapiro Wilk Critical Value					0.944	Detected Data Not Normal at 5% Significance Level					

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L	
577	Lilliefors Test Statistic					0.362	Lilliefors GOF Test						
578	5% Lilliefors Critical Value					0.132	Detected Data Not Normal at 5% Significance Level						
579	Detected Data Not Normal at 5% Significance Level												
580													
581	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
582	KM Mean				2.399	KM Standard Error of Mean				0.991			
583	KM SD				7.453	95% KM (BCA) UCL				4.409			
584	95% KM (t) UCL				4.056	95% KM (Percentile Bootstrap) UCL				4.13			
585	95% KM (z) UCL				4.029	95% KM Bootstrap t UCL				7.478			
586	90% KM Chebyshev UCL				5.372	95% KM Chebyshev UCL				6.718			
587	97.5% KM Chebyshev UCL				8.587	99% KM Chebyshev UCL				12.26			
588													
589	Gamma GOF Tests on Detected Observations Only												
590	A-D Test Statistic				2.94	Anderson-Darling GOF Test							
591	5% A-D Critical Value				0.827	Detected Data Not Gamma Distributed at 5% Significance Level							
592	K-S Test Statistic				0.256	Kolmogorov-Smirnov GOF							
593	5% K-S Critical Value				0.142	Detected Data Not Gamma Distributed at 5% Significance Level							
594	Detected Data Not Gamma Distributed at 5% Significance Level												
595													
596	Gamma Statistics on Detected Data Only												
597	k hat (MLE)			0.444	k star (bias corrected MLE)			0.429					
598	Theta hat (MLE)			6.881	Theta star (bias corrected MLE)			7.123					
599	nu hat (MLE)			39.04	nu star (bias corrected)			37.72					
600	Mean (detects)			3.053									
601													
602	Gamma ROS Statistics using Imputed Non-Detects												
603	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
604	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)												
605	For such situations, GROS method may yield incorrect values of UCLs and BTVs												
606	This is especially true when the sample size is small.												
607	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
608	Minimum			0.01	Mean			2.318					
609	Maximum			54	Median			0.425					
610	SD			7.534	CV			3.25					
611	k hat (MLE)			0.31	k star (bias corrected MLE)			0.305					
612	Theta hat (MLE)			7.479	Theta star (bias corrected MLE)			7.59					
613	nu hat (MLE)			35.96	nu star (bias corrected)			35.44					
614	Adjusted Level of Significance (β)				0.0459								
615	Approximate Chi Square Value (35.44, α)				22.81	Adjusted Chi Square Value (35.44, β)				22.56			
616	95% Gamma Approximate UCL (use when $n \geq 50$)				3.601	95% Gamma Adjusted UCL (use when $n < 50$)				3.642			
617													
618	Estimates of Gamma Parameters using KM Estimates												
619	Mean (KM)			2.399	SD (KM)			7.453					
620	Variance (KM)			55.55	SE of Mean (KM)			0.991					
621	k hat (KM)			0.104	k star (KM)			0.11					
622	nu hat (KM)			12.02	nu star (KM)			12.73					
623	theta hat (KM)			23.16	theta star (KM)			21.86					
624	80% gamma percentile (KM)			1.889	90% gamma percentile (KM)			6.613					

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
625	95% gamma percentile (KM)					13.83	99% gamma percentile (KM)					36.36
626												
627	Gamma Kaplan-Meier (KM) Statistics											
628	Approximate Chi Square Value (12.73, α)					5.711	Adjusted Chi Square Value (12.73, β)					5.591
629	95% Gamma Approximate KM-UCL (use when $n \geq 50$)					5.347	95% Gamma Adjusted KM-UCL (use when $n < 50$)					5.462
630												
631	Lognormal GOF Test on Detected Observations Only											
632	Shapiro Wilk Test Statistic					0.96	Shapiro Wilk GOF Test					
633	5% Shapiro Wilk Critical Value					0.944	Detected Data appear Lognormal at 5% Significance Level					
634	Lilliefors Test Statistic					0.122	Lilliefors GOF Test					
635	5% Lilliefors Critical Value					0.132	Detected Data appear Lognormal at 5% Significance Level					
636	Detected Data appear Lognormal at 5% Significance Level											
637												
638	Lognormal ROS Statistics Using Imputed Non-Detects											
639	Mean in Original Scale					2.371	Mean in Log Scale					-0.696
640	SD in Original Scale					7.519	SD in Log Scale					1.596
641	95% t UCL (assumes normality of ROS data)					4.022	95% Percentile Bootstrap UCL					4.186
642	95% BCA Bootstrap UCL					5.387	95% Bootstrap t UCL					7.467
643	95% H-UCL (Log ROS)					3.544						
644												
645	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
646	KM Mean (logged)					-0.715	KM Geo Mean					0.489
647	KM SD (logged)					1.642	95% Critical H Value (KM-Log)					3.313
648	KM Standard Error of Mean (logged)					0.228	95% H-UCL (KM -Log)					3.87
649	KM SD (logged)					1.642	95% Critical H Value (KM-Log)					3.313
650	KM Standard Error of Mean (logged)					0.228						
651												
652	DL/2 Statistics											
653	DL/2 Normal					DL/2 Log-Transformed						
654	Mean in Original Scale					2.51	Mean in Log Scale					-0.521
655	SD in Original Scale					7.502	SD in Log Scale					1.591
656	95% t UCL (Assumes normality)					4.157	95% H-Stat UCL					4.176
657	DL/2 is not a recommended method, provided for comparisons and historical reasons											
658												
659	Nonparametric Distribution Free UCL Statistics											
660	Detected Data appear Lognormal Distributed at 5% Significance Level											
661												
662	Suggested UCL to Use											
663	KM H-UCL					3.87						
664												
665	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
666	Recommendations are based upon data size, data distribution, and skewness.											
667	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
668	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
669												
670	Nap											
671												
672	General Statistics											

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
673	Total Number of Observations					58	Number of Distinct Observations					46
674	Number of Detects					46	Number of Non-Detects					12
675	Number of Distinct Detects					37	Number of Distinct Non-Detects					9
676	Minimum Detect					0.036	Minimum Non-Detect					0.17
677	Maximum Detect					52	Maximum Non-Detect					11
678	Variance Detects					58.65	Percent Non-Detects					20.69%
679	Mean Detects					2.715	SD Detects					7.658
680	Median Detects					1.05	CV Detects					2.82
681	Skewness Detects					6.187	Kurtosis Detects					40.36
682	Mean of Logged Detects					-0.224	SD of Logged Detects					1.579
683												
684	Normal GOF Test on Detects Only											
685	Shapiro Wilk Test Statistic					0.322	Shapiro Wilk GOF Test					
686	5% Shapiro Wilk Critical Value					0.945	Detected Data Not Normal at 5% Significance Level					
687	Lilliefors Test Statistic					0.363	Lilliefors GOF Test					
688	5% Lilliefors Critical Value					0.129	Detected Data Not Normal at 5% Significance Level					
689	Detected Data Not Normal at 5% Significance Level											
690												
691	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
692	KM Mean					2.201	KM Standard Error of Mean					0.907
693	KM SD					6.826	95% KM (BCA) UCL					3.977
694	95% KM (t) UCL					3.717	95% KM (Percentile Bootstrap) UCL					3.957
695	95% KM (z) UCL					3.692	95% KM Bootstrap t UCL					7.335
696	90% KM Chebyshev UCL					4.921	95% KM Chebyshev UCL					6.153
697	97.5% KM Chebyshev UCL					7.864	99% KM Chebyshev UCL					11.22
698												
699	Gamma GOF Tests on Detected Observations Only											
700	A-D Test Statistic					1.421	Anderson-Darling GOF Test					
701	5% A-D Critical Value					0.812	Detected Data Not Gamma Distributed at 5% Significance Level					
702	K-S Test Statistic					0.154	Kolmogorov-Smirnov GOF					
703	5% K-S Critical Value					0.138	Detected Data Not Gamma Distributed at 5% Significance Level					
704	Detected Data Not Gamma Distributed at 5% Significance Level											
705												
706	Gamma Statistics on Detected Data Only											
707	k hat (MLE)					0.517	k star (bias corrected MLE)					0.497
708	Theta hat (MLE)					5.256	Theta star (bias corrected MLE)					5.459
709	nu hat (MLE)					47.53	nu star (bias corrected)					45.76
710	Mean (detects)					2.715						
711												
712	Gamma ROS Statistics using Imputed Non-Detects											
713	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
714	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
715	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
716	This is especially true when the sample size is small.											
717	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
718	Minimum					0.01	Mean					2.156
719	Maximum					52	Median					0.435
720	SD					6.894	CV					3.198

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
721	k hat (MLE)					0.354	k star (bias corrected MLE)					0.347
722	Theta hat (MLE)					6.097	Theta star (bias corrected MLE)					6.216
723	nu hat (MLE)					41.01	nu star (bias corrected)					40.22
724	Adjusted Level of Significance (β)					0.0459						
725	Approximate Chi Square Value (40.22, α)					26.69	Adjusted Chi Square Value (40.22, β)					26.41
726	95% Gamma Approximate UCL (use when $n \geq 50$)					3.248	95% Gamma Adjusted UCL (use when $n < 50$)					3.283
727												
728	Estimates of Gamma Parameters using KM Estimates											
729	Mean (KM)					2.201	SD (KM)					6.826
730	Variance (KM)					46.6	SE of Mean (KM)					0.907
731	k hat (KM)					0.104	k star (KM)					0.11
732	nu hat (KM)					12.06	nu star (KM)					12.77
733	theta hat (KM)					21.17	theta star (KM)					20
734	80% gamma percentile (KM)					1.74	90% gamma percentile (KM)					6.072
735	95% gamma percentile (KM)					12.68	99% gamma percentile (KM)					33.31
736												
737	Gamma Kaplan-Meier (KM) Statistics											
738	Approximate Chi Square Value (12.77, α)					5.736	Adjusted Chi Square Value (12.77, β)					5.616
739	95% Gamma Approximate KM-UCL (use when $n \geq 50$)					4.898	95% Gamma Adjusted KM-UCL (use when $n < 50$)					5.003
740												
741	Lognormal GOF Test on Detected Observations Only											
742	Shapiro Wilk Test Statistic					0.972	Shapiro Wilk GOF Test					
743	5% Shapiro Wilk Critical Value					0.945	Detected Data appear Lognormal at 5% Significance Level					
744	Lilliefors Test Statistic					0.128	Lilliefors GOF Test					
745	5% Lilliefors Critical Value					0.129	Detected Data appear Lognormal at 5% Significance Level					
746	Detected Data appear Lognormal at 5% Significance Level											
747												
748	Lognormal ROS Statistics Using Imputed Non-Detects											
749	Mean in Original Scale					2.187	Mean in Log Scale					-0.595
750	SD in Original Scale					6.884	SD in Log Scale					1.605
751	95% t UCL (assumes normality of ROS data)					3.698	95% Percentile Bootstrap UCL					3.986
752	95% BCA Bootstrap UCL					4.952	95% Bootstrap t UCL					7.263
753	95% H-UCL (Log ROS)					3.997						
754												
755	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
756	KM Mean (logged)					-0.636	KM Geo Mean					0.53
757	KM SD (logged)					1.662	95% Critical H Value (KM-Log)					3.34
758	KM Standard Error of Mean (logged)					0.227	95% H-UCL (KM -Log)					4.396
759	KM SD (logged)					1.662	95% Critical H Value (KM-Log)					3.34
760	KM Standard Error of Mean (logged)					0.227						
761												
762	DL/2 Statistics											
763	DL/2 Normal					DL/2 Log-Transformed						
764	Mean in Original Scale					2.288	Mean in Log Scale					-0.496
765	SD in Original Scale					6.89	SD in Log Scale					1.599
766	95% t UCL (Assumes normality)					3.801	95% H-Stat UCL					4.354
767	DL/2 is not a recommended method, provided for comparisons and historical reasons											
768												

Table 13

ProUCL Output

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

	A	B	C	D	E	F	G	H	I	J	K	L
769	Nonparametric Distribution Free UCL Statistics											
770	Detected Data appear Lognormal Distributed at 5% Significance Level											
771												
772	Suggested UCL to Use											
773					KM H-UCL	4.396						
774												
775	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
776	Recommendations are based upon data size, data distribution, and skewness.											
777	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
778	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
779												

Attachment 3

Maintenance Worker Risk Calculations

Table 1 – Normalized Average Vapor Flux from Soil to Outdoor Air

Table 2 – Dispersion Factor to Outdoor Air

Table 3 – Concentrations in Outdoor Air from Soil

Table 4a – Unit Risk Calculations for Exposure of Maintenance Workers to Soil

Table 4b – Unit Hazard Quotient Calculations for Exposure of Maintenance Workers to Soil

Table 5 – Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Table 6 – Dermal Absorbed Dose for Groundwater

Table 7a – Unit Risk Calculations for Exposure of Maintenance Workers to Groundwater in Excavations

Table 7b – Unit Hazard Quotient Calculations for Exposure of Maintenance Workers to Groundwater in Excavations



Attachment 3

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	D _G (m ² /d)	D _L (m ² /d)	D _E (m ² /d)	J _v (kg/m ² -s)
VOC	Benzene	71-43-2	5.82E+01		1.68E-01	7.60E-01	8.47E-05	9.47E-02	1.21E-07	2.61E-02	4.69E-06
VOC	Cumene	98-82-8	7.05E+02		3.28E-01	5.62E-01	6.13E-05	6.99E-02	8.79E-08	3.80E-03	4.48E-06
VOC	1,2-Dibromoethane	106-93-4	2.22E+01		2.37E-02	3.72E-01	7.29E-05	4.63E-02	1.05E-07	4.09E-03	4.49E-06
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.92E-02	8.99E-01	8.55E-05	1.12E-01	1.23E-07	1.41E-02	4.64E-06
VOC	Ethyl Benzene	100-41-4	3.67E+02		2.20E-01	6.48E-01	6.74E-05	8.07E-02	9.66E-08	5.56E-03	4.54E-06
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.83E-02	7.42E-01	8.73E-05	9.24E-02	1.25E-07	9.49E-03	4.60E-06
VOC	Toluene	108-88-3	1.80E+02		1.93E-01	7.52E-01	7.43E-05	9.36E-02	1.06E-07	1.11E-02	4.62E-06
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.61E-01	5.24E-01	6.84E-05	6.52E-02	9.81E-08	1.39E-03	4.27E-06
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.54E-01	5.20E-01	7.49E-05	6.48E-02	1.07E-07	6.76E-04	4.03E-06
VOC	Xylenes (total)	1330-20-7	3.86E+02		2.52E-01	6.74E-01	7.56E-05	8.39E-02	1.08E-07	6.29E-03	4.55E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.30E-03	2.80E-01	6.69E-05	3.49E-02	9.58E-08	1.85E-07	1.54E-07
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		5.55E-05	4.41E-01	7.78E-05	5.49E-02	1.11E-07	9.48E-10	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		1.49E-05	3.72E-01	7.78E-05	4.63E-02	1.11E-07	9.53E-11	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		1.66E-03	1.95E-01	4.80E-05	2.43E-02	6.88E-08	3.91E-09	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		1.10E-05	1.88E-01	4.54E-05	2.33E-02	6.51E-08	3.03E-12	
SVOC	Chrysene	218-01-9	4.01E+05		1.48E-03	2.14E-01	5.37E-05	2.67E-02	7.69E-08	1.19E-08	
SVOC	Ethanol	64-17-5	6.81E-01		1.75E-04	1.06E+00	1.12E-04	1.32E-01	1.61E-07	2.79E-04	
SVOC	Fluorene	86-73-7	1.38E+04		1.39E-03	3.14E-01	6.81E-05	3.90E-02	9.76E-08	4.75E-07	2.47E-07
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		2.03E-05	1.64E-01	4.89E-05	2.04E-02	7.01E-08	1.70E-11	
SVOC	Naphthalene	91-20-3	2.01E+03		1.20E-02	5.10E-01	6.48E-05	6.35E-02	9.29E-08	4.56E-05	2.28E-06
SVOC	Phenanthrene	85-01-8	2.42E+04		1.41E-03	3.24E-01	6.45E-05	4.03E-02	9.25E-08	2.82E-07	1.91E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.00E-04	2.35E-01	6.26E-05	2.93E-02	8.96E-08	6.79E-09	
SVOC	Tetraethylene Glycol	112-60-7	3.00E-02		1.62E-11	4.39E-01	6.96E-05	5.46E-02	9.97E-08	1.28E-06	
INORG	Lead	7439-92-1		9.00E+02							

Attachment 3

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Soil bulk density	kg/L	ρ_b	1.66
Soil porosity	L/L-soil	θ	0.38
Soil water content	L/L-soil	θ_w	0.08
Soil air-filled porosity	L/L-soil	θ_a	0.30
Soil organic carbon fraction	unitless	f_{oc}	0.005
Averaging period (Exposure Duration)	years	T	10
	days	T	3650
Temperature	$^{\circ}\text{C}$	Temp	18
Clean soil above source	m	Z_1	
Bottom of source depth	m	Z_2	0.91

Based on the volatilization model developed by Jury et. al. (1983) for finite sources as described in USEPA's (1996) Soil Screening Guidance: Technical Background Document. The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 3

Table 2

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Soil source area	acres	20.6
		Annual
Soil C/Q averaging time		Max
Conversion factor from 1-Hr Max for soil		0.19
C/Q for soil	(kg/m³)/(kg/m²-s)	21.04

Groundwater source area	acres	0.0052
		24-Hour
Groundwater averaging time for C/Q		Max
Conversion factor from 1-Hr Max for groundwater		0.40
C/Q for Groundwater	(L/m³)/(L/m²-s)	9.63

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 3

Table 3

Concentrations in Outdoor Air from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Chem	Chemical	CASRN	Vapor		PM ₁₀	
			C _{soil} (mg/kg)	C _{air} (mg/m ³)	C _{soil} (mg/kg)	C _{air} (mg/m ³)
			C/Q (kg/m ³ per kg/m ² -s): 2.1E+01			
VOC	Benzene	71-43-2	1.00E+00	9.86E-05	1.00E+00	5.00E-08
VOC	Cumene	98-82-8	1.00E+00	9.43E-05	1.00E+00	5.00E-08
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	9.45E-05	1.00E+00	5.00E-08
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	9.76E-05	1.00E+00	5.00E-08
VOC	Ethyl Benzene	100-41-4	1.00E+00	9.55E-05	1.00E+00	5.00E-08
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	9.68E-05	1.00E+00	5.00E-08
VOC	Toluene	108-88-3	1.00E+00	9.72E-05	1.00E+00	5.00E-08
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	8.97E-05	1.00E+00	5.00E-08
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	8.49E-05	1.00E+00	5.00E-08
VOC	Xylenes (total)	1330-20-7	1.00E+00	9.58E-05	1.00E+00	5.00E-08
SVOC	Anthracene	120-12-7	1.00E+00	3.24E-06	1.00E+00	5.00E-08
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Chrysene	218-01-9	1.00E+00		1.00E+00	5.00E-08
SVOC	Ethanol	64-17-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Fluorene	86-73-7	1.00E+00	5.20E-06	1.00E+00	5.00E-08
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Naphthalene	91-20-3	1.00E+00	4.79E-05	1.00E+00	5.00E-08
SVOC	Phenanthrene	85-01-8	1.00E+00	4.01E-06	1.00E+00	5.00E-08
SVOC	Pyrene	129-00-0	1.00E+00		1.00E+00	5.00E-08
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.00E+00	5.00E-08
INORG	Lead	7439-92-1	1.00E+00		1.00E+00	5.00E-08

Attachment 3

Table 4a

Unit Risk Calculations for Exposure of Maintenance Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes Risk
					RBA	LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	ABS _{derm}	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	
VOC	Benzene	71-43-2	A	1.00E+00		1.47E-08	5.5E-02	8.1E-10			5.5E-02		9.86E-05	7.8E-03	3.0E-09	5.00E-08	7.8E-03	1.5E-12	3.8E-09
VOC	Cumene	98-82-8	D	1.00E+00		1.47E-08							9.43E-05			5.00E-08			
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00		1.47E-08	2.0E+00	2.9E-08			2.0E+00		9.45E-05	6.0E-01	2.2E-07	5.00E-08	6.0E-01	1.2E-10	2.5E-07
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00		1.47E-08	9.1E-02	1.3E-09			9.1E-02		9.76E-05	2.6E-02	9.9E-09	5.00E-08	2.6E-02	5.1E-12	1.1E-08
VOC	Ethyl Benzene	100-41-4	D	1.00E+00		1.47E-08							9.55E-05			5.00E-08			
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00		1.47E-08	1.8E-03	2.6E-11			1.8E-03		9.68E-05	2.6E-04	9.9E-11	5.00E-08	2.6E-04	5.1E-14	1.3E-10
VOC	Toluene	108-88-3	ID	1.00E+00		1.47E-08							9.72E-05			5.00E-08			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00		1.47E-08							8.97E-05			5.00E-08			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00		1.47E-08							8.49E-05			5.00E-08			
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00		1.47E-08							9.58E-05			5.00E-08			
SVOC	Anthracene	120-12-7	ID	1.00E+00		1.47E-08			1.30E-01	8.08E-09			3.24E-06			5.00E-08			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		1.47E-08	1.0E-01	1.5E-09	1.30E-01	8.08E-09	1.0E-01	8.1E-10		6.0E-02		5.00E-08	6.0E-02	1.2E-11	2.3E-09
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		1.47E-08	1.0E+00	1.5E-08	1.30E-01	8.08E-09	1.0E+00	8.1E-09		6.0E-01		5.00E-08	6.0E-01	1.2E-10	2.3E-08
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		1.47E-08	1.0E-01	1.5E-09	1.30E-01	8.08E-09	1.0E-01	8.1E-10		6.0E-02		5.00E-08	6.0E-02	1.2E-11	2.3E-09
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00		1.47E-08			1.30E-01	8.08E-09						5.00E-08			
SVOC	Chrysene	218-01-9	B2	1.00E+00		1.47E-08	1.0E-03	1.5E-11	1.30E-01	8.08E-09	1.0E-03	8.1E-12		6.0E-04		5.00E-08	6.0E-04	1.2E-13	2.3E-11
SVOC	Ethanol	64-17-5		1.00E+00		1.47E-08										5.00E-08			
SVOC	Fluorene	86-73-7	D	1.00E+00		1.47E-08			1.30E-01	8.08E-09			5.20E-06			5.00E-08			
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		1.47E-08	1.0E-01	1.5E-09	1.30E-01	8.08E-09	1.0E-01	8.1E-10		6.0E-02		5.00E-08	6.0E-02	1.2E-11	2.3E-09
SVOC	Naphthalene	91-20-3	C	1.00E+00		1.47E-08	1.2E-01	1.8E-09	1.30E-01	8.08E-09	1.2E-01	9.7E-10	4.79E-05	3.4E-02	6.4E-09	5.00E-08	3.4E-02	6.7E-12	9.1E-09
SVOC	Phenanthrene	85-01-8	D	1.00E+00		1.47E-08			1.30E-01	8.08E-09			4.01E-06			5.00E-08			
SVOC	Pyrene	129-00-0	NC	1.00E+00		1.47E-08			1.30E-01	8.08E-09						5.00E-08			
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00		1.47E-08			1.00E-01	6.21E-09						5.00E-08			
INORG	Lead	7439-92-1	B2	1.00E+00		1.47E-08										5.00E-08			

Notes:
The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³.

Attachment 3

Table 4b

Unit Hazard Quotient Calculations for Exposure of Maintenance Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes	
				RBA	ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	ABS _{derm}	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ	
VOC	Benzene	71-43-2	1.00E+00		1.03E-07	4.0E-03	2.6E-05			4.0E-03			9.86E-05	3.0E-02	9.0E-05	5.00E-08	3.0E-02	4.6E-08	1.2E-04
VOC	Cumene	98-82-8	1.00E+00		1.03E-07	1.0E-01	1.0E-06			1.0E-01			9.43E-05	4.0E-01	6.5E-06	5.00E-08	4.0E-01	3.4E-09	7.5E-06
VOC	1,2-Dibromoethane	106-93-4	1.00E+00		1.03E-07	9.0E-03	1.1E-05			9.0E-03			9.45E-05	9.0E-03	2.9E-04	5.00E-08	9.0E-03	1.5E-07	3.0E-04
VOC	1,2-Dichloroethane	107-06-2	1.00E+00		1.03E-07	2.0E-02	5.1E-06			2.0E-02			9.76E-05	7.0E-03	3.8E-04	5.00E-08	7.0E-03	2.0E-07	3.9E-04
VOC	Ethyl Benzene	100-41-4	1.00E+00		1.03E-07	1.0E-01	1.0E-06			1.0E-01			9.55E-05	1.0E+00	2.6E-06	5.00E-08	1.0E+00	1.4E-09	3.6E-06
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00		1.03E-07	3.0E-01	3.4E-07			3.0E-01			9.68E-05	3.0E+00	8.8E-07	5.00E-08	3.0E+00	4.6E-10	1.2E-06
VOC	Toluene	108-88-3	1.00E+00		1.03E-07	8.0E-02	1.3E-06			8.0E-02			9.72E-05	5.0E+00	5.3E-07	5.00E-08	5.0E+00	2.7E-10	1.8E-06
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00		1.03E-07	1.0E-02	1.0E-05			1.0E-02			8.97E-05	6.0E-02	4.1E-05	5.00E-08	6.0E-02	2.3E-08	5.1E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00		1.03E-07	1.0E-02	1.0E-05			1.0E-02			8.49E-05	6.0E-02	3.9E-05	5.00E-08	6.0E-02	2.3E-08	4.9E-05
VOC	Xylenes (total)	1330-20-7	1.00E+00		1.03E-07	2.0E-01	5.1E-07			2.0E-01			9.58E-05	1.0E-01	2.6E-05	5.00E-08	1.0E-01	1.4E-08	2.7E-05
SVOC	Anthracene	120-12-7	1.00E+00		1.03E-07	3.0E-01	3.4E-07	1.30E-01	5.65E-08	3.0E-01	1.9E-07		3.24E-06			5.00E-08			5.3E-07
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.03E-07			1.30E-01	5.65E-08							5.00E-08			
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.03E-07	3.0E-04	3.4E-04	1.30E-01	5.65E-08	3.0E-04	1.9E-04			2.0E-06		5.00E-08	2.0E-06	6.8E-04	1.2E-03
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.03E-07			1.30E-01	5.65E-08							5.00E-08			
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.03E-07	3.0E-02	3.4E-06	1.30E-01	5.65E-08	3.0E-02	1.9E-06					5.00E-08			5.3E-06
SVOC	Chrysene	218-01-9	1.00E+00		1.03E-07			1.30E-01	5.65E-08							5.00E-08			
SVOC	Ethanol	64-17-5	1.00E+00		1.03E-07	6.2E+01	1.7E-09			6.2E+01				1.9E+01		5.00E-08	1.9E+01	7.2E-11	1.7E-09
SVOC	Fluorene	86-73-7	1.00E+00		1.03E-07	4.0E-02	2.6E-06	1.30E-01	5.65E-08	4.0E-02	1.4E-06		5.20E-06			5.00E-08			4.0E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.03E-07			1.30E-01	5.65E-08							5.00E-08			
SVOC	Naphthalene	91-20-3	1.00E+00		1.03E-07	2.0E-02	5.1E-06	1.30E-01	5.65E-08	2.0E-02	2.8E-06		4.79E-05	3.0E-03	4.4E-04	5.00E-08	3.0E-03	4.6E-07	4.5E-04
SVOC	Phenanthrene	85-01-8	1.00E+00		1.03E-07	3.0E-02	3.4E-06	1.30E-01	5.65E-08	3.0E-02	1.9E-06		4.01E-06			5.00E-08			5.3E-06
SVOC	Pyrene	129-00-0	1.00E+00		1.03E-07	3.0E-02	3.4E-06	1.30E-01	5.65E-08	3.0E-02	1.9E-06					5.00E-08			5.3E-06
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.03E-07	2.0E+00	5.1E-08	1.00E-01	4.35E-08	2.0E+00	2.2E-08					5.00E-08			7.3E-08
INORG	Lead	7439-92-1	1.00E+00		1.03E-07											5.00E-08			

Notes:

The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³.

Attachment 3

Table 5

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	k_G (cm/s)	k_L (cm/s)	$1/K_L$ (s/cm)	K_L (cm/s)	J_L (L/m ² -s)
VOC	Benzene	71-43-2	1.7E-01	7.8E+01	4.97E-01	1.25E-03	8.12E+02	1.23E-03	1.23E-02
VOC	Cumene	98-82-8	3.3E-01	1.2E+02	4.31E-01	1.01E-03	9.99E+02	1.00E-03	1.00E-02
VOC	1,2-Dibromoethane	106-93-4	2.4E-02	1.9E+02	3.71E-01	8.06E-04	1.35E+03	7.38E-04	7.38E-03
VOC	1,2-Dichloroethane	107-06-2	2.9E-02	9.9E+01	4.60E-01	1.11E-03	9.75E+02	1.03E-03	1.03E-02
VOC	Ethyl Benzene	100-41-4	2.2E-01	1.1E+02	4.49E-01	1.07E-03	9.43E+02	1.06E-03	1.06E-02
VOC	Methyl tert-butyl ether	1634-04-4	1.8E-02	8.8E+01	4.78E-01	1.18E-03	9.64E+02	1.04E-03	1.04E-02
VOC	Toluene	108-88-3	1.9E-01	9.2E+01	4.71E-01	1.15E-03	8.80E+02	1.14E-03	1.14E-02
VOC	1,2,4-Trimethylbenzene	95-63-6	1.6E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	Xylenes (total)	1330-20-7	2.5E-01	1.1E+02	4.49E-01	1.07E-03	9.42E+02	1.06E-03	1.06E-02
SVOC	Anthracene	120-12-7	1.3E-03	1.8E+02	3.77E-01	8.28E-04	3.24E+03	3.09E-04	3.09E-03
SVOC	Benzo(a)anthracene	56-55-3	5.6E-05	2.3E+02	3.47E-01	7.31E-04	5.32E+04	1.88E-05	
SVOC	Benzo(a)pyrene	50-32-8	1.5E-05	2.5E+02	3.36E-01	6.96E-04	2.01E+05	4.98E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	1.7E-03	2.5E+02	3.36E-01	6.96E-04	3.23E+03	3.09E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.1E-05	2.8E+02	3.26E-01	6.65E-04	2.81E+05	3.56E-06	
SVOC	Chrysene	218-01-9	1.5E-03	2.3E+02	3.47E-01	7.31E-04	3.31E+03	3.02E-04	
SVOC	Ethanol	64-17-5	1.7E-04	4.6E+01	5.94E-01	1.63E-03	1.02E+04	9.76E-05	
SVOC	Fluorene	86-73-7	1.4E-03	1.7E+02	3.86E-01	8.57E-04	3.03E+03	3.30E-04	3.30E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.0E-05	2.8E+02	3.26E-01	6.65E-04	1.53E+05	6.54E-06	
SVOC	Naphthalene	91-20-3	1.2E-02	1.3E+02	4.21E-01	9.76E-04	1.22E+03	8.18E-04	8.18E-03
SVOC	Phenanthrene	85-01-8	1.4E-03	1.8E+02	3.77E-01	8.28E-04	3.09E+03	3.23E-04	3.23E-03
SVOC	Pyrene	129-00-0	2.0E-04	2.0E+02	3.62E-01	7.77E-04	1.51E+04	6.62E-05	
SVOC	Tetraethylene Glycol	112-60-7	1.6E-11	1.9E+02	3.67E-01	7.93E-04	1.68E+11	5.95E-12	
INORG	Lead	7439-92-1		2.1E+02	3.59E-01	7.68E-04			

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Table 5

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Molecular Weight of Oxygen	g/mol	MW_{O2}	32
Molecular Weight of Water	g/mol	MW_{H2O}	18
Temperature	K	Temp	291
Liquid-phase Mass Transfer Coefficient for Oxygen	cm/s	k_{L,O2}	0.002
Gas-Phase Mass Transfer Coefficient for Water Vapor at 25 °C	cm/s (L/m ³) /	K_{G,H2O}	0.833
Dispersion coefficient	(L/m ² /s)	C/Q	9.6

Attachment 3

Table 6

Dermal Absorbed Dose for Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	MW (g/mole)	FA (unitless)	K _p (cm/hr)	B (unitless)	t (hr)	c	b	ts (hr)	DA (L/cm ² -event)
VOC	Benzene	71-43-2	7.8E+01	1.0E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	3.70E-05
VOC	Cumene	98-82-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,2-Dibromoethane	106-93-4	1.9E+02	1.0E+00	1.6E-03	8.4E-03	1.2E+00	3.4E-01	3.1E-01	2.8E+00	6.81E-06
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.0E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.13E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	1.0E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.27E-04
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.0E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	8.84E-06
VOC	Toluene	108-88-3	9.2E+01	1.0E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	8.08E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	Xylenes (total)	1330-20-7	1.1E+02	1.0E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.32E-04
SVOC	Anthracene	120-12-7	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Chrysene	218-01-9	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Ethanol	64-17-5	4.6E+01	1.0E+00	5.5E-04	1.4E-03	1.9E-01	3.3E-01	3.0E-01	4.6E-01	1.30E-06
SVOC	Fluorene	86-73-7	1.7E+02	1.0E+00			9.0E-01	3.3E-01	3.0E-01	2.2E+00	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Naphthalene	91-20-3	1.3E+02	1.0E+00			5.5E-01	3.3E-01	3.0E-01	1.3E+00	
SVOC	Phenanthrene	85-01-8	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Pyrene	129-00-0	2.0E+02	1.0E+00			1.4E+00	3.3E-01	3.0E-01	3.4E+00	
SVOC	Tetraethylene Glycol	112-60-7	1.9E+02	1.0E+00			1.3E+00	3.3E-01	3.0E-01	3.1E+00	
INORG	Lead	7439-92-1	2.1E+02		1.0E-04		1.5E+00	3.3E-01	3.0E-01	3.7E+00	2.00E-07

Notes:

Event Time hours t 2

K_p capped at 1 cm/hr (USEPA 1992).

The dermal absorbed dose for inorganic chemicals is estimated using a steady-state approach (USEPA 2004, Equation 3.4) and for organic chemicals is estimated using a nonsteady-state approach (USEPA 2004, Equations 3.2 and 3.3).

Attachment 3

Table 7a

Unit Risk Calculations for Exposure of Maintenance Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{gw} (mg/l)	Incidental Ingestion			Dermal Contact				Vapor Inhalation			All Routes Risk
					LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	DA (L/cm ² -event)	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	
VOC	Benzene	71-43-2	A	1.00E+00	7.34E-07	5.5E-02	4.0E-08	3.70E-05	9.57E-06	5.5E-02	5.3E-07	1.19E-01	7.8E-03	1.8E-06	2.4E-06
VOC	Cumene	98-82-8	D	1.00E+00	7.34E-07							9.64E-02			
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	7.34E-07	2.0E+00	1.5E-06	6.81E-06	1.76E-06	2.0E+00	3.5E-06	7.11E-02	6.0E-01	8.4E-05	8.9E-05
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	7.34E-07	9.1E-02	6.7E-08	1.13E-05	2.92E-06	9.1E-02	2.7E-07	9.88E-02	2.6E-02	5.0E-06	5.4E-06
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	7.34E-07			1.27E-04	3.28E-05			1.02E-01			
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	7.34E-07	1.8E-03	1.3E-09	8.84E-06	2.29E-06	1.8E-03	4.1E-09	9.99E-02	2.6E-04	5.1E-08	5.6E-08
VOC	Toluene	108-88-3	ID	1.00E+00	7.34E-07			8.08E-05	2.09E-05			1.09E-01			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	7.34E-07							9.57E-02			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	7.34E-07							9.56E-02			
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	7.34E-07			1.32E-04	3.41E-05			1.02E-01			
SVOC	Anthracene	120-12-7	ID	1.00E+00	7.34E-07							2.97E-02			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00	7.34E-07	1.0E-01	7.3E-08			1.0E-01			6.0E-02		7.3E-08
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00	7.34E-07	1.0E+00	7.3E-07			1.0E+00			6.0E-01		7.3E-07
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00	7.34E-07	1.0E-01	7.3E-08			1.0E-01			6.0E-02		7.3E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00	7.34E-07										
SVOC	Chrysene	218-01-9	B2	1.00E+00	7.34E-07	1.0E-03	7.3E-10			1.0E-03			6.0E-04		7.3E-10
SVOC	Ethanol	64-17-5		1.00E+00	7.34E-07			1.30E-06	3.36E-07						
SVOC	Fluorene	86-73-7	D	1.00E+00	7.34E-07							3.18E-02			
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00	7.34E-07	1.0E-01	7.3E-08			1.0E-01			6.0E-02		7.3E-08
SVOC	Naphthalene	91-20-3	C	1.00E+00	7.34E-07	1.2E-01	8.8E-08			1.2E-01		7.88E-02	3.4E-02	5.2E-06	5.3E-06
SVOC	Phenanthrene	85-01-8	D	1.00E+00	7.34E-07							3.11E-02			
SVOC	Pyrene	129-00-0	NC	1.00E+00	7.34E-07										
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00	7.34E-07										
INORG	Lead	7439-92-1	B2	1.00E+00	7.34E-07			2.00E-07	5.18E-08						

Attachment 3

Table 7b

Hazard Quotient Calculations for Exposure of Maintenance Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{gw} (mg/L)	Incidental Ingestion			Dermal Contact				Vapor Inhalation			All Routes
				ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	DA (L/cm ² - event)	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ
VOC	Benzene	71-43-2	1.00E+00	5.14E-06	4.0E-03	1.3E-03	3.70E-05	6.70E-05	4.0E-03	1.7E-02	1.19E-01	3.0E-02	5.4E-02	7.2E-02
VOC	Cumene	98-82-8	1.00E+00	5.14E-06	1.0E-01	5.1E-05			1.0E-01		9.64E-02	4.0E-01	3.3E-03	3.4E-03
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	5.14E-06	9.0E-03	5.7E-04	6.81E-06	1.23E-05	9.0E-03	1.4E-03	7.11E-02	9.0E-03	1.1E-01	1.1E-01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	5.14E-06	2.0E-02	2.6E-04	1.13E-05	2.05E-05	2.0E-02	1.0E-03	9.88E-02	7.0E-03	1.9E-01	1.9E-01
VOC	Ethyl Benzene	100-41-4	1.00E+00	5.14E-06	1.0E-01	5.1E-05	1.27E-04	2.30E-04	1.0E-01	2.3E-03	1.02E-01	1.0E+00	1.4E-03	3.7E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	5.14E-06	3.0E-01	1.7E-05	8.84E-06	1.60E-05	3.0E-01	5.3E-05	9.99E-02	3.0E+00	4.6E-04	5.3E-04
VOC	Toluene	108-88-3	1.00E+00	5.14E-06	8.0E-02	6.4E-05	8.08E-05	1.46E-04	8.0E-02	1.8E-03	1.09E-01	5.0E+00	3.0E-04	2.2E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	5.14E-06	1.0E-02	5.1E-04			1.0E-02		9.57E-02	6.0E-02	2.2E-02	2.2E-02
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	5.14E-06	1.0E-02	5.1E-04			1.0E-02		9.56E-02	6.0E-02	2.2E-02	2.2E-02
VOC	Xylenes (total)	1330-20-7	1.00E+00	5.14E-06	2.0E-01	2.6E-05	1.32E-04	2.39E-04	2.0E-01	1.2E-03	1.02E-01	1.0E-01	1.4E-02	1.5E-02
SVOC	Anthracene	120-12-7	1.00E+00	5.14E-06	3.0E-01	1.7E-05			3.0E-01		2.97E-02			1.7E-05
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00	5.14E-06										
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00	5.14E-06	3.0E-04	1.7E-02			3.0E-04			2.0E-06		1.7E-02
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00	5.14E-06										
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00	5.14E-06	3.0E-02	1.7E-04			3.0E-02					1.7E-04
SVOC	Chrysene	218-01-9	1.00E+00	5.14E-06										
SVOC	Ethanol	64-17-5	1.00E+00	5.14E-06	6.2E+01	8.3E-08	1.30E-06	2.35E-06	6.2E+01	3.8E-08		1.9E+01		1.2E-07
SVOC	Fluorene	86-73-7	1.00E+00	5.14E-06	4.0E-02	1.3E-04			4.0E-02		3.18E-02			1.3E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00	5.14E-06										
SVOC	Naphthalene	91-20-3	1.00E+00	5.14E-06	2.0E-02	2.6E-04			2.0E-02		7.88E-02	3.0E-03	3.6E-01	3.6E-01
SVOC	Phenanthrene	85-01-8	1.00E+00	5.14E-06	3.0E-02	1.7E-04			3.0E-02		3.11E-02			1.7E-04
SVOC	Pyrene	129-00-0	1.00E+00	5.14E-06	3.0E-02	1.7E-04			3.0E-02					1.7E-04
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00	5.14E-06	2.0E+00	2.6E-06			2.0E+00					2.6E-06
INORG	Lead	7439-92-1	1.00E+00	5.14E-06			2.00E-07	3.62E-07						

Attachment 4

Construction Worker Risk Calculations

Table 1 – Normalized Average Vapor Flux from Soil to Outdoor Air

Table 2 – Dispersion Factor to Outdoor Air

Table 3 – Concentrations in Outdoor Air from Soil

Table 4a – Unit Risk Calculations for Exposure of Construction Workers to Soil

Table 4b – Unit Hazard Quotient Calculations for Exposure of Construction Workers to Soil

Table 5 – Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Table 6 – Dermal Absorbed Dose for Groundwater

Table 7a – Unit Risk Calculations for Exposure of Construction Workers to Groundwater in Excavations

Table 7b – Unit Hazard Quotient Calculations for Exposure of Construction Workers to Groundwater in Excavations



Attachment 4

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	D _G (m ² /d)	D _L (m ² /d)	D _E (m ² /d)	J _v (kg/m ² -s)
VOC	Benzene	71-43-2	5.82E+01		1.68E-01	7.60E-01	8.47E-05	9.47E-02	1.21E-07	2.61E-02	4.41E-05
VOC	Cumene	98-82-8	7.05E+02		3.28E-01	5.62E-01	6.13E-05	6.99E-02	8.79E-08	3.80E-03	3.78E-05
VOC	1,2-Dibromoethane	106-93-4	2.22E+01		2.37E-02	3.72E-01	7.29E-05	4.63E-02	1.05E-07	4.09E-03	3.82E-05
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.92E-02	8.99E-01	8.55E-05	1.12E-01	1.23E-07	1.41E-02	4.27E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		2.20E-01	6.48E-01	6.74E-05	8.07E-02	9.66E-08	5.56E-03	3.96E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.83E-02	7.42E-01	8.73E-05	9.24E-02	1.25E-07	9.49E-03	4.15E-05
VOC	Toluene	108-88-3	1.80E+02		1.93E-01	7.52E-01	7.43E-05	9.36E-02	1.06E-07	1.11E-02	4.20E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.61E-01	5.24E-01	6.84E-05	6.52E-02	9.81E-08	1.39E-03	3.18E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.54E-01	5.20E-01	7.49E-05	6.48E-02	1.07E-07	6.76E-04	2.62E-05
VOC	Xylenes (total)	1330-20-7	3.86E+02		2.52E-01	6.74E-01	7.56E-05	8.39E-02	1.08E-07	6.29E-03	4.01E-05
SVOC	Anthracene	120-12-7	2.97E+04		1.30E-03	2.80E-01	6.69E-05	3.49E-02	9.58E-08	1.85E-07	4.88E-07
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		5.55E-05	4.41E-01	7.78E-05	5.49E-02	1.11E-07	9.48E-10	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		1.49E-05	3.72E-01	7.78E-05	4.63E-02	1.11E-07	9.53E-11	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		1.66E-03	1.95E-01	4.80E-05	2.43E-02	6.88E-08	3.91E-09	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		1.10E-05	1.88E-01	4.54E-05	2.33E-02	6.51E-08	3.03E-12	
SVOC	Chrysene	218-01-9	4.01E+05		1.48E-03	2.14E-01	5.37E-05	2.67E-02	7.69E-08	1.19E-08	
SVOC	Ethanol	64-17-5	6.81E-01		1.75E-04	1.06E+00	1.12E-04	1.32E-01	1.61E-07	2.79E-04	
SVOC	Fluorene	86-73-7	1.38E+04		1.39E-03	3.14E-01	6.81E-05	3.90E-02	9.76E-08	4.75E-07	7.82E-07
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		2.03E-05	1.64E-01	4.89E-05	2.04E-02	7.01E-08	1.70E-11	
SVOC	Naphthalene	91-20-3	2.01E+03		1.20E-02	5.10E-01	6.48E-05	6.35E-02	9.29E-08	4.56E-05	7.66E-06
SVOC	Phenanthrene	85-01-8	2.42E+04		1.41E-03	3.24E-01	6.45E-05	4.03E-02	9.25E-08	2.82E-07	6.03E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.00E-04	2.35E-01	6.26E-05	2.93E-02	8.96E-08	6.79E-09	
SVOC	Tetraethylene Glycol	112-60-7	3.00E-02		1.62E-11	4.39E-01	6.96E-05	5.46E-02	9.97E-08	1.28E-06	
INORG	Lead	7439-92-1		9.00E+02							

Attachment 4

Table 1

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Soil bulk density	kg/L	ρ_b	1.66
Soil porosity	L/L-soil	θ	0.38
Soil water content	L/L-soil	θ_w	0.08
Soil air-filled porosity	L/L-soil	θ_a	0.30
Soil organic carbon fraction	unitless	f_{oc}	0.005
Averaging period (Exposure Duration)	years	T	1
	days	T	365
Temperature	°C	Temp	18
Clean soil above source	m	Z_1	
Bottom of source depth	m	Z_2	0.91

Based on the volatilization model developed by Jury et. al. (1983) for finite sources as described in USEPA's (1996) Soil Screening Guidance: Technical Background Document. The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 4

Table 2

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Soil source area	acres	20.6
		Annual
Soil C/Q averaging time		Max
Conversion factor from 1-Hr Max for soil		0.19
C/Q for soil	(kg/m³)/(kg/m²-s)	21.04

Groundwater source area	acres	0.0052
		24-Hour
Groundwater averaging time for C/Q		Max
Conversion factor from 1-Hr Max for groundwater		0.40
C/Q for Groundwater	(L/m³)/(L/m²-s)	9.63

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 4

Table 3

Concentrations in Outdoor Air from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Chem	Chemical	CASRN	Vapor		PM ₁₀	
			C _{soil} (mg/kg)	C _{air} (mg/m ³)	C _{soil} (mg/kg)	C _{air} (mg/m ³)
			C/Q (kg/m ³ per kg/m ² -s): 2.1E+01			
VOC	Benzene	71-43-2	1.00E+00	9.28E-04	1.00E+00	5.00E-08
VOC	Cumene	98-82-8	1.00E+00	7.96E-04	1.00E+00	5.00E-08
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	8.04E-04	1.00E+00	5.00E-08
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	8.98E-04	1.00E+00	5.00E-08
VOC	Ethyl Benzene	100-41-4	1.00E+00	8.32E-04	1.00E+00	5.00E-08
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	8.74E-04	1.00E+00	5.00E-08
VOC	Toluene	108-88-3	1.00E+00	8.84E-04	1.00E+00	5.00E-08
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	6.69E-04	1.00E+00	5.00E-08
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	5.50E-04	1.00E+00	5.00E-08
VOC	Xylenes (total)	1330-20-7	1.00E+00	8.43E-04	1.00E+00	5.00E-08
SVOC	Anthracene	120-12-7	1.00E+00	1.03E-05	1.00E+00	5.00E-08
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Chrysene	218-01-9	1.00E+00		1.00E+00	5.00E-08
SVOC	Ethanol	64-17-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Fluorene	86-73-7	1.00E+00	1.65E-05	1.00E+00	5.00E-08
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Naphthalene	91-20-3	1.00E+00	1.61E-04	1.00E+00	5.00E-08
SVOC	Phenanthrene	85-01-8	1.00E+00	1.27E-05	1.00E+00	5.00E-08
SVOC	Pyrene	129-00-0	1.00E+00		1.00E+00	5.00E-08
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.00E+00	5.00E-08
INORG	Lead	7439-92-1	1.00E+00		1.00E+00	5.00E-08

Attachment 4

Table 4a

Unit Risk Calculations for Exposure of Construction Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes Risk
					RBA	LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	ABS _{derm}	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	
VOC	Benzene	71-43-2	A	1.00E+00		2.45E-08	5.5E-02	1.3E-09			5.5E-02		9.28E-04	7.8E-03	2.4E-08	5.00E-08	7.8E-03	1.3E-12	2.5E-08
VOC	Cumene	98-82-8	D	1.00E+00		2.45E-08							7.96E-04			5.00E-08			
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00		2.45E-08	2.0E+00	4.9E-08			2.0E+00		8.04E-04	6.0E-01	1.6E-06	5.00E-08	6.0E-01	9.8E-11	1.6E-06
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00		2.45E-08	9.1E-02	2.2E-09			9.1E-02		8.98E-04	2.6E-02	7.6E-08	5.00E-08	2.6E-02	4.2E-12	7.8E-08
VOC	Ethyl Benzene	100-41-4	D	1.00E+00		2.45E-08							8.32E-04			5.00E-08			
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00		2.45E-08	1.8E-03	4.4E-11			1.8E-03		8.74E-04	2.6E-04	7.4E-10	5.00E-08	2.6E-04	4.2E-14	7.9E-10
VOC	Toluene	108-88-3	ID	1.00E+00		2.45E-08							8.84E-04			5.00E-08			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00		2.45E-08							6.69E-04			5.00E-08			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00		2.45E-08							5.50E-04			5.00E-08			
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00		2.45E-08							8.43E-04			5.00E-08			
SVOC	Anthracene	120-12-7	ID	1.00E+00		2.45E-08			1.30E-01	6.73E-09			1.03E-05			5.00E-08			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	1.30E-01	6.73E-09	1.0E-01	6.7E-10		6.0E-02		5.00E-08	6.0E-02	9.8E-12	3.1E-09
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		2.45E-08	1.0E+00	2.4E-08	1.30E-01	6.73E-09	1.0E+00	6.7E-09		6.0E-01		5.00E-08	6.0E-01	9.8E-11	3.1E-08
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	1.30E-01	6.73E-09	1.0E-01	6.7E-10		6.0E-02		5.00E-08	6.0E-02	9.8E-12	3.1E-09
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00		2.45E-08			1.30E-01	6.73E-09						5.00E-08			
SVOC	Chrysene	218-01-9	B2	1.00E+00		2.45E-08	1.0E-03	2.4E-11	1.30E-01	6.73E-09	1.0E-03	6.7E-12		6.0E-04		5.00E-08	6.0E-04	9.8E-14	3.1E-11
SVOC	Ethanol	64-17-5		1.00E+00		2.45E-08										5.00E-08			
SVOC	Fluorene	86-73-7	D	1.00E+00		2.45E-08			1.30E-01	6.73E-09			1.65E-05			5.00E-08			
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	1.30E-01	6.73E-09	1.0E-01	6.7E-10		6.0E-02		5.00E-08	6.0E-02	9.8E-12	3.1E-09
SVOC	Naphthalene	91-20-3	C	1.00E+00		2.45E-08	1.2E-01	2.9E-09	1.30E-01	6.73E-09	1.2E-01	8.1E-10	1.61E-04	3.4E-02	1.8E-08	5.00E-08	3.4E-02	5.5E-12	2.2E-08
SVOC	Phenanthrene	85-01-8	D	1.00E+00		2.45E-08			1.30E-01	6.73E-09			1.27E-05			5.00E-08			
SVOC	Pyrene	129-00-0	NC	1.00E+00		2.45E-08			1.30E-01	6.73E-09						5.00E-08			
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00		2.45E-08			1.00E-01	5.18E-09						5.00E-08			
INORG	Lead	7439-92-1	B2	1.00E+00		2.45E-08										5.00E-08			

Notes:
The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³.

Attachment 4

Table 4b

Unit Hazard Quotient Calculations for Exposure of Construction Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{soil} (mg/kg)	Soil Ingestion				Soil Dermal Contact				Soil Vapor Inhalation			Soil Particulate Inhalation			All Routes
				RBA	ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	ABS _{derm}	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ
VOC	Benzene	71-43-2	1.00E+00		1.71E-06	1.0E-02	1.7E-04			1.0E-02		9.28E-04	9.0E-02	2.4E-03	5.00E-08	9.0E-02	1.3E-07	2.5E-03
VOC	Cumene	98-82-8	1.00E+00		1.71E-06	4.0E-01	4.3E-06			4.0E-01		7.96E-04	4.0E-01	4.5E-04	5.00E-08	4.0E-01	2.9E-08	4.6E-04
VOC	1,2-Dibromoethane	106-93-4	1.00E+00		1.71E-06	9.0E-03	1.9E-04			9.0E-03		8.04E-04	9.0E-03	2.0E-02	5.00E-08	9.0E-03	1.3E-06	2.1E-02
VOC	1,2-Dichloroethane	107-06-2	1.00E+00		1.71E-06	2.0E-02	8.6E-05			2.0E-02		8.98E-04	7.0E-02	2.9E-03	5.00E-08	7.0E-02	1.6E-07	3.0E-03
VOC	Ethyl Benzene	100-41-4	1.00E+00		1.71E-06	1.0E-01	1.7E-05			1.0E-01		8.32E-04	9.0E+00	2.1E-05	5.00E-08	9.0E+00	1.3E-09	3.8E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00		1.71E-06	3.0E-01	5.7E-06			3.0E-01		8.74E-04	3.0E+00	6.6E-05	5.00E-08	3.0E+00	3.8E-09	7.2E-05
VOC	Toluene	108-88-3	1.00E+00		1.71E-06	8.0E-01	2.1E-06			8.0E-01		8.84E-04	5.0E+00	4.0E-05	5.00E-08	5.0E+00	2.3E-09	4.3E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00		1.71E-06	4.0E-02	4.3E-05			4.0E-02		6.69E-04	2.0E-01	7.6E-04	5.00E-08	2.0E-01	5.7E-08	8.1E-04
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00		1.71E-06	4.0E-02	4.3E-05			4.0E-02		5.50E-04	2.0E-01	6.3E-04	5.00E-08	2.0E-01	5.7E-08	6.7E-04
VOC	Xylenes (total)	1330-20-7	1.00E+00		1.71E-06	2.0E-01	8.6E-06			2.0E-01		8.43E-04	3.0E-01	6.4E-04	5.00E-08	3.0E-01	3.8E-08	6.5E-04
SVOC	Anthracene	120-12-7	1.00E+00		1.71E-06	1.0E+00	1.7E-06	1.30E-01	4.71E-07	1.0E+00	4.7E-07	1.03E-05			5.00E-08			2.2E-06
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.71E-06			1.30E-01	4.71E-07						5.00E-08			
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.71E-06	3.0E-04	5.7E-03	1.30E-01	4.71E-07	3.0E-04	1.6E-03		2.0E-06		5.00E-08	2.0E-06	5.7E-03	1.3E-02
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.71E-06			1.30E-01	4.71E-07						5.00E-08			
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.30E-01	4.71E-07	3.0E-01	1.6E-06				5.00E-08			7.3E-06
SVOC	Chrysene	218-01-9	1.00E+00		1.71E-06			1.30E-01	4.71E-07						5.00E-08			
SVOC	Ethanol	64-17-5	1.00E+00		1.71E-06	6.2E+01	2.8E-08			6.2E+01			1.9E+01		5.00E-08	1.9E+01	6.0E-10	2.8E-08
SVOC	Fluorene	86-73-7	1.00E+00		1.71E-06	4.0E-01	4.3E-06	1.30E-01	4.71E-07	4.0E-01	1.2E-06	1.65E-05			5.00E-08			5.5E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.71E-06			1.30E-01	4.71E-07						5.00E-08			
SVOC	Naphthalene	91-20-3	1.00E+00		1.71E-06	2.0E-01	8.6E-06	1.30E-01	4.71E-07	2.0E-01	2.4E-06	1.61E-04	3.0E-03	1.2E-02	5.00E-08	3.0E-03	3.8E-06	1.2E-02
SVOC	Phenanthrene	85-01-8	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.30E-01	4.71E-07	3.0E-01	1.6E-06	1.27E-05			5.00E-08			7.3E-06
SVOC	Pyrene	129-00-0	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.30E-01	4.71E-07	3.0E-01	1.6E-06				5.00E-08			7.3E-06
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.71E-06	2.0E+00	8.6E-07	1.00E-01	3.62E-07	2.0E+00	1.8E-07				5.00E-08			1.0E-06
INORG	Lead	7439-92-1	1.00E+00		1.71E-06										5.00E-08			

Notes:

The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³.

Attachment 4

Table 5

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	k_G (cm/s)	k_L (cm/s)	$1/K_L$ (s/cm)	K_L (cm/s)	J_L (L/m ² -s)
VOC	Benzene	71-43-2	1.7E-01	7.8E+01	4.97E-01	1.25E-03	8.12E+02	1.23E-03	1.23E-02
VOC	Cumene	98-82-8	3.3E-01	1.2E+02	4.31E-01	1.01E-03	9.99E+02	1.00E-03	1.00E-02
VOC	1,2-Dibromoethane	106-93-4	2.4E-02	1.9E+02	3.71E-01	8.06E-04	1.35E+03	7.38E-04	7.38E-03
VOC	1,2-Dichloroethane	107-06-2	2.9E-02	9.9E+01	4.60E-01	1.11E-03	9.75E+02	1.03E-03	1.03E-02
VOC	Ethyl Benzene	100-41-4	2.2E-01	1.1E+02	4.49E-01	1.07E-03	9.43E+02	1.06E-03	1.06E-02
VOC	Methyl tert-butyl ether	1634-04-4	1.8E-02	8.8E+01	4.78E-01	1.18E-03	9.64E+02	1.04E-03	1.04E-02
VOC	Toluene	108-88-3	1.9E-01	9.2E+01	4.71E-01	1.15E-03	8.80E+02	1.14E-03	1.14E-02
VOC	1,2,4-Trimethylbenzene	95-63-6	1.6E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	Xylenes (total)	1330-20-7	2.5E-01	1.1E+02	4.49E-01	1.07E-03	9.42E+02	1.06E-03	1.06E-02
SVOC	Anthracene	120-12-7	1.3E-03	1.8E+02	3.77E-01	8.28E-04	3.24E+03	3.09E-04	3.09E-03
SVOC	Benzo(a)anthracene	56-55-3	5.6E-05	2.3E+02	3.47E-01	7.31E-04	5.32E+04	1.88E-05	
SVOC	Benzo(a)pyrene	50-32-8	1.5E-05	2.5E+02	3.36E-01	6.96E-04	2.01E+05	4.98E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	1.7E-03	2.5E+02	3.36E-01	6.96E-04	3.23E+03	3.09E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.1E-05	2.8E+02	3.26E-01	6.65E-04	2.81E+05	3.56E-06	
SVOC	Chrysene	218-01-9	1.5E-03	2.3E+02	3.47E-01	7.31E-04	3.31E+03	3.02E-04	
SVOC	Ethanol	64-17-5	1.7E-04	4.6E+01	5.94E-01	1.63E-03	1.02E+04	9.76E-05	
SVOC	Fluorene	86-73-7	1.4E-03	1.7E+02	3.86E-01	8.57E-04	3.03E+03	3.30E-04	3.30E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.0E-05	2.8E+02	3.26E-01	6.65E-04	1.53E+05	6.54E-06	
SVOC	Naphthalene	91-20-3	1.2E-02	1.3E+02	4.21E-01	9.76E-04	1.22E+03	8.18E-04	8.18E-03
SVOC	Phenanthrene	85-01-8	1.4E-03	1.8E+02	3.77E-01	8.28E-04	3.09E+03	3.23E-04	3.23E-03
SVOC	Pyrene	129-00-0	2.0E-04	2.0E+02	3.62E-01	7.77E-04	1.51E+04	6.62E-05	
SVOC	Tetraethylene Glycol	112-60-7	1.6E-11	1.9E+02	3.67E-01	7.93E-04	1.68E+11	5.95E-12	
INORG	Lead	7439-92-1		2.1E+02	3.59E-01	7.68E-04			

Attachment 4

Table 5

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Molecular Weight of Oxygen	g/mol	MW_{O2}	32
Molecular Weight of Water	g/mol	MW_{H2O}	18
Temperature	K	Temp	291
Liquid-phase Mass Transfer Coefficient for Oxygen	cm/s	k_{L,O2}	0.002
Gas-Phase Mass Transfer Coefficient for Water Vapor at 25 °C	cm/s	K_{G,H2O}	0.833
	(L/m ³) /		
Dispersion coefficient	(L/m ² /s)	C/Q	9.6

Attachment 4

Table 7a

Unit Risk Calculations for Exposure of Construction Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{gw} (mg/l)	Incidental Ingestion			Dermal Contact				Vapor Inhalation			All Routes Risk
					LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	DA (L/cm ² -event)	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	
VOC	Benzene	71-43-2	A	1.00E+00	7.34E-08	5.5E-02	4.0E-09	3.70E-05	9.57E-07	5.5E-02	5.3E-08	1.19E-01	7.8E-03	1.8E-07	2.4E-07
VOC	Cumene	98-82-8	D	1.00E+00	7.34E-08							9.64E-02			
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	7.34E-08	2.0E+00	1.5E-07	6.81E-06	1.76E-07	2.0E+00	3.5E-07	7.11E-02	6.0E-01	8.4E-06	8.9E-06
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	7.34E-08	9.1E-02	6.7E-09	1.13E-05	2.92E-07	9.1E-02	2.7E-08	9.88E-02	2.6E-02	5.0E-07	5.4E-07
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	7.34E-08			1.27E-04	3.28E-06			1.02E-01			
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	7.34E-08	1.8E-03	1.3E-10	8.84E-06	2.29E-07	1.8E-03	4.1E-10	9.99E-02	2.6E-04	5.1E-09	5.6E-09
VOC	Toluene	108-88-3	ID	1.00E+00	7.34E-08			8.08E-05	2.09E-06			1.09E-01			
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	7.34E-08							9.57E-02			
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	7.34E-08							9.56E-02			
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	7.34E-08			1.32E-04	3.41E-06			1.02E-01			
SVOC	Anthracene	120-12-7	ID	1.00E+00	7.34E-08							2.97E-02			
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09			1.0E-01			6.0E-02		7.3E-09
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00	7.34E-08	1.0E+00	7.3E-08			1.0E+00			6.0E-01		7.3E-08
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09			1.0E-01			6.0E-02		7.3E-09
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00	7.34E-08										
SVOC	Chrysene	218-01-9	B2	1.00E+00	7.34E-08	1.0E-03	7.3E-11			1.0E-03			6.0E-04		7.3E-11
SVOC	Ethanol	64-17-5		1.00E+00	7.34E-08			1.30E-06	3.36E-08						
SVOC	Fluorene	86-73-7	D	1.00E+00	7.34E-08							3.18E-02			
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09			1.0E-01			6.0E-02		7.3E-09
SVOC	Naphthalene	91-20-3	C	1.00E+00	7.34E-08	1.2E-01	8.8E-09			1.2E-01		7.88E-02	3.4E-02	5.2E-07	5.3E-07
SVOC	Phenanthrene	85-01-8	D	1.00E+00	7.34E-08							3.11E-02			
SVOC	Pyrene	129-00-0	NC	1.00E+00	7.34E-08										
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00	7.34E-08										
INORG	Lead	7439-92-1	B2	1.00E+00	7.34E-08			2.00E-07	5.18E-09						

Attachment 4

Table 7b

Hazard Quotient Calculations for Exposure of Construction Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{gw} (mg/L)	Incidental Ingestion			Dermal Contact				Vapor Inhalation			All Routes
				ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	DA (L/cm ² -event)	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ
VOC	Benzene	71-43-2	1.00E+00	5.14E-06	1.0E-02	5.1E-04	3.70E-05	6.70E-05	1.0E-02	6.7E-03	1.19E-01	9.0E-02	1.8E-02	2.5E-02
VOC	Cumene	98-82-8	1.00E+00	5.14E-06	4.0E-01	1.3E-05			4.0E-01		9.64E-02	4.0E-01	3.3E-03	3.3E-03
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	5.14E-06	9.0E-03	5.7E-04	6.81E-06	1.23E-05	9.0E-03	1.4E-03	7.11E-02	9.0E-03	1.1E-01	1.1E-01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	5.14E-06	2.0E-02	2.6E-04	1.13E-05	2.05E-05	2.0E-02	1.0E-03	9.88E-02	7.0E-02	1.9E-02	2.1E-02
VOC	Ethyl Benzene	100-41-4	1.00E+00	5.14E-06	1.0E-01	5.1E-05	1.27E-04	2.30E-04	1.0E-01	2.3E-03	1.02E-01	9.0E+00	1.6E-04	2.5E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	5.14E-06	3.0E-01	1.7E-05	8.84E-06	1.60E-05	3.0E-01	5.3E-05	9.99E-02	3.0E+00	4.6E-04	5.3E-04
VOC	Toluene	108-88-3	1.00E+00	5.14E-06	8.0E-01	6.4E-06	8.08E-05	1.46E-04	8.0E-01	1.8E-04	1.09E-01	5.0E+00	3.0E-04	4.9E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	5.14E-06	4.0E-02	1.3E-04			4.0E-02		9.57E-02	2.0E-01	6.6E-03	6.7E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	5.14E-06	4.0E-02	1.3E-04			4.0E-02		9.56E-02	2.0E-01	6.5E-03	6.7E-03
VOC	Xylenes (total)	1330-20-7	1.00E+00	5.14E-06	2.0E-01	2.6E-05	1.32E-04	2.39E-04	2.0E-01	1.2E-03	1.02E-01	3.0E-01	4.7E-03	5.9E-03
SVOC	Anthracene	120-12-7	1.00E+00	5.14E-06	1.0E+00	5.1E-06			1.0E+00		2.97E-02			5.1E-06
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00	5.14E-06										
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00	5.14E-06	3.0E-04	1.7E-02			3.0E-04			2.0E-06		1.7E-02
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00	5.14E-06										
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00	5.14E-06	3.0E-01	1.7E-05			3.0E-01					1.7E-05
SVOC	Chrysene	218-01-9	1.00E+00	5.14E-06										
SVOC	Ethanol	64-17-5	1.00E+00	5.14E-06	6.2E+01	8.3E-08	1.30E-06	2.35E-06	6.2E+01	3.8E-08		1.9E+01		1.2E-07
SVOC	Fluorene	86-73-7	1.00E+00	5.14E-06	4.0E-01	1.3E-05			4.0E-01		3.18E-02			1.3E-05
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00	5.14E-06										
SVOC	Naphthalene	91-20-3	1.00E+00	5.14E-06	2.0E-01	2.6E-05			2.0E-01		7.88E-02	3.0E-03	3.6E-01	3.6E-01
SVOC	Phenanthrene	85-01-8	1.00E+00	5.14E-06	3.0E-01	1.7E-05			3.0E-01		3.11E-02			1.7E-05
SVOC	Pyrene	129-00-0	1.00E+00	5.14E-06	3.0E-01	1.7E-05			3.0E-01					1.7E-05
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00	5.14E-06	2.0E+00	2.6E-06			2.0E+00					2.6E-06
INORG	Lead	7439-92-1	1.00E+00	5.14E-06			2.00E-07	3.62E-07						

Attachment 5

Off-Site Resident Risk Calculations

Figure 1 – Soil Moisture Profile for Default PADEP Residential Building (w/ Basement)

Table 1 – Normalized Indoor Air Concentrations in a Default PADEP Residential Building (with Basement) Due to Vapor Intrusion from Groundwater

Table 2 – Unit Risk and Hazard Quotient Calculations for Groundwater Vapor Intrusion into a Default PADEP Residential Building (with Basement)



Attachment 5

Table 1

Groundwater Protection Concentrations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	Nonpotable Groundwater Use RBSL [Cancer] (mg/L)	Nonpotable Groundwater Use RBSL [Noncancer] (mg/L)	RW GW Volatilization to Outdoor Air RBSL [Cancer] (mg/L)	RW GW Volatilization to Outdoor Air RBSL [Noncancer] (mg/L)	RW GW Vapor Intrusion RBSL [Cancer] (mg/L)	RW GW Vapor Intrusion RBSL [Noncancer] (mg/L)	Construction Worker Direct Contact RBSL [Cancer] (mg/L)	Construction Worker Direct Contact RBSL [Noncancer] (mg/L)	Groundwater MTSW RBSL (mg/L)	Groundwater Protection Concentration (mg/L)	GWP Basis
VOC	Benzene	71-43-2	A	3.0E-01	6.1E-01	6.5E+02	5.5E+02	4.6E+00	3.8E+00	4.2E+01	4.0E+00	1.3E+02	2.5E-01	Min
VOC	Cumene	98-82-8	D		3.7E+01		9.1E+03		6.3E+01		3.0E+01	2.6E+00	2.6E+00	Min
VOC	1,2-Dibromoethane	106-93-4	LC	1.7E-02	6.7E-01	1.6E+01	3.1E+02	1.1E-01	2.2E+00	1.1E+00	9.1E-01		7.9E-03	Min
VOC	1,2-Dichloroethane	107-06-2	B2	3.3E-01	2.2E+00	2.5E+02	1.7E+02	1.8E+00	1.2E+00	1.9E+01	4.9E+00	3.1E+03	8.2E-02	Min
VOC	Ethyl Benzene	100-41-4	D		2.0E+00		2.2E+04		1.5E+02		4.0E+01	1.3E+01	2.0E+00	Min
VOC	Methyl tert-butyl ether	1634-04-4	C	2.1E+01	4.5E+01	2.9E+04	8.0E+04	2.1E+02	5.8E+02	1.8E+03	1.9E+02	1.1E+04	1.5E+01	Min
VOC	Toluene	108-88-3	ID		2.5E+01		1.0E+05		7.0E+02		2.0E+02	5.2E+01	2.5E+01	Min
VOC	1,2,4-Trimethylbenzene	95-63-6	ID		8.7E+00		1.4E+03		9.7E+00		1.5E+01	3.3E+01	6.3E-01	Min
VOC	1,3,5-Trimethylbenzene	108-67-8	ID		8.8E+00		1.3E+03		9.1E+00		1.5E+01	7.1E+01	5.9E-01	Min
VOC	Xylenes (total)	1330-20-7	ID		3.7E+00		1.9E+03		1.3E+01		1.7E+01	2.1E+02	8.6E-01	Min
SVOC	Anthracene	120-12-7	ID		2.4E+02						1.9E+04	4.0E+01	4.0E+01	Min
SVOC	Benzo(a)anthracene	56-55-3	B2	1.0E-01						1.4E+03		1.3E-02	1.3E-02	Min
SVOC	Benzo(a)pyrene	50-32-8	HC	1.0E-02	4.4E-02					1.4E+02	5.8E+00	1.3E-03	1.3E-03	Min
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.6E-01						1.4E+03		1.3E-02	1.3E-02	Min
SVOC	Benzo(g,h,i)perylene	191-24-2	D		4.4E+01						5.8E+03	1.2E-02	1.2E-02	Min
SVOC	Chrysene	218-01-9	B2	1.6E+01						1.4E+05		1.3E+00	1.3E+00	Min
SVOC	Ethanol	64-17-5			1.0E+04						8.3E+05		1.0E+04	Min
SVOC	Fluorene	86-73-7	D		9.7E+01						7.8E+03	7.0E+00	7.0E+00	Min
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.0E-01						1.4E+03		1.3E-02	1.3E-02	Min
SVOC	Naphthalene	91-20-3	C	4.2E-01	3.9E-01	3.3E+02	1.2E+02	2.4E+00	8.8E-01	1.9E+01	2.8E-01	4.3E+01	6.7E-02	Min
SVOC	Phenanthrene	85-01-8	D		7.3E+01						5.8E+03	1.0E+00	1.0E+00	Min
SVOC	Pyrene	129-00-0	NC		5.0E+01						5.8E+03	3.0E+00	3.0E+00	Min
SVOC	Tetraethylene Glycol	112-60-7			2.9E+02						3.9E+04	1.9E+05	2.9E+02	Min
INORG	Lead	7439-92-1	B2									2.5E+00	2.5E+00	Min

Notes:

Cancer RBSLs are calculated at a target cancer risk of 1E-05. Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 5

Table 2

Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				TCRL								LT
VOC	Benzene	71-43-2	3.0E-01	TCRL	1.8E+03	5.8E+01		1.7E-01	2.2E+00	1.2E+02	1.2E+02	LT
VOC	Cumene	98-82-8			6.1E+01	7.1E+02		3.3E-01				NA
VOC	1,2-Dibromoethane	106-93-4	1.7E-02	TCRL	3.9E+03	2.2E+01		2.4E-02	5.5E-02	6.8E+00	6.8E+00	LT
VOC	1,2-Dichloroethane	107-06-2	3.3E-01	TCRL	8.5E+03	1.7E+01		2.9E-02	9.1E-01	1.3E+02	1.3E+02	LT
VOC	Ethyl Benzene	100-41-4			1.7E+02	3.7E+02		2.2E-01				NA
VOC	Methyl tert-butyl ether	1634-04-4	2.1E+01	TCRL	5.1E+04	1.1E+01		1.8E-02	4.6E+01	8.5E+03	8.5E+03	LT
VOC	Toluene	108-88-3			5.3E+02	1.8E+02		1.9E-01				NA
VOC	1,2,4-Trimethylbenzene	95-63-6			5.7E+01	9.0E+02		1.6E-01				NA
VOC	1,3,5-Trimethylbenzene	108-67-8			4.8E+01	1.8E+03		1.5E-01				NA
VOC	Xylenes (total)	1330-20-7			1.7E+02	3.9E+02		2.5E-01				NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3	1.0E-01	TCRL	9.4E-03	4.0E+05		5.6E-05	4.2E+03	4.2E+01		NA
SVOC	Benzo(a)pyrene	50-32-8	1.0E-02	TCRL	1.6E-03	1.0E+06		1.5E-05	1.0E+03	4.0E+00		NA
SVOC	Benzo(b)fluoranthene	205-99-2	1.6E-01	TCRL	1.5E-03	1.2E+06		1.7E-03	1.9E+04	6.2E+01		NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9	1.6E+01	TCRL	1.6E-03	4.0E+05		1.5E-03	6.2E+05	6.2E+03		NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.0E-01	TCRL	2.2E-05	3.4E+06		2.0E-05	3.4E+04	4.0E+01		NA
SVOC	Naphthalene	91-20-3	4.2E-01	TCRL	3.1E+01	2.0E+03		1.2E-02	8.4E+01	1.7E+02	1.7E+02	LT
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 2

Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 3

Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				THQ								LT
VOC	Benzene	71-43-2	6.1E-01	THQ	1.8E+03	5.8E+01		1.7E-01	4.5E+00	2.5E+02	2.5E+02	LT
VOC	Cumene	98-82-8	3.7E+01	THQ	6.1E+01	7.1E+02		3.3E-01	2.7E+03	1.5E+04		NA
VOC	1,2-Dibromoethane	106-93-4	6.7E-01	THQ	3.9E+03	2.2E+01		2.4E-02	2.2E+00	2.7E+02	2.7E+02	LT
VOC	1,2-Dichloroethane	107-06-2	2.2E+00	THQ	8.5E+03	1.7E+01		2.9E-02	6.2E+00	8.9E+02	8.9E+02	LT
VOC	Ethyl Benzene	100-41-4	2.0E+00	THQ	1.7E+02	3.7E+02		2.2E-01	7.9E+01	8.2E+02	8.2E+02	LT
VOC	Methyl tert-butyl ether	1634-04-4	4.5E+01	THQ	5.1E+04	1.1E+01		1.8E-02	9.6E+01	1.8E+04	1.8E+04	LT
VOC	Toluene	108-88-3	2.5E+01	THQ	5.3E+02	1.8E+02		1.9E-01	4.8E+02	9.8E+03	9.8E+03	LT
VOC	1,2,4-Trimethylbenzene	95-63-6	8.7E+00	THQ	5.7E+01	9.0E+02		1.6E-01	7.9E+02	3.5E+03		NA
VOC	1,3,5-Trimethylbenzene	108-67-8	8.8E+00	THQ	4.8E+01	1.8E+03		1.5E-01	1.6E+03	3.5E+03		NA
VOC	Xylenes (total)	1330-20-7	3.7E+00	THQ	1.7E+02	3.9E+02		2.5E-01	1.5E+02	1.5E+03	1.5E+03	LT
SVOC	Anthracene	120-12-7	2.4E+02	THQ	4.3E-02	3.0E+04		1.3E-03	7.0E+05	9.4E+04		NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8	4.4E-02	THQ	1.6E-03	1.0E+06		1.5E-05	4.5E+03	1.8E+01		NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2	4.4E+01	THQ	2.6E-04	1.3E+07		1.1E-05	5.6E+07	1.7E+04		NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5	1.0E+04	THQ		6.8E-01		1.7E-04	1.1E+04	4.2E+06	4.2E+06	LT
SVOC	Fluorene	86-73-7	9.7E+01	THQ	2.0E+00	1.4E+04		1.4E-03	1.3E+05	3.9E+04		NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	3.9E-01	THQ	3.1E+01	2.0E+03		1.2E-02	7.8E+01	1.5E+02	1.5E+02	LT
SVOC	Phenanthrene	85-01-8	7.3E+01	THQ	1.2E+00	2.4E+04		1.4E-03	1.8E+05	2.9E+04		NA
SVOC	Pyrene	129-00-0	5.0E+01	THQ	1.4E-01	1.1E+05		2.0E-04	5.2E+05	2.0E+04		NA
SVOC	Tetraethylene Glycol	112-60-7	2.9E+02	THQ	1.0E+06	3.0E-02		1.6E-11	2.7E+02	1.2E+05	1.2E+05	LT
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 3

Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 4

Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
VOC	Benzene	71-43-2	6.5E+02	TCRL	1.8E+03	5.8E+01		1.7E-01	4.8E+03	2.6E+05		NA
VOC	Cumene	98-82-8			6.1E+01	7.1E+02		3.3E-01				NA
VOC	1,2-Dibromoethane	106-93-4	1.6E+01	TCRL	3.9E+03	2.2E+01		2.4E-02	5.1E+01	6.3E+03	6.3E+03	LT
VOC	1,2-Dichloroethane	107-06-2	2.5E+02	TCRL	8.5E+03	1.7E+01		2.9E-02	7.1E+02	1.0E+05	1.0E+05	LT
VOC	Ethyl Benzene	100-41-4			1.7E+02	3.7E+02		2.2E-01				NA
VOC	Methyl tert-butyl ether	1634-04-4	2.9E+04	TCRL	5.1E+04	1.1E+01		1.8E-02	6.2E+04	1.1E+07		NA
VOC	Toluene	108-88-3			5.3E+02	1.8E+02		1.9E-01				NA
VOC	1,2,4-Trimethylbenzene	95-63-6			5.7E+01	9.0E+02		1.6E-01				NA
VOC	1,3,5-Trimethylbenzene	108-67-8			4.8E+01	1.8E+03		1.5E-01				NA
VOC	Xylenes (total)	1330-20-7			1.7E+02	3.9E+02		2.5E-01				NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8			1.6E-03	1.0E+06		1.5E-05				NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	3.3E+02	TCRL	3.1E+01	2.0E+03		1.2E-02	6.7E+04	1.3E+05		NA
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 4

Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{\text{soil-MtGW-Eq}}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{\text{soil-MtGW-Lt}}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 5

Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				THQ								
VOC	Benzene	71-43-2	5.5E+02	THQ	1.8E+03	5.8E+01		1.7E-01	4.0E+03	2.2E+05		NA
VOC	Cumene	98-82-8	9.1E+03	THQ	6.1E+01	7.1E+02		3.3E-01	6.6E+05	3.7E+06		NA
VOC	1,2-Dibromoethane	106-93-4	3.1E+02	THQ	3.9E+03	2.2E+01		2.4E-02	9.9E+02	1.2E+05		NA
VOC	1,2-Dichloroethane	107-06-2	1.7E+02	THQ	8.5E+03	1.7E+01		2.9E-02	4.6E+02	6.6E+04	6.6E+04	LT
VOC	Ethyl Benzene	100-41-4	2.2E+04	THQ	1.7E+02	3.7E+02		2.2E-01	8.4E+05	8.7E+06		NA
VOC	Methyl tert-butyl ether	1634-04-4	8.0E+04	THQ	5.1E+04	1.1E+01		1.8E-02	1.7E+05	3.2E+07		NA
VOC	Toluene	108-88-3	1.0E+05	THQ	5.3E+02	1.8E+02		1.9E-01	2.0E+06	4.0E+07		NA
VOC	1,2,4-Trimethylbenzene	95-63-6	1.4E+03	THQ	5.7E+01	9.0E+02		1.6E-01	1.3E+05	5.6E+05		NA
VOC	1,3,5-Trimethylbenzene	108-67-8	1.3E+03	THQ	4.8E+01	1.8E+03		1.5E-01	2.3E+05	5.2E+05		NA
VOC	Xylenes (total)	1330-20-7	1.9E+03	THQ	1.7E+02	3.9E+02		2.5E-01	7.8E+04	7.7E+05		NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8			1.6E-03	1.0E+06		1.5E-05				NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	1.2E+02	THQ	3.1E+01	2.0E+03		1.2E-02	2.5E+04	4.9E+04		NA
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 5

Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 6

Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				TCRL								LT
VOC	Benzene	71-43-2	4.6E+00	TCRL	1.8E+03	5.8E+01		1.7E-01	3.4E+01	1.8E+03	1.8E+03	LT
VOC	Cumene	98-82-8			6.1E+01	7.1E+02		3.3E-01				NA
VOC	1,2-Dibromoethane	106-93-4	1.1E-01	TCRL	3.9E+03	2.2E+01		2.4E-02	3.6E-01	4.5E+01	4.5E+01	LT
VOC	1,2-Dichloroethane	107-06-2	1.8E+00	TCRL	8.5E+03	1.7E+01		2.9E-02	5.1E+00	7.3E+02	7.3E+02	LT
VOC	Ethyl Benzene	100-41-4			1.7E+02	3.7E+02		2.2E-01				NA
VOC	Methyl tert-butyl ether	1634-04-4	2.1E+02	TCRL	5.1E+04	1.1E+01		1.8E-02	4.5E+02	8.4E+04	8.4E+04	LT
VOC	Toluene	108-88-3			5.3E+02	1.8E+02		1.9E-01				NA
VOC	1,2,4-Trimethylbenzene	95-63-6			5.7E+01	9.0E+02		1.6E-01				NA
VOC	1,3,5-Trimethylbenzene	108-67-8			4.8E+01	1.8E+03		1.5E-01				NA
VOC	Xylenes (total)	1330-20-7			1.7E+02	3.9E+02		2.5E-01				NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8			1.6E-03	1.0E+06		1.5E-05				NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	2.4E+00	TCRL	3.1E+01	2.0E+03		1.2E-02	4.9E+02	9.7E+02		NA
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 6

Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 7

Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				THQ								LT
VOC	Benzene	71-43-2	3.8E+00	THQ	1.8E+03	5.8E+01		1.7E-01	2.8E+01	1.5E+03	1.5E+03	LT
VOC	Cumene	98-82-8	6.3E+01	THQ	6.1E+01	7.1E+02		3.3E-01	4.6E+03	2.5E+04		NA
VOC	1,2-Dibromoethane	106-93-4	2.2E+00	THQ	3.9E+03	2.2E+01		2.4E-02	7.0E+00	8.6E+02	8.6E+02	LT
VOC	1,2-Dichloroethane	107-06-2	1.2E+00	THQ	8.5E+03	1.7E+01		2.9E-02	3.3E+00	4.8E+02	4.8E+02	LT
VOC	Ethyl Benzene	100-41-4	1.5E+02	THQ	1.7E+02	3.7E+02		2.2E-01	5.8E+03	6.1E+04		NA
VOC	Methyl tert-butyl ether	1634-04-4	5.8E+02	THQ	5.1E+04	1.1E+01		1.8E-02	1.3E+03	2.3E+05	2.3E+05	LT
VOC	Toluene	108-88-3	7.0E+02	THQ	5.3E+02	1.8E+02		1.9E-01	1.4E+04	2.8E+05		NA
VOC	1,2,4-Trimethylbenzene	95-63-6	9.7E+00	THQ	5.7E+01	9.0E+02		1.6E-01	8.9E+02	3.9E+03		NA
VOC	1,3,5-Trimethylbenzene	108-67-8	9.1E+00	THQ	4.8E+01	1.8E+03		1.5E-01	1.6E+03	3.6E+03		NA
VOC	Xylenes (total)	1330-20-7	1.3E+01	THQ	1.7E+02	3.9E+02		2.5E-01	5.4E+02	5.4E+03		NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8			1.6E-03	1.0E+06		1.5E-05				NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	8.8E-01	THQ	3.1E+01	2.0E+03		1.2E-02	1.8E+02	3.5E+02	3.5E+02	LT
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 7

Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 8

Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
VOC	Benzene	71-43-2	4.2E+01	TCRL	1.8E+03	5.8E+01		1.7E-01	3.1E+02	1.7E+04	1.7E+04	LT
VOC	Cumene	98-82-8			6.1E+01	7.1E+02		3.3E-01				NA
VOC	1,2-Dibromoethane	106-93-4	1.1E+00	TCRL	3.9E+03	2.2E+01		2.4E-02	3.7E+00	4.5E+02	4.5E+02	LT
VOC	1,2-Dichloroethane	107-06-2	1.9E+01	TCRL	8.5E+03	1.7E+01		2.9E-02	5.2E+01	7.5E+03	7.5E+03	LT
VOC	Ethyl Benzene	100-41-4			1.7E+02	3.7E+02		2.2E-01				NA
VOC	Methyl tert-butyl ether	1634-04-4	1.8E+03	TCRL	5.1E+04	1.1E+01		1.8E-02	3.8E+03	7.1E+05	7.1E+05	LT
VOC	Toluene	108-88-3			5.3E+02	1.8E+02		1.9E-01				NA
VOC	1,2,4-Trimethylbenzene	95-63-6			5.7E+01	9.0E+02		1.6E-01				NA
VOC	1,3,5-Trimethylbenzene	108-67-8			4.8E+01	1.8E+03		1.5E-01				NA
VOC	Xylenes (total)	1330-20-7			1.7E+02	3.9E+02		2.5E-01				NA
SVOC	Anthracene	120-12-7			4.3E-02	3.0E+04		1.3E-03				NA
SVOC	Benzo(a)anthracene	56-55-3	1.4E+03	TCRL	9.4E-03	4.0E+05		5.6E-05	5.5E+07	5.5E+05		NA
SVOC	Benzo(a)pyrene	50-32-8	1.4E+02	TCRL	1.6E-03	1.0E+06		1.5E-05	1.4E+07	5.5E+04		NA
SVOC	Benzo(b)fluoranthene	205-99-2	1.4E+03	TCRL	1.5E-03	1.2E+06		1.7E-03	1.7E+08	5.5E+05		NA
SVOC	Benzo(g,h,i)perylene	191-24-2			2.6E-04	1.3E+07		1.1E-05				NA
SVOC	Chrysene	218-01-9	1.4E+05	TCRL	1.6E-03	4.0E+05		1.5E-03	5.5E+09	5.5E+07		NA
SVOC	Ethanol	64-17-5				6.8E-01		1.7E-04				NA
SVOC	Fluorene	86-73-7			2.0E+00	1.4E+04		1.4E-03				NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.4E+03	TCRL	2.2E-05	3.4E+06		2.0E-05	4.7E+08	5.5E+05		NA
SVOC	Naphthalene	91-20-3	1.9E+01	TCRL	3.1E+01	2.0E+03		1.2E-02	3.8E+03	7.5E+03		NA
SVOC	Phenanthrene	85-01-8			1.2E+00	2.4E+04		1.4E-03				NA
SVOC	Pyrene	129-00-0			1.4E-01	1.1E+05		2.0E-04				NA
SVOC	Tetraethylene Glycol	112-60-7			1.0E+06	3.0E-02		1.6E-11				NA
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 8

Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Cancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 9

Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				THQ								LT
VOC	Benzene	71-43-2	4.0E+00	THQ	1.8E+03	5.8E+01		1.7E-01	2.9E+01	1.6E+03	1.6E+03	LT
VOC	Cumene	98-82-8	3.0E+01	THQ	6.1E+01	7.1E+02		3.3E-01	2.2E+03	1.2E+04		NA
VOC	1,2-Dibromoethane	106-93-4	9.1E-01	THQ	3.9E+03	2.2E+01		2.4E-02	2.9E+00	3.6E+02	3.6E+02	LT
VOC	1,2-Dichloroethane	107-06-2	4.9E+00	THQ	8.5E+03	1.7E+01		2.9E-02	1.4E+01	1.9E+03	1.9E+03	LT
VOC	Ethyl Benzene	100-41-4	4.0E+01	THQ	1.7E+02	3.7E+02		2.2E-01	1.5E+03	1.6E+04		NA
VOC	Methyl tert-butyl ether	1634-04-4	1.9E+02	THQ	5.1E+04	1.1E+01		1.8E-02	4.1E+02	7.6E+04	7.6E+04	LT
VOC	Toluene	108-88-3	2.0E+02	THQ	5.3E+02	1.8E+02		1.9E-01	4.0E+03	8.2E+04		NA
VOC	1,2,4-Trimethylbenzene	95-63-6	1.5E+01	THQ	5.7E+01	9.0E+02		1.6E-01	1.4E+03	6.0E+03		NA
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E+01	THQ	4.8E+01	1.8E+03		1.5E-01	2.7E+03	6.0E+03		NA
VOC	Xylenes (total)	1330-20-7	1.7E+01	THQ	1.7E+02	3.9E+02		2.5E-01	6.9E+02	6.8E+03		NA
SVOC	Anthracene	120-12-7	1.9E+04	THQ	4.3E-02	3.0E+04		1.3E-03	5.8E+07	7.8E+06		NA
SVOC	Benzo(a)anthracene	56-55-3			9.4E-03	4.0E+05		5.6E-05				NA
SVOC	Benzo(a)pyrene	50-32-8	5.8E+00	THQ	1.6E-03	1.0E+06		1.5E-05	5.9E+05	2.3E+03		NA
SVOC	Benzo(b)fluoranthene	205-99-2			1.5E-03	1.2E+06		1.7E-03				NA
SVOC	Benzo(g,h,i)perylene	191-24-2	5.8E+03	THQ	2.6E-04	1.3E+07		1.1E-05	7.5E+09	2.3E+06		NA
SVOC	Chrysene	218-01-9			1.6E-03	4.0E+05		1.5E-03				NA
SVOC	Ethanol	64-17-5	8.3E+05	THQ		6.8E-01		1.7E-04	8.3E+05	3.3E+08	3.3E+08	LT
SVOC	Fluorene	86-73-7	7.8E+03	THQ	2.0E+00	1.4E+04		1.4E-03	1.1E+07	3.1E+06		NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5			2.2E-05	3.4E+06		2.0E-05				NA
SVOC	Naphthalene	91-20-3	2.8E-01	THQ	3.1E+01	2.0E+03		1.2E-02	5.6E+01	1.1E+02	1.1E+02	LT
SVOC	Phenanthrene	85-01-8	5.8E+03	THQ	1.2E+00	2.4E+04		1.4E-03	1.4E+07	2.3E+06		NA
SVOC	Pyrene	129-00-0	5.8E+03	THQ	1.4E-01	1.1E+05		2.0E-04	6.2E+07	2.3E+06		NA
SVOC	Tetraethylene Glycol	112-60-7	3.9E+04	THQ	1.0E+06	3.0E-02		1.6E-11	3.7E+04	1.6E+07	1.6E+07	LT
INORG	Lead	7439-92-1					9.0E+02					NA

Attachment 5

Table 9

Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Noncancer]

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Table 10

Soil Migration to Groundwater Criteria Based on the GW MtSW RBSL

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)	Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
VOC	Benzene	71-43-2	1.3E+02	1.8E+03	5.8E+01		1.7E-01	9.6E+02	5.2E+04		NA
VOC	Cumene	98-82-8	2.6E+00	6.1E+01	7.1E+02		3.3E-01	1.9E+02	1.0E+03	1.0E+03	LT
VOC	1,2-Dibromoethane	106-93-4		3.9E+03	2.2E+01		2.4E-02				
VOC	1,2-Dichloroethane	107-06-2	3.1E+03	8.5E+03	1.7E+01		2.9E-02	8.6E+03	1.2E+06		NA
VOC	Ethyl Benzene	100-41-4	1.3E+01	1.7E+02	3.7E+02		2.2E-01	5.0E+02	5.2E+03		NA
VOC	Methyl tert-butyl ether	1634-04-4	1.1E+04	5.1E+04	1.1E+01		1.8E-02	2.4E+04	4.4E+06		NA
VOC	Toluene	108-88-3	5.2E+01	5.3E+02	1.8E+02		1.9E-01	1.0E+03	2.1E+04		NA
VOC	1,2,4-Trimethylbenzene	95-63-6	3.3E+01	5.7E+01	9.0E+02		1.6E-01	3.0E+03	1.3E+04		NA
VOC	1,3,5-Trimethylbenzene	108-67-8	7.1E+01	4.8E+01	1.8E+03		1.5E-01	1.3E+04	2.8E+04		NA
VOC	Xylenes (total)	1330-20-7	2.1E+02	1.7E+02	3.9E+02		2.5E-01	8.5E+03	8.4E+04		NA
SVOC	Anthracene	120-12-7	4.0E+01	4.3E-02	3.0E+04		1.3E-03	1.2E+05	1.6E+04		NA
SVOC	Benzo(a)anthracene	56-55-3	1.3E-02	9.4E-03	4.0E+05		5.6E-05	5.2E+02	5.2E+00		NA
SVOC	Benzo(a)pyrene	50-32-8	1.3E-03	1.6E-03	1.0E+06		1.5E-05	1.3E+02	5.2E-01		NA
SVOC	Benzo(b)fluoranthene	205-99-2	1.3E-02	1.5E-03	1.2E+06		1.7E-03	1.6E+03	5.2E+00		NA
SVOC	Benzo(g,h,i)perylene	191-24-2	1.2E-02	2.6E-04	1.3E+07		1.1E-05	1.5E+04	4.8E+00		NA
SVOC	Chrysene	218-01-9	1.3E+00	1.6E-03	4.0E+05		1.5E-03	5.2E+04	5.2E+02		NA
SVOC	Ethanol	64-17-5			6.8E-01		1.7E-04				
SVOC	Fluorene	86-73-7	7.0E+00	2.0E+00	1.4E+04		1.4E-03	9.6E+03	2.8E+03		NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.3E-02	2.2E-05	3.4E+06		2.0E-05	4.5E+03	5.2E+00		NA
SVOC	Naphthalene	91-20-3	4.3E+01	3.1E+01	2.0E+03		1.2E-02	8.7E+03	1.7E+04		NA
SVOC	Phenanthrene	85-01-8	1.0E+00	1.2E+00	2.4E+04		1.4E-03	2.4E+03	4.0E+02		NA
SVOC	Pyrene	129-00-0	3.0E+00	1.4E-01	1.1E+05		2.0E-04	3.2E+04	1.2E+03		NA
SVOC	Tetraethylene Glycol	112-60-7	1.9E+05	1.0E+06	3.0E-02		1.6E-11	1.8E+05	7.7E+07		NA
INORG	Lead	7439-92-1	2.5E+00			9.0E+02		4.5E+04	1.0E+03	4.5E+04	EQ

Attachment 5

Table 10

Soil Migration to Groundwater Criteria Based on the GW MtSW RBSL

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.08
θ_a	Air-filled soil porosity	0.30
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 6

Soil Migration to Groundwater Calculations

Table 1 – Groundwater Protection Concentrations

Table 2 – Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Cancer]

Table 3 – Soil Migration to Groundwater Criteria Based on the Nonpotable GW Use RBSL [Noncancer]

Table 4 – Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Cancer]

Table 5 – Soil Migration to Groundwater Criteria Based on the RW GW Vol to Outdoor Air RBSL [Noncancer]

Table 6 – Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Cancer]

Table 7 – Soil Migration to Groundwater Criteria Based on the RW GW Vapor Intrusion RBSL [Noncancer]

Table 8 – Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Cancer]

Table 9 – Soil Migration to Groundwater Criteria Based on the Construction Worker Direct Contact RBSL [Noncancer]

Table 10 – Soil Migration to Groundwater Criteria Based on the Off-Site Resident Vapor Intrusion RBSL [Cancer]

Table 11 – Soil Migration to Groundwater Criteria Based on the Off-Site Resident Vapor Intrusion RBSL [Noncancer]

Table 12 – Soil Migration to Groundwater Criteria Based on the GW MtSW RBSL



Attachment 6

Table 1

Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	Sc _L (unitless)	Sc _G (unitless)	k _L (m/s)	k _G (m/s)	K _L (cm/s)	C _{avg} /C ₀ (unitless)	J _L (L/m ² -s)
VOC	Benzene	71-43-2	1.7E-01	7.6E-01	8.5E-05	9.1E+02	1.7E+00	5.73E-06	9.43E-03	5.71E-06	4.10E-01	2.34E-03
VOC	Cumene	98-82-8	3.3E-01	5.6E-01	6.1E-05	1.3E+03	2.3E+00	5.02E-06	7.69E-03	5.01E-06	4.48E-01	2.25E-03
VOC	1,2-Dibromoethane	106-93-4	2.4E-02	3.7E-01	7.3E-05	1.1E+03	3.5E+00	5.39E-06	5.83E-03	5.18E-06	4.38E-01	2.27E-03
VOC	1,2-Dichloroethane	107-06-2	2.9E-02	9.0E-01	8.6E-05	9.0E+02	1.5E+00	5.75E-06	1.05E-02	5.64E-06	4.13E-01	2.33E-03
VOC	Ethyl Benzene	100-41-4	2.2E-01	6.5E-01	6.7E-05	1.1E+03	2.0E+00	5.22E-06	8.47E-03	5.20E-06	4.37E-01	2.28E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.8E-02	7.4E-01	8.7E-05	8.8E+02	1.8E+00	5.80E-06	9.28E-03	5.61E-06	4.15E-01	2.33E-03
VOC	Toluene	108-88-3	1.9E-01	7.5E-01	7.4E-05	1.0E+03	1.7E+00	5.43E-06	9.35E-03	5.41E-06	4.26E-01	2.30E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.6E-01	5.2E-01	6.8E-05	1.1E+03	2.5E+00	5.25E-06	7.34E-03	5.23E-06	4.36E-01	2.28E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E-01	5.2E-01	7.5E-05	1.0E+03	2.5E+00	5.45E-06	7.31E-03	5.42E-06	4.25E-01	2.30E-03
VOC	Xylenes (total)	1330-20-7	2.5E-01	6.7E-01	7.6E-05	1.0E+03	1.9E+00	5.46E-06	8.69E-03	5.45E-06	4.24E-01	2.31E-03
SVOC	Anthracene	120-12-7	1.3E-03	2.8E-01	6.7E-05	1.2E+03	4.7E+00	5.20E-06	4.83E-03	2.85E-06	6.12E-01	1.74E-03
SVOC	Benzo(a)anthracene	56-55-3	5.6E-05	4.4E-01	7.8E-05	9.9E+02	3.0E+00	5.53E-06	6.54E-03	3.41E-07	9.38E-01	
SVOC	Benzo(a)pyrene	50-32-8	1.5E-05	3.7E-01	7.8E-05	9.9E+02	3.5E+00	5.53E-06	5.83E-03	8.58E-08	9.84E-01	
SVOC	Benzo(b)fluoranthene	205-99-2	1.7E-03	2.0E-01	4.8E-05	1.6E+03	6.7E+00	4.56E-06	3.79E-03	2.64E-06	6.32E-01	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.1E-05	1.9E-01	4.5E-05	1.7E+03	6.9E+00	4.46E-06	3.69E-03	4.02E-08	9.92E-01	
SVOC	Chrysene	218-01-9	1.5E-03	2.1E-01	5.4E-05	1.4E+03	6.1E+00	4.76E-06	4.03E-03	2.65E-06	6.32E-01	
SVOC	Ethanol	64-17-5	1.7E-04	1.1E+00	1.1E-04	6.9E+02	1.2E+00	6.44E-06	1.18E-02	1.56E-06	7.55E-01	
SVOC	Fluorene	86-73-7	1.4E-03	3.1E-01	6.8E-05	1.1E+03	4.2E+00	5.24E-06	5.21E-03	3.04E-06	5.95E-01	1.81E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.0E-05	1.6E-01	4.9E-05	1.6E+03	7.9E+00	4.59E-06	3.38E-03	6.75E-08	9.87E-01	
SVOC	Naphthalene	91-20-3	1.2E-02	5.1E-01	6.5E-05	1.2E+03	2.6E+00	5.13E-06	7.21E-03	4.85E-06	4.58E-01	2.22E-03
SVOC	Phenanthrene	85-01-8	1.4E-03	3.2E-01	6.5E-05	1.2E+03	4.0E+00	5.13E-06	5.32E-03	3.04E-06	5.94E-01	1.81E-03
SVOC	Pyrene	129-00-0	2.0E-04	2.4E-01	6.3E-05	1.2E+03	5.5E+00	5.06E-06	4.29E-03	7.35E-07	8.73E-01	
SVOC	Tetraethylene Glycol	112-60-7	1.6E-11	4.4E-01	7.0E-05	1.1E+03	3.0E+00	5.28E-06	6.52E-03	1.06E-13	1.00E+00	
INORG	Lead	7439-92-1										

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Table 1

Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes: Water density (g/cm ³)	ρ_w	1.00E+00
Water viscosity (g/cm-s)	ν_w	8.93E-03
Air density (g/cm ³)	ρ_a	1.20E-03
Air viscosity (g/cm-s)	ν_a	1.81E-04
Wind speed (mph)	u_{10}	9.3
Wind speed (m/s)	u_{10}	4.2
Friction velocity (m/s)	u	0.123
Pool effective diameter (m)	d_e	2.1
Pool water surface area (m ²)	A	3.3
Pool water depth (m)	d	0.23
Pool water volume (m ³)	V	0.76
Fetch-to-depth ratio	F/D	9.0
Averaging period (days)	t	1.0

Attachment 6

Table 2

Nonsteady State Dermal Absorption of Chemicals from Water in Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	MW (g/mole)	FA (unitless)	K _p (cm/hr)	B (unitless)	t (hr)	c	b	ts (hr)	DA (L/cm ² -event)
VOC	Benzene	71-43-2	7.8E+01	1.0E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	3.70E-05
VOC	Cumene	98-82-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,2-Dibromoethane	106-93-4	1.9E+02	1.0E+00	1.6E-03	8.4E-03	1.2E+00	3.4E-01	3.1E-01	2.8E+00	6.81E-06
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.0E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.13E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	1.0E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.27E-04
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.0E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	8.84E-06
VOC	Toluene	108-88-3	9.2E+01	1.0E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	8.08E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	Xylenes (total)	1330-20-7	1.1E+02	1.0E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.32E-04
SVOC	Anthracene	120-12-7	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Chrysene	218-01-9	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Ethanol	64-17-5	4.6E+01	1.0E+00	5.5E-04	1.4E-03	1.9E-01	3.3E-01	3.0E-01	4.6E-01	1.30E-06
SVOC	Fluorene	86-73-7	1.7E+02	1.0E+00			9.0E-01	3.3E-01	3.0E-01	2.2E+00	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Naphthalene	91-20-3	1.3E+02	1.0E+00			5.5E-01	3.3E-01	3.0E-01	1.3E+00	
SVOC	Phenanthrene	85-01-8	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Pyrene	129-00-0	2.0E+02	1.0E+00			1.4E+00	3.3E-01	3.0E-01	3.4E+00	
SVOC	Tetraethylene Glycol	112-60-7	1.9E+02	1.0E+00			1.3E+00	3.3E-01	3.0E-01	3.1E+00	
INORG	Lead	7439-92-1	2.1E+02		1.0E-04		1.5E+00	3.3E-01	3.0E-01	3.7E+00	2.00E-07

Notes:

Event Time hours t 2

K_p capped at 1 cm/hr (USEPA 1992).

The dermal absorbed dose for inorganic chemicals is estimated using a steady-state approach (USEPA 2004, Equation 3.4) and for organic chemicals is estimated using a nonsteady-state approach (USEPA 2004, Equations 3.2 and 3.3).

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Table 3

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Source area	acres	0.0008
Groundwater averaging time for C/Q		1-Hour Max
C/Q	(L/m³)/(L/m²-s)	15.83

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 6

Table 4a

Unit Risk Calculations for Exposure of Residents to Groundwater in Kiddie Pools

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	ADAF	C _{gw} (mg/l)	Incidental Ingestion				Dermal Contact					Vapor Inhalation				All Routes Risk
						LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	f _{oral}	Risk	DA (L/cm ² -event)	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	f _{oral}	Risk	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	f _{inh}	Risk	
VOC	Benzene	71-43-2	A	N	1.00E+00	1.06E-04	5.5E-02		5.8E-06	3.70E-05	4.65E-04	5.5E-02		2.6E-05	3.70E-02	7.8E-03		2.4E-06	3.4E-05
VOC	Cumene	98-82-8	D	N	1.00E+00	1.16E-04									3.56E-02				
VOC	1,2-Dibromoethane	106-93-4	LC	N	1.00E+00	1.13E-04	2.0E+00		2.3E-04	6.81E-06	9.15E-05	2.0E+00		1.8E-04	3.60E-02	6.0E-01		1.8E-04	5.8E-04
VOC	1,2-Dichloroethane	107-06-2	B2	N	1.00E+00	1.06E-04	9.1E-02		9.7E-06	1.13E-05	1.43E-04	9.1E-02		1.3E-05	3.69E-02	2.6E-02		7.8E-06	3.1E-05
VOC	Ethyl Benzene	100-41-4	D	N	1.00E+00	1.13E-04				1.27E-04	1.70E-03				3.60E-02				
VOC	Methyl tert-butyl ether	1634-04-4	C	N	1.00E+00	1.07E-04	1.8E-03		1.9E-07	8.84E-06	1.12E-04	1.8E-03		2.0E-07	3.68E-02	2.6E-04		7.8E-08	4.7E-07
VOC	Toluene	108-88-3	ID	N	1.00E+00	1.10E-04				8.08E-05	1.05E-03				3.65E-02				
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	N	1.00E+00	1.12E-04									3.61E-02				
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	N	1.00E+00	1.10E-04									3.65E-02				
VOC	Xylenes (total)	1330-20-7	ID	N	1.00E+00	1.09E-04				1.32E-04	1.71E-03				3.65E-02				
SVOC	Anthracene	120-12-7	ID	N	1.00E+00	1.58E-04									2.76E-02				
SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.00E+00	2.42E-04	1.0E-01	1	9.5E-05			1.0E-01	1			6.0E-02	1		9.5E-05
SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.00E+00	2.54E-04	1.0E+00	1	1.0E-03			1.0E+00	1			6.0E-01	1		1.0E-03
SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.00E+00	1.63E-04	1.0E-01	1	6.4E-05			1.0E-01	1			6.0E-02	1		6.4E-05
SVOC	Benzo(g,h,i)perylene	191-24-2	D	N	1.00E+00	2.56E-04													
SVOC	Chrysene	218-01-9	B2	Y	1.00E+00	1.63E-04	1.0E-03	1	6.4E-07			1.0E-03	1			6.0E-04	1		6.4E-07
SVOC	Ethanol	64-17-5		N	1.00E+00	1.95E-04				1.30E-06	3.01E-05								
SVOC	Fluorene	86-73-7	D	N	1.00E+00	1.53E-04									2.86E-02				
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	1.00E+00	2.54E-04	1.0E-01	1	1.0E-04			1.0E-01	1			6.0E-02	1		1.0E-04
SVOC	Naphthalene	91-20-3	C	N	1.00E+00	1.18E-04	1.2E-01		1.4E-05			1.2E-01			3.52E-02	3.4E-02		9.7E-06	2.4E-05
SVOC	Phenanthrene	85-01-8	D	N	1.00E+00	1.53E-04									2.86E-02				
SVOC	Pyrene	129-00-0	NC	N	1.00E+00	2.25E-04													
SVOC	Tetraethylene Glycol	112-60-7		N	1.00E+00	2.58E-04													
INORG	Lead	7439-92-1	B2	N	1.00E+00	2.58E-04				2.00E-07	6.13E-06								

Notes:

f_{oral} and f_{inh} are the fraction of the oral and inhalation toxicity values, respectively, that USEPA identified as having a mutagenic mode of action.

Attachment 6

Table 4b

Hazard Quotient Calculations for Exposure of Residents to Groundwater in Kiddie Pools

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{gw} (mg/L)	Incidental Ingestion			Dermal Contact				Vapor Inhalation			All Routes
				ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	DA (L/cm ² - event)	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	HQ
VOC	Benzene	71-43-2	1.00E+00	2.84E-04	1.0E-02	2.8E-02	3.70E-05	1.25E-03	1.0E-02	1.3E-01	3.70E-02	9.0E-02	9.0E-03	1.6E-01
VOC	Cumene	98-82-8	1.00E+00	3.11E-04	4.0E-01	7.8E-04			4.0E-01		3.56E-02	4.0E-01	1.9E-03	2.7E-03
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	3.04E-04	9.0E-03	3.4E-02	6.81E-06	2.46E-04	9.0E-03	2.7E-02	3.60E-02	9.0E-03	8.8E-02	1.5E-01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	2.87E-04	2.0E-02	1.4E-02	1.13E-05	3.85E-04	2.0E-02	1.9E-02	3.69E-02	7.0E-02	1.2E-02	4.5E-02
VOC	Ethyl Benzene	100-41-4	1.00E+00	3.03E-04	1.0E-01	3.0E-03	1.27E-04	4.58E-03	1.0E-01	4.6E-02	3.60E-02	9.0E+00	8.8E-05	4.9E-02
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	2.88E-04	3.0E-01	9.6E-04	8.84E-06	3.03E-04	3.0E-01	1.0E-03	3.68E-02	3.0E+00	2.7E-04	2.2E-03
VOC	Toluene	108-88-3	1.00E+00	2.95E-04	8.0E-01	3.7E-04	8.08E-05	2.84E-03	8.0E-01	3.5E-03	3.65E-02	5.0E+00	1.6E-04	4.1E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	3.02E-04	4.0E-02	7.6E-03			4.0E-02		3.61E-02	2.0E-01	4.0E-03	1.2E-02
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	2.95E-04	4.0E-02	7.4E-03			4.0E-02		3.65E-02	2.0E-01	4.0E-03	1.1E-02
VOC	Xylenes (total)	1330-20-7	1.00E+00	2.94E-04	2.0E-01	1.5E-03	1.32E-04	4.61E-03	2.0E-01	2.3E-02	3.65E-02	3.0E-01	2.7E-03	2.7E-02
SVOC	Anthracene	120-12-7	1.00E+00	4.25E-04	1.0E+00	4.2E-04			1.0E+00		2.76E-02			4.2E-04
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00	6.51E-04										
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00	6.83E-04	3.0E-04	2.3E+00			3.0E-04			2.0E-06		2.3E+00
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00	4.39E-04										
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00	6.88E-04	3.0E-01	2.3E-03			3.0E-01					2.3E-03
SVOC	Chrysene	218-01-9	1.00E+00	4.38E-04										
SVOC	Ethanol	64-17-5	1.00E+00	5.24E-04	6.2E+01	8.4E-06	1.30E-06	8.10E-05	6.2E+01	1.3E-06		1.9E+01		9.8E-06
SVOC	Fluorene	86-73-7	1.00E+00	4.13E-04	4.0E-01	1.0E-03			4.0E-01		2.86E-02			1.0E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00	6.85E-04										
SVOC	Naphthalene	91-20-3	1.00E+00	3.18E-04	2.0E-01	1.6E-03			2.0E-01		3.52E-02	3.0E-03	2.6E-01	2.6E-01
SVOC	Phenanthrene	85-01-8	1.00E+00	4.12E-04	3.0E-01	1.4E-03			3.0E-01		2.86E-02			1.4E-03
SVOC	Pyrene	129-00-0	1.00E+00	6.06E-04	3.0E-01	2.0E-03			3.0E-01					2.0E-03
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00	6.94E-04	2.0E+00	3.5E-04			2.0E+00					3.5E-04
INORG	Lead	7439-92-1	1.00E+00	6.94E-04			2.00E-07	1.65E-05						

Attachment 7

Nonpotable Groundwater Use Calculations

Table 1 – Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Table 2 – Nonsteady State Dermal Absorption of Chemicals from Water in Residential Kiddie Pool

Table 3 – Dispersion Factor to Outdoor Air

Table 4a – Unit Risk Calculations for Exposure of Resident to Groundwater in Kiddie Pools

Table 4b – Unit Hazard Quotient Calculations for Exposure of Resident to Groundwater in Kiddie Pools



Attachment 7

Table 1

Upper-Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Chem Group	Chemical	CASRN	Carc Class	Max Detect from All Depths (mg/kg)	Routine Worker				Maintenance Worker		Construction Worker		Soil Migration to GW							
						Outdoor Activities		Vapor Intrusion		Outdoor Activities		Outdoor Activities		Nonpotable Use		R. Worker GW Vol OA		R. Worker GW VI		Const. W GW Contact	
						Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	VOC	Benzene	71-43-2	A	1.20E+04	2.9E-04	3.5E+00	2.6E-02	3.1E+02	4.6E-05	1.4E+00	3.0E-04	3.0E+01	1.0E-03	4.9E+00	NC	NC	6.6E-05	7.9E-01	7.1E-06	7.6E-01
Tank Group 07	VOC	Cumene	98-82-8	D	1.50E+04	NC	2.9E-01	NC	2.9E+01	NC	1.1E-01	NC	6.9E+00	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	VOC	Ethyl Benzene	100-41-4	D	1.20E+02	NC	1.1E-03	NC	9.4E-02	NC	4.4E-04	NC	4.6E-03	NC	1.5E-02	NC	NC	NC	NC	NC	NC
Tank Group 07	VOC	Toluene	108-88-3	ID	6.20E+03	NC	3.2E-02	NC	9.7E-01	NC	1.1E-02	NC	2.6E-01	NC	6.3E-02	NC	NC	NC	NC	NC	NC
Tank Group 07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	3.30E+02	NC	4.4E-02	NC	4.3E+00	NC	1.7E-02	NC	2.7E-01	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.40E+02	NC	1.8E-02	NC	1.8E+00	NC	6.9E-03	NC	9.4E-02	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	VOC	Xylenes (total)	1330-20-7	ID	5.60E+02	NC	3.7E-02	NC	4.4E+00	NC	1.5E-02	NC	3.6E-01	NC	3.8E-02	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Anthracene	120-12-7	ID	2.30E+01	NC	5.0E-05	NC	NC	NC	1.2E-05	NC	5.0E-05	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Benzo[a]anthracene	56-55-3	B2	7.10E+01	1.6E-06	NC	NC	NC	1.6E-07	NC	2.2E-07	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Benzo[a]pyrene	50-32-8	HC	5.40E+01	1.2E-05	1.2E-01	NC	NC	1.2E-06	6.6E-02	1.7E-06	7.0E-01	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Benzo[b]fluoranthene	205-99-2	B2	2.80E+01	6.5E-07	NC	NC	NC	6.4E-08	NC	8.8E-08	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Benzo[g,h,i]perylene	191-24-2	D	1.80E+01	NC	3.9E-04	NC	NC	NC	9.6E-05	NC	1.3E-04	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Chrysene	218-01-9	B2	1.70E+02	3.9E-08	NC	NC	NC	3.9E-09	NC	5.3E-09	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Fluorene	86-73-7	D	1.10E+01	NC	1.8E-04	NC	NC	NC	4.4E-05	NC	6.0E-05	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Indeno[1,2,3-cd]pyrene	193-39-5	B2	3.50E+01	8.1E-09	NC	NC	NC	8.0E-10	NC	1.1E-09	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Naphthalene	91-20-3	C	5.20E+01	4.1E-06	7.4E-02	3.5E-04	9.6E+00	4.7E-07	2.3E-02	1.1E-06	6.4E-01	3.1E-06	3.4E-02	NC	NC	NC	1.5E-02	NC	4.7E-02
Tank Group 07	SVOC	Phenanthrene	85-01-8	D	1.10E+02	NC	2.4E-03	NC	NC	NC	5.8E-04	NC	8.0E-04	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	SVOC	Pyrene	129-00-0	NC	1.30E+02	NC	2.8E-03	NC	NC	NC	6.9E-04	NC	9.5E-04	NC	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	INORG	Lead	7439-92-1	B2	1.36E+03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:

Only constituents detected in each area are shown.
 Single-chemical cancer risk and hazard quotient (HQ) estimates in excess of PADEP's thresholds for cumulative cancer risk and HI of 1E-4 and 1, respectively, are shaded and bold.
 Single-chemical cancer risk and HQ estimates in excess of 1/10 PADEP's thresholds for cumulative cancer risk or HI of 1E-4 and 1, respectively, are italic and bold.
 NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect.
 The concentrations for the Xylene isomers (m/p and o) were summed to Xylenes (total).
 Chem Group - chemical group
 Carc Class - USEPA Weight-of-Evidence Cancer Classification

Attachment 7

Table 2

RME Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Chem Group	Chemical	CASRN	Carc Class	Max Detect from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Basis	Routine Worker		Maintenance Worker		Construction Worker	
								Outdoor Activities		Outdoor Activities		Outdoor Activities	
								Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	VOC	Benzene	71-43-2	A	1.20E+04	1.28E+03	UCL	3.1E-05	3.8E-01	4.9E-06	1.5E-01	3.2E-05	3.2E+00
Tank Group 07	VOC	Cumene	98-82-8	D	1.50E+04	3.76E+03	UCL	NC	7.2E-02	NC	2.8E-02	NC	1.7E+00
Tank Group 07	VOC	Ethyl Benzene	100-41-4	D	1.20E+02	1.20E+02	Max	NC	1.1E-03	NC	4.4E-04	NC	4.6E-03
Tank Group 07	VOC	Toluene	108-88-3	ID	6.20E+03	1.17E+03	UCL	NC	6.0E-03	NC	2.1E-03	NC	5.0E-02
Tank Group 07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	3.30E+02	3.64E+01	UCL	NC	4.9E-03	NC	1.9E-03	NC	2.9E-02
Tank Group 07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.40E+02	1.40E+02	Max	NC	1.8E-02	NC	6.9E-03	NC	9.4E-02
Tank Group 07	VOC	Xylenes (total)	1330-20-7	ID	5.60E+02	1.10E+02	UCL	NC	7.3E-03	NC	3.0E-03	NC	7.2E-02
Tank Group 07	SVOC	Anthracene	120-12-7	ID	2.30E+01	2.30E+01	Max	NC	5.0E-05	NC	1.2E-05	NC	5.0E-05
Tank Group 07	SVOC	Benzo(a)anthracene	56-55-3	B2	7.10E+01	7.10E+01	Max	1.6E-06	NC	1.6E-07	NC	2.2E-07	NC
Tank Group 07	SVOC	Benzo(a)pyrene	50-32-8	HC	5.40E+01	3.87E+00	UCL	8.9E-07	8.5E-03	8.9E-08	4.7E-03	1.2E-07	5.0E-02
Tank Group 07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	2.80E+01	2.80E+01	Max	6.5E-07	NC	6.4E-08	NC	8.8E-08	NC
Tank Group 07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.80E+01	1.80E+01	Max	NC	3.9E-04	NC	9.6E-05	NC	1.3E-04
Tank Group 07	SVOC	Chrysene	218-01-9	B2	1.70E+02	1.70E+02	Max	3.9E-08	NC	3.9E-09	NC	5.3E-09	NC
Tank Group 07	SVOC	Fluorene	86-73-7	D	1.10E+01	1.10E+01	Max	NC	1.8E-04	NC	4.4E-05	NC	6.0E-05
Tank Group 07	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	3.50E-01	3.50E-01	Max	8.1E-09	NC	8.0E-10	NC	1.1E-09	NC
Tank Group 07	SVOC	Naphthalene	91-20-3	C	5.20E+01	4.40E+00	UCL	3.5E-07	6.3E-03	4.0E-08	2.0E-03	9.5E-08	5.4E-02
Tank Group 07	SVOC	Phenanthrene	85-01-8	D	1.10E+02	1.10E+02	Max	NC	2.4E-03	NC	5.8E-04	NC	8.0E-04
Tank Group 07	SVOC	Pyrene	129-00-0	NC	1.30E+02	1.30E+02	Max	NC	2.8E-03	NC	6.9E-04	NC	9.5E-04
Tank Group 07	INORG	Lead	7439-92-1	B2	1.36E+03	1.36E+03	Max	NC	NC	NC	NC	NC	NC

Notes:

Only constituents detected in each area are shown.

Single-chemical cancer risk and hazard quotient (HQ) estimates in excess of PADEP's thresholds for cumulative cancer risk and HI of 1E-4 and 1, respectively, are shaded and bold

Single-chemical cancer risk and HQ estimates in excess of 1/10 PADEP's thresholds for cumulative cancer risk or HI of 1E-4 and 1, respectively, are italic and bold

NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect

The concentrations for the Xylene isomers (m/p and o) were summed to Xylenes (total).

Chem Group - chemical group

Carc Class - USEPA Weight-of-Evidence Cancer Classification

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-01	VOC	Benzene	71-43-2	A	Y		7.30E-04	3.65E-04	8.0E-10	9.5E-06	9.1E-12	9.2E-07	3.1E-11	1.5E-07
Tank Group 07	GPR1116-01	VOC	Cumene	98-82-8	D	Y	2.80E-02		2.80E-02	NC	5.5E-05	NC	1.3E-05	NC	NC
Tank Group 07	GPR1116-01	VOC	1,2-Dibromoethane	106-93-4	LC	N		7.30E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-01	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.50E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-01	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E-03		1.20E-03	NC	9.4E-07	NC	4.6E-08	NC	1.5E-07
Tank Group 07	GPR1116-01	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-01	VOC	Toluene	108-88-3	ID	Y	8.10E-04		8.10E-04	NC	1.3E-07	NC	3.4E-08	NC	8.3E-09
Tank Group 07	GPR1116-01	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.60E-02		2.60E-02	NC	3.4E-04	NC	2.1E-05	NC	NC
Tank Group 07	GPR1116-01	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.60E-02		1.60E-02	NC	2.1E-04	NC	1.1E-05	NC	NC
Tank Group 07	GPR1116-01	VOC	Xylenes (total)	1330-20-7	ID	Y	4.20E-02		4.20E-02	NC	3.3E-04	NC	2.7E-05	NC	2.9E-06
Tank Group 07	GPR1116-01	SVOC	Anthracene	120-12-7	ID	Y	1.40E-01		1.40E-01	NC	NC	NC	3.1E-07	NC	NC
Tank Group 07	GPR1116-01	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.80E-01		3.80E-01	NC	NC	1.2E-09	NC	NC	NC
Tank Group 07	GPR1116-01	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	5.80E-01		5.80E-01	NC	NC	1.8E-08	7.5E-03	NC	NC
Tank Group 07	GPR1116-01	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	5.70E-01		5.70E-01	NC	NC	1.8E-09	NC	NC	NC
Tank Group 07	GPR1116-01	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.30E-01		3.30E-01	NC	NC	NC	2.4E-06	NC	NC
Tank Group 07	GPR1116-01	SVOC	Chrysene	218-01-9	B2	Y	4.20E-01		4.20E-01	NC	NC	1.3E-11	NC	NC	NC
Tank Group 07	GPR1116-01	SVOC	Fluorene	86-73-7	D	Y	1.10E-01		1.10E-01	NC	NC	NC	6.0E-07	NC	NC
Tank Group 07	GPR1116-01	SVOC	Naphthalene	91-20-3	C	Y	9.40E-01		9.40E-01	6.4E-06	1.7E-01	2.0E-08	1.2E-02	5.6E-08	6.1E-04
Tank Group 07	GPR1116-01	SVOC	Phenanthrene	85-01-8	D	Y	3.20E-01		3.20E-01	NC	NC	NC	2.3E-06	NC	NC
Tank Group 07	GPR1116-01	SVOC	Pyrene	129-00-0	NC	Y	4.90E-01		4.90E-01	NC	NC	NC	3.6E-06	NC	NC
Tank Group 07	GPR1116-01	INORG	Lead	7439-92-1	B2	Y	1.94E+01		1.94E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-02	VOC	Benzene	71-43-2	A	Y	1.70E-02		1.70E-02	3.7E-08	4.4E-04	4.2E-10	4.3E-05	1.4E-09	6.9E-06
Tank Group 07	GPR1116-02	VOC	Cumene	98-82-8	D	Y	9.10E-03		9.10E-03	NC	1.8E-05	NC	4.2E-06	NC	NC
Tank Group 07	GPR1116-02	VOC	1,2-Dibromoethane	106-93-4	LC	N		9.20E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-02	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-02	VOC	Ethyl Benzene	100-41-4	D	Y	3.10E-03		3.10E-03	NC	2.4E-06	NC	1.2E-07	NC	3.8E-07
Tank Group 07	GPR1116-02	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.70E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-02	VOC	Toluene	108-88-3	ID	Y	2.00E-02		2.00E-02	NC	3.1E-06	NC	8.5E-07	NC	2.0E-07
Tank Group 07	GPR1116-02	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.90E-02		2.90E-02	NC	3.8E-04	NC	2.3E-05	NC	NC
Tank Group 07	GPR1116-02	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	9.70E-04		9.70E-04	NC	1.3E-05	NC	6.5E-07	NC	NC
Tank Group 07	GPR1116-02	VOC	Xylenes (total)	1330-20-7	ID	Y	2.15E-02		2.15E-02	NC	1.7E-04	NC	1.4E-05	NC	1.5E-06
Tank Group 07	GPR1116-02	SVOC	Anthracene	120-12-7	ID	Y	3.40E-01		3.40E-01	NC	NC	NC	7.4E-07	NC	NC
Tank Group 07	GPR1116-02	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	8.10E-01		8.10E-01	NC	NC	2.5E-09	NC	NC	NC
Tank Group 07	GPR1116-02	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.20E+00		1.20E+00	NC	NC	3.8E-08	1.6E-02	NC	NC
Tank Group 07	GPR1116-02	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.10E+00		1.10E+00	NC	NC	3.4E-09	NC	NC	NC
Tank Group 07	GPR1116-02	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	5.40E-01		5.40E-01	NC	NC	NC	3.9E-06	NC	NC
Tank Group 07	GPR1116-02	SVOC	Chrysene	218-01-9	B2	Y	9.20E-01		9.20E-01	NC	NC	2.9E-11	NC	NC	NC
Tank Group 07	GPR1116-02	SVOC	Fluorene	86-73-7	D	Y	3.50E-01		3.50E-01	NC	NC	NC	1.9E-06	NC	NC
Tank Group 07	GPR1116-02	SVOC	Naphthalene	91-20-3	C	Y	2.00E+00		2.00E+00	1.4E-05	3.7E-01	4.3E-08	2.5E-02	1.2E-07	1.3E-03
Tank Group 07	GPR1116-02	SVOC	Phenanthrene	85-01-8	D	Y	9.40E-01		9.40E-01	NC	NC	NC	6.8E-06	NC	NC
Tank Group 07	GPR1116-02	SVOC	Pyrene	129-00-0	NC	Y	1.20E+00		1.20E+00	NC	NC	NC	8.7E-06	NC	NC
Tank Group 07	GPR1116-02	INORG	Lead	7439-92-1	B2	Y	9.78E+01		9.78E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-03	VOC	Benzene	71-43-2	A	Y	1.20E-03		1.20E-03	2.6E-09	3.1E-05	3.0E-11	3.0E-06	1.0E-10	4.9E-07
Tank Group 07	GPR1116-03	VOC	Cumene	98-82-8	D	Y	1.50E-02		1.50E-02	NC	2.9E-05	NC	6.9E-06	NC	NC
Tank Group 07	GPR1116-03	VOC	1,2-Dibromoethane	106-93-4	LC	N		7.20E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-03	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-03	VOC	Ethyl Benzene	100-41-4	D	Y	4.00E-04		4.00E-04	NC	3.1E-07	NC	1.5E-08	NC	4.9E-08
Tank Group 07	GPR1116-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-03	VOC	Toluene	108-88-3	ID	Y	8.00E-04		8.00E-04	NC	1.3E-07	NC	3.4E-08	NC	8.2E-09
Tank Group 07	GPR1116-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	9.50E-03		9.50E-03	NC	1.2E-04	NC	7.7E-06	NC	NC
Tank Group 07	GPR1116-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	5.60E-04		5.60E-04	NC	7.3E-06	NC	3.8E-07	NC	NC
Tank Group 07	GPR1116-03	VOC	Xylenes (total)	1330-20-7	ID	Y	3.95E-03		3.95E-03	NC	3.1E-05	NC	2.6E-06	NC	2.7E-07
Tank Group 07	GPR1116-03	SVOC	Anthracene	120-12-7	ID	Y	3.00E-01		3.00E-01	NC	NC	NC	6.6E-07	NC	NC
Tank Group 07	GPR1116-03	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.90E-01		3.90E-01	NC	NC	1.2E-09	NC	NC	NC
Tank Group 07	GPR1116-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.20E-01		4.20E-01	NC	NC	1.3E-08	5.5E-03	NC	NC
Tank Group 07	GPR1116-03	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	4.90E-01		4.90E-01	NC	NC	1.5E-09	NC	NC	NC
Tank Group 07	GPR1116-03	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.20E-01		2.20E-01	NC	NC	NC	1.6E-06	NC	NC
Tank Group 07	GPR1116-03	SVOC	Chrysene	218-01-9	B2	Y	7.70E-01		7.70E-01	NC	NC	2.4E-11	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-03	SVOC	Fluorene	86-73-7	D	Y	7.50E-01	7.50E-01	NC	NC	NC	4.1E-06	NC	NC	
Tank Group 07	GPR1116-03	SVOC	Naphthalene	91-20-3	C	Y	5.20E-01	5.20E-01	3.5E-06	9.6E-02	1.1E-08	6.4E-03	3.1E-08	3.4E-04	
Tank Group 07	GPR1116-03	SVOC	Phenanthrene	85-01-8	D	Y	1.50E+00	1.50E+00	NC	NC	NC	1.1E-05	NC	NC	
Tank Group 07	GPR1116-03	SVOC	Pyrene	129-00-0	NC	Y	6.80E-01	6.80E-01	NC	NC	NC	4.9E-06	NC	NC	
Tank Group 07	GPR1116-03	INORG	Lead	7439-92-1	B2	Y	1.36E+03	1.36E+03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-04	VOC	Benzene	71-43-2	A	Y	5.60E-04	5.60E-04	1.2E-09	1.5E-05	1.4E-11	1.4E-06	4.7E-11	2.3E-07	
Tank Group 07	GPR1116-04	VOC	Cumene	98-82-8	D	Y	2.40E-02	2.40E-02	NC	4.7E-05	NC	1.1E-05	NC	NC	
Tank Group 07	GPR1116-04	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.90E-04	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-04	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-04	VOC	Ethyl Benzene	100-41-4	D	Y	1.00E-03	1.00E-03	NC	7.8E-07	NC	3.8E-08	NC	1.2E-07	
Tank Group 07	GPR1116-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.30E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-04	VOC	Toluene	108-88-3	ID	Y	1.70E-03	1.70E-03	NC	2.7E-07	NC	7.2E-08	NC	1.7E-08	
Tank Group 07	GPR1116-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.20E-02	2.20E-02	NC	2.9E-04	NC	1.8E-05	NC	NC	
Tank Group 07	GPR1116-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	8.90E-03	8.90E-03	NC	1.2E-04	NC	6.0E-06	NC	NC	
Tank Group 07	GPR1116-04	VOC	Xylenes (total)	1330-20-7	ID	Y	1.50E-02	1.50E-02	NC	1.2E-04	NC	9.8E-06	NC	1.0E-06	
Tank Group 07	GPR1116-04	SVOC	Anthracene	120-12-7	ID	Y	2.80E-01	2.80E-01	NC	NC	NC	6.1E-07	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.90E-01	4.90E-01	NC	NC	1.5E-09	NC	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	6.60E-01	6.60E-01	NC	NC	2.1E-08	8.6E-03	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	6.70E-01	6.70E-01	NC	NC	2.1E-09	NC	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	5.20E-01	5.20E-01	NC	NC	NC	3.8E-06	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Chrysene	218-01-9	B2	Y	5.20E-01	5.20E-01	NC	NC	1.6E-11	NC	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Fluorene	86-73-7	D	Y	1.60E-01	1.60E-01	NC	NC	NC	8.7E-07	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Naphthalene	91-20-3	C	Y	2.80E+00	2.80E+00	1.9E-05	5.2E-01	6.1E-08	3.4E-02	1.7E-07	1.8E-03	
Tank Group 07	GPR1116-04	SVOC	Phenanthrene	85-01-8	D	Y	5.20E-01	5.20E-01	NC	NC	NC	3.8E-06	NC	NC	
Tank Group 07	GPR1116-04	SVOC	Pyrene	129-00-0	NC	Y	5.40E-01	5.40E-01	NC	NC	NC	3.9E-06	NC	NC	
Tank Group 07	GPR1116-04	INORG	Lead	7439-92-1	B2	Y	2.02E+01	2.02E+01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-05	VOC	Benzene	71-43-2	A	Y	2.67E-02	8.80E-04	2.67E-02	5.8E-08	7.0E-04	6.7E-10	6.8E-05	2.3E-09	1.1E-05
Tank Group 07	GPR1116-05	VOC	Cumene	98-82-8	D	Y	4.02E-01	4.02E-01	NC	7.9E-04	NC	1.8E-04	NC	NC	
Tank Group 07	GPR1116-05	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.39E-02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-05	VOC	1,2-Dichloroethane	107-06-2	B2	N		4.79E-02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-05	VOC	Ethyl Benzene	100-41-4	D	Y	1.15E-02	1.80E-03	1.15E-02	NC	9.0E-06	NC	4.4E-07	NC	1.4E-06
Tank Group 07	GPR1116-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		9.68E-02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-05	VOC	Toluene	108-88-3	ID	Y	3.95E-02	1.80E-03	3.95E-02	NC	6.2E-06	NC	1.7E-06	NC	4.0E-07
Tank Group 07	GPR1116-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.92E-01	3.92E-01	NC	5.1E-03	NC	3.2E-04	NC	NC	
Tank Group 07	GPR1116-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	4.81E-02	4.81E-02	NC	6.3E-04	NC	3.2E-05	NC	NC	
Tank Group 07	GPR1116-05	VOC	Xylenes (total)	1330-20-7	ID	Y	6.09E-02	6.09E-02	NC	4.8E-04	NC	4.0E-05	NC	4.1E-06	
Tank Group 07	GPR1116-05	SVOC	Anthracene	120-12-7	ID	Y	6.25E-02	1.40E-01	6.25E-02	NC	NC	1.4E-07	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.40E-01	1.40E-01	NC	NC	4.4E-10	NC	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	2.45E-01	1.80E-01	2.45E-01	NC	NC	7.7E-09	3.2E-03	NC	NC
Tank Group 07	GPR1116-05	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	2.31E-01	2.31E-01	NC	NC	7.2E-10	NC	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	1.44E-01	1.44E-01	NC	NC	NC	1.0E-06	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Chrysene	218-01-9	B2	Y	1.57E-01	1.57E-01	NC	NC	4.9E-12	NC	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Fluorene	86-73-7	D	Y	8.70E-02	8.70E-02	NC	NC	NC	4.7E-07	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Naphthalene	91-20-3	C	Y	2.55E-01	2.55E-01	1.7E-06	4.7E-02	5.5E-09	3.1E-03	1.5E-08	1.6E-04	
Tank Group 07	GPR1116-05	SVOC	Phenanthrene	85-01-8	D	Y	1.90E-01	1.90E-01	NC	NC	NC	1.4E-06	NC	NC	
Tank Group 07	GPR1116-05	SVOC	Pyrene	129-00-0	NC	Y	1.55E-01	1.55E-01	NC	NC	NC	1.1E-06	NC	NC	
Tank Group 07	GPR1116-05	INORG	Lead	7439-92-1	B2	Y	2.06E+02	2.06E+02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-06	VOC	Benzene	71-43-2	A	Y		3.80E-01	1.90E-01	4.2E-07	5.0E-03	4.7E-09	4.8E-04	1.6E-08	7.7E-05
Tank Group 07	GPR1116-06	VOC	Cumene	98-82-8	D	Y	1.80E+01	1.80E+01	NC	3.5E-02	NC	8.3E-03	NC	NC	
Tank Group 07	GPR1116-06	VOC	1,2-Dibromoethane	106-93-4	LC	N		3.80E-01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-06	VOC	1,2-Dichloroethane	107-06-2	B2	N		7.70E-01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-06	VOC	Ethyl Benzene	100-41-4	D	Y	1.90E-01	1.90E-01	NC	1.5E-04	NC	7.3E-06	NC	2.3E-05	
Tank Group 07	GPR1116-06	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.50E+00	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR1116-06	VOC	Toluene	108-88-3	ID	Y		7.70E-01	3.85E-01	NC	6.0E-05	NC	1.6E-05	NC	3.9E-06
Tank Group 07	GPR1116-06	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.20E+00	1.20E+00	NC	1.6E-02	NC	9.7E-04	NC	NC	
Tank Group 07	GPR1116-06	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.50E-01	1.50E-01	NC	2.0E-03	NC	1.0E-04	NC	NC	
Tank Group 07	GPR1116-06	VOC	Xylenes (total)	1330-20-7	ID	Y	1.16E+00	1.16E+00	NC	9.1E-03	NC	7.5E-04	NC	7.9E-05	
Tank Group 07	GPR1116-06	SVOC	Anthracene	120-12-7	ID	Y	1.80E-01	1.80E-01	NC	NC	NC	3.9E-07	NC	NC	

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-06	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.70E-01		2.70E-01	NC	NC	8.4E-10	NC	NC	NC
Tank Group 07	GPR1116-06	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.10E-01		4.10E-01	NC	NC	1.3E-08	5.3E-03	NC	NC
Tank Group 07	GPR1116-06	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	4.40E-01		4.40E-01	NC	NC	1.4E-09	NC	NC	NC
Tank Group 07	GPR1116-06	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.10E-01		3.10E-01	NC	NC	NC	2.3E-06	NC	NC
Tank Group 07	GPR1116-06	SVOC	Chrysene	218-01-9	B2	Y	3.00E-01		3.00E-01	NC	NC	9.4E-12	NC	NC	NC
Tank Group 07	GPR1116-06	SVOC	Fluorene	86-73-7	D	Y	2.20E-01		2.20E-01	NC	NC	NC	1.2E-06	NC	NC
Tank Group 07	GPR1116-06	SVOC	Naphthalene	91-20-3	C	Y	1.10E+00		1.10E+00	7.4E-06	2.0E-01	2.4E-08	1.4E-02	6.6E-08	7.1E-04
Tank Group 07	GPR1116-06	SVOC	Phenanthrene	85-01-8	D	Y	6.70E-01		6.70E-01	NC	NC	NC	4.9E-06	NC	NC
Tank Group 07	GPR1116-06	SVOC	Pyrene	129-00-0	NC	Y	5.50E-01		5.50E-01	NC	NC	NC	4.0E-06	NC	NC
Tank Group 07	GPR1116-06	INORG	Lead	7439-92-1	B2	Y	1.04E+02		1.04E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-07	VOC	Benzene	71-43-2	A	Y	3.70E-02		3.70E-02	8.1E-08	9.7E-04	9.2E-10	9.3E-05	3.1E-09	1.5E-05
Tank Group 07	GPR1116-07	VOC	Cumene	98-82-8	D	Y	8.40E+00		8.40E+00	NC	1.6E-02	NC	3.9E-03	NC	NC
Tank Group 07	GPR1116-07	VOC	1,2-Dibromoethane	106-93-4	LC	N		4.60E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-07	VOC	1,2-Dichloroethane	107-06-2	B2	N		9.30E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-07	VOC	Ethyl Benzene	100-41-4	D	Y	8.70E-02		8.70E-02	NC	6.8E-05	NC	3.3E-06	NC	1.1E-05
Tank Group 07	GPR1116-07	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.80E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-07	VOC	Toluene	108-88-3	ID	Y	1.70E-01		1.70E-01	NC	2.7E-05	NC	7.2E-06	NC	1.7E-06
Tank Group 07	GPR1116-07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.70E+00		2.70E+00	NC	3.5E-02	NC	2.2E-03	NC	NC
Tank Group 07	GPR1116-07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.20E-01		1.20E-01	NC	1.6E-03	NC	8.1E-05	NC	NC
Tank Group 07	GPR1116-07	VOC	Xylenes (total)	1330-20-7	ID	Y	4.30E-01		4.30E-01	NC	3.4E-03	NC	2.8E-04	NC	2.9E-05
Tank Group 07	GPR1116-07	SVOC	Anthracene	120-12-7	ID	Y		6.60E+00	3.30E+00	NC	NC	NC	7.2E-06	NC	NC
Tank Group 07	GPR1116-07	SVOC	Benzo(a)anthracene	56-55-3	B2	Y		6.60E+00	3.30E+00	NC	NC	1.0E-08	NC	NC	NC
Tank Group 07	GPR1116-07	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		8.80E+00	4.40E+00	NC	NC	1.4E-07	5.7E-02	NC	NC
Tank Group 07	GPR1116-07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		6.60E+00	3.30E+00	NC	NC	1.0E-08	NC	NC	NC
Tank Group 07	GPR1116-07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		8.80E+00	4.40E+00	NC	NC	NC	3.2E-05	NC	NC
Tank Group 07	GPR1116-07	SVOC	Chrysene	218-01-9	B2	Y		6.60E+00	3.30E+00	NC	NC	1.0E-10	NC	NC	NC
Tank Group 07	GPR1116-07	SVOC	Fluorene	86-73-7	D	Y	1.40E+00		1.40E+00	NC	NC	NC	7.6E-06	NC	NC
Tank Group 07	GPR1116-07	SVOC	Naphthalene	91-20-3	C	Y		1.10E+01	5.50E+00	3.7E-05	1.0E+00	1.2E-07	6.8E-02	3.3E-07	3.6E-03
Tank Group 07	GPR1116-07	SVOC	Phenanthrene	85-01-8	D	Y	2.80E+00		2.80E+00	NC	NC	NC	2.0E-05	NC	NC
Tank Group 07	GPR1116-07	SVOC	Pyrene	129-00-0	NC	Y		6.60E+00	3.30E+00	NC	NC	NC	2.4E-05	NC	NC
Tank Group 07	GPR1116-07	INORG	Lead	7439-92-1	B2	Y	1.19E+02		1.19E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-08	VOC	Benzene	71-43-2	A	Y	2.80E+01	5.00E-04	2.80E+01	6.1E-05	7.3E-01	7.0E-07	7.1E-02	2.4E-06	1.1E-02
Tank Group 07	GPR1116-08	VOC	Cumene	98-82-8	D	Y	2.20E-02		2.20E-02	NC	4.3E-05	NC	1.0E-05	NC	NC
Tank Group 07	GPR1116-08	VOC	1,2-Dibromoethane	106-93-4	LC	N		3.90E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-08	VOC	1,2-Dichloroethane	107-06-2	B2	N		7.80E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-08	VOC	Ethyl Benzene	100-41-4	D	Y	3.40E-01	9.95E-04	3.40E-01	NC	2.7E-04	NC	1.3E-05	NC	4.2E-05
Tank Group 07	GPR1116-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.60E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-08	VOC	Toluene	108-88-3	ID	Y	6.80E+00	9.95E-04	6.80E+00	NC	1.1E-03	NC	2.9E-04	NC	6.9E-05
Tank Group 07	GPR1116-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.00E-01		1.00E-01	NC	1.3E-03	NC	8.1E-05	NC	NC
Tank Group 07	GPR1116-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.50E-02	2.05E-03	2.50E-02	NC	3.3E-04	NC	1.7E-05	NC	NC
Tank Group 07	GPR1116-08	VOC	Xylenes (total)	1330-20-7	ID	Y	1.08E+00		1.08E+00	NC	8.4E-03	NC	7.0E-04	NC	7.3E-05
Tank Group 07	GPR1116-08	SVOC	Anthracene	120-12-7	ID	Y		1.20E-01	6.00E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPR1116-08	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.90E-02		2.90E-02	NC	NC	9.1E-11	NC	NC	NC
Tank Group 07	GPR1116-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	8.50E-02	1.70E-01	8.50E-02	NC	NC	2.7E-09	1.1E-03	NC	NC
Tank Group 07	GPR1116-08	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.50E-02		3.50E-02	NC	NC	1.1E-10	NC	NC	NC
Tank Group 07	GPR1116-08	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.70E-01	8.50E-02	NC	NC	NC	6.2E-07	NC	NC
Tank Group 07	GPR1116-08	SVOC	Chrysene	218-01-9	B2	Y	3.00E-02		3.00E-02	NC	NC	9.4E-13	NC	NC	NC
Tank Group 07	GPR1116-08	SVOC	Fluorene	86-73-7	D	Y	2.40E-02		2.40E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPR1116-08	SVOC	Naphthalene	91-20-3	C	Y	9.80E-02	2.10E-01	9.80E-02	6.6E-07	1.8E-02	2.1E-09	1.2E-03	5.9E-09	6.3E-05
Tank Group 07	GPR1116-08	SVOC	Phenanthrene	85-01-8	D	Y	6.20E-02		6.20E-02	NC	NC	NC	4.5E-07	NC	NC
Tank Group 07	GPR1116-08	SVOC	Pyrene	129-00-0	NC	Y	4.10E-02		4.10E-02	NC	NC	NC	3.0E-07	NC	NC
Tank Group 07	GPR1116-08	INORG	Lead	7439-92-1	B2	Y	8.53E+01		8.53E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-09	VOC	Benzene	71-43-2	A	Y		5.10E-04	2.55E-04	5.6E-10	6.7E-06	6.4E-12	6.4E-07	2.2E-11	1.0E-07
Tank Group 07	GPR1116-09	VOC	Cumene	98-82-8	D	Y	6.40E-04		6.40E-04	NC	1.3E-06	NC	2.9E-07	NC	NC
Tank Group 07	GPR1116-09	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.10E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-09	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.00E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-09	VOC	Ethyl Benzene	100-41-4	D	Y		1.00E-03	5.00E-04	NC	3.9E-07	NC	1.9E-08	NC	6.1E-08
Tank Group 07	GPR1116-09	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.00E-03		NC	NC	NC	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-09	VOC	Toluene	108-88-3	ID	Y		1.00E-03	5.00E-04	NC	7.8E-08	NC	2.1E-08	NC	5.1E-09
Tank Group 07	GPR1116-09	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		2.00E-03	1.00E-03	NC	1.3E-05	NC	8.1E-07	NC	NC
Tank Group 07	GPR1116-09	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.00E-03	1.00E-03	NC	1.3E-05	NC	6.7E-07	NC	NC
Tank Group 07	GPR1116-09	VOC	Xylenes (total)	1330-20-7	ID	Y		2.00E-03	1.00E-03	NC	7.8E-06	NC	6.5E-07	NC	6.8E-08
Tank Group 07	GPR1116-09	SVOC	Anthracene	120-12-7	ID	Y		1.20E-01	6.00E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPR1116-09	SVOC	Benzo(a)anthracene	56-55-3	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-10	NC	NC	NC
Tank Group 07	GPR1116-09	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.60E-01	8.00E-02	NC	NC	2.5E-09	1.0E-03	NC	NC
Tank Group 07	GPR1116-09	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-10	NC	NC	NC
Tank Group 07	GPR1116-09	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.60E-01	8.00E-02	NC	NC	NC	5.8E-07	NC	NC
Tank Group 07	GPR1116-09	SVOC	Chrysene	218-01-9	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-12	NC	NC	NC
Tank Group 07	GPR1116-09	SVOC	Fluorene	86-73-7	D	Y		2.00E-01	1.00E-01	NC	NC	NC	5.5E-07	NC	NC
Tank Group 07	GPR1116-09	SVOC	Naphthalene	91-20-3	C	Y		2.00E-01	1.00E-01	6.8E-07	1.9E-02	2.2E-09	1.2E-03	6.0E-09	6.5E-05
Tank Group 07	GPR1116-09	SVOC	Phenanthrene	85-01-8	D	Y		1.20E-01	6.00E-02	NC	NC	NC	4.4E-07	NC	NC
Tank Group 07	GPR1116-09	SVOC	Pyrene	129-00-0	NC	Y		1.20E-01	6.00E-02	NC	NC	NC	4.4E-07	NC	NC
Tank Group 07	GPR1116-09	INORG	Lead	7439-92-1	B2	Y	4.08E+01		4.08E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-10	VOC	Benzene	71-43-2	A	Y	3.00E-04		3.00E-04	6.6E-10	7.8E-06	7.5E-12	7.6E-07	2.5E-11	1.2E-07
Tank Group 07	GPR1116-10	VOC	Cumene	98-82-8	D	Y	5.40E-04		5.40E-04	NC	1.1E-06	NC	2.5E-07	NC	NC
Tank Group 07	GPR1116-10	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.10E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-10	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.00E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-10	VOC	Ethyl Benzene	100-41-4	D	Y	2.20E-04		2.20E-04	NC	1.7E-07	NC	8.4E-09	NC	2.7E-08
Tank Group 07	GPR1116-10	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.00E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-10	VOC	Toluene	108-88-3	ID	Y	8.40E-04		8.40E-04	NC	1.3E-07	NC	3.6E-08	NC	8.6E-09
Tank Group 07	GPR1116-10	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	7.20E-04		7.20E-04	NC	9.4E-06	NC	5.8E-07	NC	NC
Tank Group 07	GPR1116-10	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.50E-04		2.50E-04	NC	3.3E-06	NC	1.7E-07	NC	NC
Tank Group 07	GPR1116-10	VOC	Xylenes (total)	1330-20-7	ID	Y	1.56E-03		1.56E-03	NC	1.2E-05	NC	1.0E-06	NC	1.1E-07
Tank Group 07	GPR1116-10	SVOC	Anthracene	120-12-7	ID	Y	2.20E-01		2.20E-01	NC	NC	NC	4.8E-07	NC	NC
Tank Group 07	GPR1116-10	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.00E-01		4.00E-01	NC	NC	1.3E-09	NC	NC	NC
Tank Group 07	GPR1116-10	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.40E+00		1.40E+00	NC	NC	4.4E-08	1.8E-02	NC	NC
Tank Group 07	GPR1116-10	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.20E+00		1.20E+00	NC	NC	3.8E-09	NC	NC	NC
Tank Group 07	GPR1116-10	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	9.40E-01		9.40E-01	NC	NC	NC	6.8E-06	NC	NC
Tank Group 07	GPR1116-10	SVOC	Chrysene	218-01-9	B2	Y	5.20E-01		5.20E-01	NC	NC	1.6E-11	NC	NC	NC
Tank Group 07	GPR1116-10	SVOC	Fluorene	86-73-7	D	Y	1.40E-01		1.40E-01	NC	NC	NC	7.6E-07	NC	NC
Tank Group 07	GPR1116-10	SVOC	Naphthalene	91-20-3	C	Y	2.20E+00		2.20E+00	1.5E-05	4.1E-01	4.8E-08	2.7E-02	1.3E-07	1.4E-03
Tank Group 07	GPR1116-10	SVOC	Phenanthrene	85-01-8	D	Y	3.40E-01		3.40E-01	NC	NC	NC	2.5E-06	NC	NC
Tank Group 07	GPR1116-10	SVOC	Pyrene	129-00-0	NC	Y	3.80E-01		3.80E-01	NC	NC	NC	2.8E-06	NC	NC
Tank Group 07	GPR1116-10	INORG	Lead	7439-92-1	B2	Y	1.39E+01		1.39E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-11	VOC	Benzene	71-43-2	A	Y	4.10E-02		2.05E-02	4.5E-08	5.4E-04	5.1E-10	5.2E-05	1.7E-09	8.3E-06
Tank Group 07	GPR1116-11	VOC	Cumene	98-82-8	D	Y	6.80E-02		6.80E-02	NC	1.3E-04	NC	3.1E-05	NC	NC
Tank Group 07	GPR1116-11	VOC	1,2-Dibromoethane	106-93-4	LC	N		4.10E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-11	VOC	1,2-Dichloroethane	107-06-2	B2	N		8.30E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-11	VOC	Ethyl Benzene	100-41-4	D	Y	1.50E-02		1.50E-02	NC	1.2E-05	NC	5.7E-07	NC	1.8E-06
Tank Group 07	GPR1116-11	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.60E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-11	VOC	Toluene	108-88-3	ID	Y	8.30E-02		4.15E-02	NC	6.5E-06	NC	1.8E-06	NC	4.2E-07
Tank Group 07	GPR1116-11	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.60E-01		8.00E-02	NC	1.0E-03	NC	6.5E-05	NC	NC
Tank Group 07	GPR1116-11	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.60E-01		8.00E-02	NC	1.0E-03	NC	5.4E-05	NC	NC
Tank Group 07	GPR1116-11	VOC	Xylenes (total)	1330-20-7	ID	Y	1.10E-01		1.10E-01	NC	8.6E-04	NC	7.2E-05	NC	7.5E-06
Tank Group 07	GPR1116-11	SVOC	Anthracene	120-12-7	ID	Y	3.90E-02		3.90E-02	NC	NC	NC	8.5E-08	NC	NC
Tank Group 07	GPR1116-11	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.30E-01		1.30E-01	NC	NC	4.1E-10	NC	NC	NC
Tank Group 07	GPR1116-11	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.70E-01		1.70E-01	NC	NC	5.3E-09	2.2E-03	NC	NC
Tank Group 07	GPR1116-11	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.80E-01		1.80E-01	NC	NC	5.6E-10	NC	NC	NC
Tank Group 07	GPR1116-11	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	9.20E-02		9.20E-02	NC	NC	NC	6.7E-07	NC	NC
Tank Group 07	GPR1116-11	SVOC	Chrysene	218-01-9	B2	Y	1.60E-01		1.60E-01	NC	NC	5.0E-12	NC	NC	NC
Tank Group 07	GPR1116-11	SVOC	Fluorene	86-73-7	D	Y	3.60E-02		3.60E-02	NC	NC	NC	2.0E-07	NC	NC
Tank Group 07	GPR1116-11	SVOC	Naphthalene	91-20-3	C	Y	1.60E-01		1.60E-01	1.1E-06	3.0E-02	3.5E-09	2.0E-03	9.6E-09	1.0E-04
Tank Group 07	GPR1116-11	SVOC	Phenanthrene	85-01-8	D	Y	8.30E-02		8.30E-02	NC	NC	NC	6.0E-07	NC	NC
Tank Group 07	GPR1116-11	SVOC	Pyrene	129-00-0	NC	Y	1.60E-01		1.60E-01	NC	NC	NC	1.2E-06	NC	NC
Tank Group 07	GPR1116-11	INORG	Lead	7439-92-1	B2	Y	1.93E+02		1.93E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-12	VOC	Benzene	71-43-2	A	Y	5.20E-02		5.20E-02	1.1E-07	1.4E-03	1.3E-09	1.3E-04	4.4E-09	2.1E-05

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-12	VOC	Cumene	98-82-8	D	Y	3.80E+00		3.80E+00	NC	7.4E-03	NC	1.7E-03	NC	NC
Tank Group 07	GPR1116-12	VOC	1,2-Dibromoethane	106-93-4	LC	N		3.30E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-12	VOC	1,2-Dichloroethane	107-06-2	B2	N		6.60E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-12	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E-01		1.20E-01	NC	9.4E-05	NC	4.6E-06	NC	1.5E-05
Tank Group 07	GPR1116-12	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.30E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-12	VOC	Toluene	108-88-3	ID	Y	2.90E-01		2.90E-01	NC	4.5E-05	NC	1.2E-05	NC	3.0E-06
Tank Group 07	GPR1116-12	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.60E+01		1.60E+01	NC	2.1E-01	NC	1.3E-02	NC	NC
Tank Group 07	GPR1116-12	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.80E+00		3.80E+00	NC	5.0E-02	NC	2.5E-03	NC	NC
Tank Group 07	GPR1116-12	VOC	Xylenes (total)	1330-20-7	ID	Y	1.26E+00		1.26E+00	NC	9.9E-03	NC	8.2E-04	NC	8.6E-05
Tank Group 07	GPR1116-12	SVOC	Anthracene	120-12-7	ID	Y	4.50E-01		4.50E-01	NC	NC	NC	9.8E-07	NC	NC
Tank Group 07	GPR1116-12	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.40E-01		3.40E-01	NC	NC	1.1E-09	NC	NC	NC
Tank Group 07	GPR1116-12	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	6.20E-01		6.20E-01	NC	NC	1.9E-08	8.1E-03	NC	NC
Tank Group 07	GPR1116-12	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	6.80E-01		6.80E-01	NC	NC	2.1E-09	NC	NC	NC
Tank Group 07	GPR1116-12	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.10E-01		3.10E-01	NC	NC	NC	2.3E-06	NC	NC
Tank Group 07	GPR1116-12	SVOC	Chrysene	218-01-9	B2	Y	9.20E-01		9.20E-01	NC	NC	2.9E-11	NC	NC	NC
Tank Group 07	GPR1116-12	SVOC	Fluorene	86-73-7	D	Y	1.20E+00		1.20E+00	NC	NC	NC	6.6E-06	NC	NC
Tank Group 07	GPR1116-12	SVOC	Naphthalene	91-20-3	C	Y	3.20E-01		3.20E-01	2.2E-06	5.9E-02	6.9E-09	3.9E-03	1.9E-08	2.1E-04
Tank Group 07	GPR1116-12	SVOC	Phenanthrene	85-01-8	D	Y	1.60E+00		1.60E+00	NC	NC	NC	1.2E-05	NC	NC
Tank Group 07	GPR1116-12	SVOC	Pyrene	129-00-0	NC	Y	6.20E-01		6.20E-01	NC	NC	NC	4.5E-06	NC	NC
Tank Group 07	GPR1116-12	INORG	Lead	7439-92-1	B2	Y	9.75E+01		9.75E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-13	VOC	Benzene	71-43-2	A	Y	6.40E-04		6.40E-04	1.4E-09	1.7E-05	1.6E-11	1.6E-06	5.4E-11	2.6E-07
Tank Group 07	GPR1116-13	VOC	Cumene	98-82-8	D	Y	3.40E-03		3.40E-03	NC	6.7E-06	NC	1.6E-06	NC	NC
Tank Group 07	GPR1116-13	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.50E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-13	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.30E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-13	VOC	Ethyl Benzene	100-41-4	D	Y	1.10E-03		1.10E-03	NC	8.6E-07	NC	4.2E-08	NC	1.3E-07
Tank Group 07	GPR1116-13	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.60E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-13	VOC	Toluene	108-88-3	ID	Y	2.90E-03		2.90E-03	NC	4.5E-07	NC	1.2E-07	NC	3.0E-08
Tank Group 07	GPR1116-13	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.80E-03		4.80E-03	NC	6.3E-05	NC	3.9E-06	NC	NC
Tank Group 07	GPR1116-13	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.80E-03		1.80E-03	NC	2.4E-05	NC	1.2E-06	NC	NC
Tank Group 07	GPR1116-13	VOC	Xylenes (total)	1330-20-7	ID	Y	1.42E-02		1.42E-02	NC	1.1E-04	NC	9.2E-06	NC	9.6E-07
Tank Group 07	GPR1116-13	SVOC	Anthracene	120-12-7	ID	Y	4.80E-01		4.80E-01	NC	NC	NC	1.0E-06	NC	NC
Tank Group 07	GPR1116-13	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	8.50E-01		8.50E-01	NC	NC	2.7E-09	NC	NC	NC
Tank Group 07	GPR1116-13	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	9.70E-01		9.70E-01	NC	NC	3.0E-08	1.3E-02	NC	NC
Tank Group 07	GPR1116-13	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	9.20E-01		9.20E-01	NC	NC	2.9E-09	NC	NC	NC
Tank Group 07	GPR1116-13	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	4.50E-01		4.50E-01	NC	NC	NC	3.3E-06	NC	NC
Tank Group 07	GPR1116-13	SVOC	Chrysene	218-01-9	B2	Y	8.60E-01		8.60E-01	NC	NC	2.7E-11	NC	NC	NC
Tank Group 07	GPR1116-13	SVOC	Fluorene	86-73-7	D	Y	5.30E-01		5.30E-01	NC	NC	NC	2.9E-06	NC	NC
Tank Group 07	GPR1116-13	SVOC	Naphthalene	91-20-3	C	Y	1.30E+00		1.30E+00	8.8E-06	2.4E-01	2.8E-08	1.6E-02	7.8E-08	8.4E-04
Tank Group 07	GPR1116-13	SVOC	Phenanthrene	85-01-8	D	Y	1.50E+00		1.50E+00	NC	NC	NC	1.1E-05	NC	NC
Tank Group 07	GPR1116-13	SVOC	Pyrene	129-00-0	NC	Y	1.50E+00		1.50E+00	NC	NC	NC	1.1E-05	NC	NC
Tank Group 07	GPR1116-13	INORG	Lead	7439-92-1	B2	Y	3.75E+02		3.75E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-14	VOC	Benzene	71-43-2	A	Y	1.20E-03		1.20E-03	2.6E-09	3.1E-05	3.0E-11	3.0E-06	1.0E-10	4.9E-07
Tank Group 07	GPR1116-14	VOC	Cumene	98-82-8	D	Y	2.00E-02		2.00E-02	NC	3.9E-05	NC	9.2E-06	NC	NC
Tank Group 07	GPR1116-14	VOC	1,2-Dibromoethane	106-93-4	LC	N		9.30E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-14	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-14	VOC	Ethyl Benzene	100-41-4	D	Y	4.10E-04		4.10E-04	NC	3.2E-07	NC	1.6E-08	NC	5.0E-08
Tank Group 07	GPR1116-14	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.70E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-14	VOC	Toluene	108-88-3	ID	Y		1.90E-03	9.50E-04	NC	1.5E-07	NC	4.0E-08	NC	9.7E-09
Tank Group 07	GPR1116-14	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.40E-03		1.40E-03	NC	1.8E-05	NC	1.1E-06	NC	NC
Tank Group 07	GPR1116-14	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.20E-03		1.20E-03	NC	1.6E-05	NC	8.1E-07	NC	NC
Tank Group 07	GPR1116-14	VOC	Xylenes (total)	1330-20-7	ID	Y	2.50E-03		2.50E-03	NC	2.0E-05	NC	1.6E-06	NC	1.7E-07
Tank Group 07	GPR1116-14	SVOC	Anthracene	120-12-7	ID	Y	1.80E-01		1.80E-01	NC	NC	NC	3.9E-07	NC	NC
Tank Group 07	GPR1116-14	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.20E-01		4.20E-01	NC	NC	1.3E-09	NC	NC	NC
Tank Group 07	GPR1116-14	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.30E-01		4.30E-01	NC	NC	1.3E-08	5.6E-03	NC	NC
Tank Group 07	GPR1116-14	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	4.40E-01		4.40E-01	NC	NC	1.4E-09	NC	NC	NC
Tank Group 07	GPR1116-14	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	1.90E-01		1.90E-01	NC	NC	NC	1.4E-06	NC	NC
Tank Group 07	GPR1116-14	SVOC	Chrysene	218-01-9	B2	Y	3.60E-01		3.60E-01	NC	NC	1.1E-11	NC	NC	NC
Tank Group 07	GPR1116-14	SVOC	Fluorene	86-73-7	D	Y	7.40E-01		7.40E-01	NC	NC	NC	4.0E-06	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1116-14	SVOC	Naphthalene	91-20-3	C	Y	3.70E-01		3.70E-01	2.5E-06	6.9E-02	8.0E-09	4.5E-03	2.2E-08	2.4E-04
Tank Group 07	GPR1116-14	SVOC	Phenanthrene	85-01-8	D	Y	1.50E+00		1.50E+00	NC	NC	NC	1.1E-05	NC	NC
Tank Group 07	GPR1116-14	SVOC	Pyrene	129-00-0	NC	Y	6.20E-01		6.20E-01	NC	NC	NC	4.5E-06	NC	NC
Tank Group 07	GPR1116-14	INORG	Lead	7439-92-1	B2	Y	6.02E+01		6.02E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-15	VOC	Benzene	71-43-2	A	Y	5.00E-02		5.00E-02	1.1E-07	1.3E-03	1.2E-09	1.3E-04	4.2E-09	2.0E-05
Tank Group 07	GPR1116-15	VOC	Cumene	98-82-8	D	Y	1.10E+00		1.10E+00	NC	2.2E-03	NC	5.0E-04	NC	NC
Tank Group 07	GPR1116-15	VOC	1,2-Dibromoethane	106-93-4	LC	N		9.70E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-15	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.90E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-15	VOC	Ethyl Benzene	100-41-4	D	Y	2.70E-01		2.70E-01	NC	2.1E-04	NC	1.0E-05	NC	3.3E-05
Tank Group 07	GPR1116-15	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.90E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1116-15	VOC	Toluene	108-88-3	ID	Y	3.50E-01		3.50E-01	NC	5.5E-05	NC	1.5E-05	NC	3.6E-06
Tank Group 07	GPR1116-15	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.60E+00		2.60E+00	NC	3.4E-02	NC	2.1E-03	NC	NC
Tank Group 07	GPR1116-15	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.80E-01		3.80E-01	NC	5.0E-03	NC	2.5E-04	NC	NC
Tank Group 07	GPR1116-15	VOC	Xylenes (total)	1330-20-7	ID	Y	1.37E+00		1.37E+00	NC	1.1E-02	NC	8.9E-04	NC	9.3E-05
Tank Group 07	GPR1116-15	SVOC	Anthracene	120-12-7	ID	Y	1.30E+00		1.30E+00	NC	NC	NC	2.8E-06	NC	NC
Tank Group 07	GPR1116-15	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.70E+00		3.70E+00	NC	NC	1.2E-08	NC	NC	NC
Tank Group 07	GPR1116-15	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	5.20E+00		5.20E+00	NC	NC	1.6E-07	6.8E-02	NC	NC
Tank Group 07	GPR1116-15	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	5.10E+00		5.10E+00	NC	NC	1.6E-08	NC	NC	NC
Tank Group 07	GPR1116-15	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.80E+00		3.80E+00	NC	NC	NC	2.8E-05	NC	NC
Tank Group 07	GPR1116-15	SVOC	Chrysene	218-01-9	B2	Y	3.70E+00		3.70E+00	NC	NC	1.2E-10	NC	NC	NC
Tank Group 07	GPR1116-15	SVOC	Fluorene	86-73-7	D	Y	5.20E-01		5.20E-01	NC	NC	NC	2.8E-06	NC	NC
Tank Group 07	GPR1116-15	SVOC	Naphthalene	91-20-3	C	Y	3.90E+00		3.90E+00	2.6E-05	7.2E-01	8.4E-08	4.8E-02	2.3E-07	2.5E-03
Tank Group 07	GPR1116-15	SVOC	Phenanthrene	85-01-8	D	Y	2.80E+00		2.80E+00	NC	NC	NC	2.0E-05	NC	NC
Tank Group 07	GPR1116-15	SVOC	Pyrene	129-00-0	NC	Y	4.30E+00		4.30E+00	NC	NC	NC	3.1E-05	NC	NC
Tank Group 07	GPR1116-15	INORG	Lead	7439-92-1	B2	Y	1.89E+02		1.89E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-01	VOC	Benzene	71-43-2	A	Y		8.70E-04	4.35E-04	9.5E-10	1.1E-05	1.1E-11	1.1E-06	3.7E-11	1.8E-07
Tank Group 07	GPR1117-01	VOC	Cumene	98-82-8	D	Y	5.50E-03		5.50E-03	NC	1.1E-05	NC	2.5E-06	NC	NC
Tank Group 07	GPR1117-01	VOC	1,2-Dibromoethane	106-93-4	LC	N		8.70E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-01	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.70E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-01	VOC	Ethyl Benzene	100-41-4	D	Y	1.70E-03		8.50E-04	NC	6.7E-07	NC	3.3E-08	NC	1.0E-07
Tank Group 07	GPR1117-01	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.50E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-01	VOC	Toluene	108-88-3	ID	Y		1.70E-03	8.50E-04	NC	1.3E-07	NC	3.6E-08	NC	8.7E-09
Tank Group 07	GPR1117-01	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.30E-03		2.30E-03	NC	3.0E-05	NC	1.9E-06	NC	NC
Tank Group 07	GPR1117-01	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.60E-03		1.60E-03	NC	2.1E-05	NC	1.1E-06	NC	NC
Tank Group 07	GPR1117-01	VOC	Xylenes (total)	1330-20-7	ID	Y	3.15E-03		3.15E-03	NC	2.5E-05	NC	2.0E-06	NC	2.1E-07
Tank Group 07	GPR1117-01	SVOC	Anthracene	120-12-7	ID	Y	2.20E-01		2.20E-01	NC	NC	NC	4.8E-07	NC	NC
Tank Group 07	GPR1117-01	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	7.20E-01		7.20E-01	NC	NC	2.3E-09	NC	NC	NC
Tank Group 07	GPR1117-01	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.00E+00		1.00E+00	NC	NC	3.1E-08	1.3E-02	NC	NC
Tank Group 07	GPR1117-01	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	9.70E-01		9.70E-01	NC	NC	3.0E-09	NC	NC	NC
Tank Group 07	GPR1117-01	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	5.00E-01		5.00E-01	NC	NC	NC	3.6E-06	NC	NC
Tank Group 07	GPR1117-01	SVOC	Chrysene	218-01-9	B2	Y	7.90E-01		7.90E-01	NC	NC	2.5E-11	NC	NC	NC
Tank Group 07	GPR1117-01	SVOC	Fluorene	86-73-7	D	Y	2.60E-01		2.60E-01	NC	NC	NC	1.4E-06	NC	NC
Tank Group 07	GPR1117-01	SVOC	Naphthalene	91-20-3	C	Y	1.10E+00		1.10E+00	7.4E-06	2.0E-01	2.4E-08	1.4E-02	6.6E-08	7.1E-04
Tank Group 07	GPR1117-01	SVOC	Phenanthrene	85-01-8	D	Y	8.60E-01		8.60E-01	NC	NC	NC	6.3E-06	NC	NC
Tank Group 07	GPR1117-01	SVOC	Pyrene	129-00-0	NC	Y	1.20E+00		1.20E+00	NC	NC	NC	8.7E-06	NC	NC
Tank Group 07	GPR1117-01	INORG	Lead	7439-92-1	B2	Y	1.57E+02		1.57E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-02	VOC	Benzene	71-43-2	A	Y		8.30E-04	4.15E-04	9.1E-10	1.1E-05	1.0E-11	1.0E-06	3.5E-11	1.7E-07
Tank Group 07	GPR1117-02	VOC	Cumene	98-82-8	D	Y	1.00E-03		1.00E-03	NC	2.0E-06	NC	4.6E-07	NC	NC
Tank Group 07	GPR1117-02	VOC	1,2-Dibromoethane	106-93-4	LC	N		8.30E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-02	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.70E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-02	VOC	Ethyl Benzene	100-41-4	D	Y	1.70E-03		8.50E-04	NC	6.7E-07	NC	3.3E-08	NC	1.0E-07
Tank Group 07	GPR1117-02	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.30E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-02	VOC	Toluene	108-88-3	ID	Y		1.70E-03	8.50E-04	NC	1.3E-07	NC	3.6E-08	NC	8.7E-09
Tank Group 07	GPR1117-02	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.70E-03		1.70E-03	NC	2.2E-05	NC	1.4E-06	NC	NC
Tank Group 07	GPR1117-02	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.50E-03		1.50E-03	NC	2.0E-05	NC	1.0E-06	NC	NC
Tank Group 07	GPR1117-02	VOC	Xylenes (total)	1330-20-7	ID	Y	2.63E-03		2.63E-03	NC	2.1E-05	NC	1.7E-06	NC	1.8E-07
Tank Group 07	GPR1117-02	SVOC	Anthracene	120-12-7	ID	Y	2.90E-01		2.90E-01	NC	NC	NC	6.3E-07	NC	NC
Tank Group 07	GPR1117-02	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	7.60E-01		7.60E-01	NC	NC	2.4E-09	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1117-02	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.10E+00		1.10E+00	NC	NC	3.4E-08	1.4E-02	NC	NC
Tank Group 07	GPR1117-02	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.00E+00		1.00E+00	NC	NC	3.1E-09	NC	NC	NC
Tank Group 07	GPR1117-02	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	5.80E-01		5.80E-01	NC	NC	NC	4.2E-06	NC	NC
Tank Group 07	GPR1117-02	SVOC	Chrysene	218-01-9	B2	Y	8.80E-01		8.80E-01	NC	NC	2.8E-11	NC	NC	NC
Tank Group 07	GPR1117-02	SVOC	Fluorene	86-73-7	D	Y	2.70E-01		2.70E-01	NC	NC	NC	1.5E-06	NC	NC
Tank Group 07	GPR1117-02	SVOC	Naphthalene	91-20-3	C	Y	2.00E+00		2.00E+00	1.4E-05	3.7E-01	4.3E-08	2.5E-02	1.2E-07	1.3E-03
Tank Group 07	GPR1117-02	SVOC	Phenanthrene	85-01-8	D	Y	8.00E-01		8.00E-01	NC	NC	NC	5.8E-06	NC	NC
Tank Group 07	GPR1117-02	SVOC	Pyrene	129-00-0	NC	Y	1.50E+00		1.50E+00	NC	NC	NC	1.1E-05	NC	NC
Tank Group 07	GPR1117-02	INORG	Lead	7439-92-1	B2	Y	1.25E+02		1.25E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-03	VOC	Benzene	71-43-2	A	Y	3.20E-04		3.20E-04	7.0E-10	8.4E-06	8.0E-12	8.1E-07	2.7E-11	1.3E-07
Tank Group 07	GPR1117-03	VOC	Cumene	98-82-8	D	Y	1.10E-01		1.10E-01	NC	2.2E-04	NC	5.0E-05	NC	NC
Tank Group 07	GPR1117-03	VOC	1,2-Dibromoethane	106-93-4	LC	N		7.10E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-03	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-03	VOC	Ethyl Benzene	100-41-4	D	Y		1.40E-03	7.00E-04	NC	5.5E-07	NC	2.7E-08	NC	8.6E-08
Tank Group 07	GPR1117-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-03	VOC	Toluene	108-88-3	ID	Y		1.40E-03	7.00E-04	NC	1.1E-07	NC	3.0E-08	NC	7.1E-09
Tank Group 07	GPR1117-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	8.50E-04	2.00E-03	8.50E-04	NC	1.1E-05	NC	6.9E-07	NC	NC
Tank Group 07	GPR1117-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.80E-03	1.40E-03	NC	1.8E-05	NC	9.4E-07	NC	NC
Tank Group 07	GPR1117-03	VOC	Xylenes (total)	1330-20-7	ID	Y	1.88E-03	2.00E-03	1.88E-03	NC	1.5E-05	NC	1.2E-06	NC	1.3E-07
Tank Group 07	GPR1117-03	SVOC	Anthracene	120-12-7	ID	Y	1.40E+00		1.40E+00	NC	NC	NC	3.1E-06	NC	NC
Tank Group 07	GPR1117-03	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	8.80E-01		8.80E-01	NC	NC	2.8E-09	NC	NC	NC
Tank Group 07	GPR1117-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	8.40E-01		8.40E-01	NC	NC	2.6E-08	1.1E-02	NC	NC
Tank Group 07	GPR1117-03	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	7.90E-01		7.90E-01	NC	NC	2.5E-09	NC	NC	NC
Tank Group 07	GPR1117-03	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	4.10E-01		4.10E-01	NC	NC	NC	3.0E-06	NC	NC
Tank Group 07	GPR1117-03	SVOC	Chrysene	218-01-9	B2	Y	1.00E+00		1.00E+00	NC	NC	3.1E-11	NC	NC	NC
Tank Group 07	GPR1117-03	SVOC	Fluorene	86-73-7	D	Y	2.70E+00		2.70E+00	NC	NC	NC	1.5E-05	NC	NC
Tank Group 07	GPR1117-03	SVOC	Naphthalene	91-20-3	C	Y	6.30E+00		6.30E+00	4.3E-05	1.2E+00	1.4E-07	7.7E-02	3.8E-07	4.1E-03
Tank Group 07	GPR1117-03	SVOC	Phenanthrene	85-01-8	D	Y	8.90E+00		8.90E+00	NC	NC	NC	6.5E-05	NC	NC
Tank Group 07	GPR1117-03	SVOC	Pyrene	129-00-0	NC	Y	3.20E+00		3.20E+00	NC	NC	NC	2.3E-05	NC	NC
Tank Group 07	GPR1117-03	INORG	Lead	7439-92-1	B2	Y	1.33E+02		1.33E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-04	VOC	Benzene	71-43-2	A	Y	1.10E-01		1.10E-01	2.4E-07	2.9E-03	2.7E-09	2.8E-04	9.3E-09	4.5E-05
Tank Group 07	GPR1117-04	VOC	Cumene	98-82-8	D	Y	3.70E+00		3.70E+00	NC	7.3E-03	NC	1.7E-03	NC	NC
Tank Group 07	GPR1117-04	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.80E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-04	VOC	1,2-Dichloroethane	107-06-2	B2	N		5.60E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-04	VOC	Ethyl Benzene	100-41-4	D	Y	2.30E-01		2.30E-01	NC	1.8E-04	NC	8.8E-06	NC	2.8E-05
Tank Group 07	GPR1117-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.10E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-04	VOC	Toluene	108-88-3	ID	Y	3.40E-01		3.40E-01	NC	5.3E-05	NC	1.4E-05	NC	3.5E-06
Tank Group 07	GPR1117-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.30E+00		1.30E+00	NC	1.7E-02	NC	1.0E-03	NC	NC
Tank Group 07	GPR1117-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	4.10E-01		4.10E-01	NC	5.4E-03	NC	2.8E-04	NC	NC
Tank Group 07	GPR1117-04	VOC	Xylenes (total)	1330-20-7	ID	Y	1.12E+00		1.12E+00	NC	8.8E-03	NC	7.3E-04	NC	7.6E-05
Tank Group 07	GPR1117-04	SVOC	Anthracene	120-12-7	ID	Y	9.60E-01		9.60E-01	NC	NC	NC	2.1E-06	NC	NC
Tank Group 07	GPR1117-04	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.90E+00		2.90E+00	NC	NC	9.1E-09	NC	NC	NC
Tank Group 07	GPR1117-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	3.10E+00		3.10E+00	NC	NC	9.7E-08	4.0E-02	NC	NC
Tank Group 07	GPR1117-04	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.40E+00		3.40E+00	NC	NC	1.1E-08	NC	NC	NC
Tank Group 07	GPR1117-04	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	1.60E+00		1.60E+00	NC	NC	NC	1.2E-05	NC	NC
Tank Group 07	GPR1117-04	SVOC	Chrysene	218-01-9	B2	Y	2.80E+00		2.80E+00	NC	NC	8.8E-11	NC	NC	NC
Tank Group 07	GPR1117-04	SVOC	Fluorene	86-73-7	D	Y	1.00E+00		1.00E+00	NC	NC	NC	5.5E-06	NC	NC
Tank Group 07	GPR1117-04	SVOC	Naphthalene	91-20-3	C	Y	2.00E+00		2.00E+00	1.4E-05	3.7E-01	4.3E-08	2.5E-02	1.2E-07	1.3E-03
Tank Group 07	GPR1117-04	SVOC	Phenanthrene	85-01-8	D	Y	3.50E+00		3.50E+00	NC	NC	NC	2.5E-05	NC	NC
Tank Group 07	GPR1117-04	SVOC	Pyrene	129-00-0	NC	Y	4.80E+00		4.80E+00	NC	NC	NC	3.5E-05	NC	NC
Tank Group 07	GPR1117-04	INORG	Lead	7439-92-1	B2	Y	6.69E+01		6.69E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-05	VOC	Benzene	71-43-2	A	Y	1.10E-03		1.10E-03	2.4E-09	2.9E-05	2.7E-11	2.8E-06	9.3E-11	4.5E-07
Tank Group 07	GPR1117-05	VOC	Cumene	98-82-8	D	Y		2.20E-03	1.10E-03	NC	2.2E-06	NC	5.0E-07	NC	NC
Tank Group 07	GPR1117-05	VOC	1,2-Dibromoethane	106-93-4	LC	N		1.10E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-05	VOC	1,2-Dichloroethane	107-06-2	B2	N		2.20E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-05	VOC	Ethyl Benzene	100-41-4	D	Y		2.20E-03	1.10E-03	NC	8.6E-07	NC	4.2E-08	NC	1.3E-07
Tank Group 07	GPR1117-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		4.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-05	VOC	Toluene	108-88-3	ID	Y		2.20E-03	1.10E-03	NC	1.7E-07	NC	4.7E-08	NC	1.1E-08

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1117-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		4.40E-03	2.20E-03	NC	2.9E-05	NC	1.8E-06	NC	NC
Tank Group 07	GPR1117-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		4.40E-03	2.20E-03	NC	2.9E-05	NC	1.5E-06	NC	NC
Tank Group 07	GPR1117-05	VOC	Xylenes (total)	1330-20-7	ID	Y		4.40E-03	2.20E-03	NC	1.7E-05	NC	1.4E-06	NC	1.5E-07
Tank Group 07	GPR1117-05	SVOC	Anthracene	120-12-7	ID	Y	5.40E-01		5.40E-01	NC	NC	NC	1.2E-06	NC	NC
Tank Group 07	GPR1117-05	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	6.70E-01		6.70E-01	NC	NC	2.1E-09	NC	NC	NC
Tank Group 07	GPR1117-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	6.40E-01		6.40E-01	NC	NC	2.0E-08	8.3E-03	NC	NC
Tank Group 07	GPR1117-05	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	7.50E-01		7.50E-01	NC	NC	2.3E-09	NC	NC	NC
Tank Group 07	GPR1117-05	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.60E-01		3.60E-01	NC	NC	NC	2.6E-06	NC	NC
Tank Group 07	GPR1117-05	SVOC	Chrysene	218-01-9	B2	Y	6.60E-01		6.60E-01	NC	NC	2.1E-11	NC	NC	NC
Tank Group 07	GPR1117-05	SVOC	Fluorene	86-73-7	D	Y	1.90E-01		1.90E-01	NC	NC	NC	1.0E-06	NC	NC
Tank Group 07	GPR1117-05	SVOC	Napthalene	91-20-3	C	Y	3.20E-01		3.20E-01	2.2E-06	5.9E-02	6.9E-09	3.9E-03	1.9E-08	2.1E-04
Tank Group 07	GPR1117-05	SVOC	Phenanthrene	85-01-8	D	Y	1.20E+00		1.20E+00	NC	NC	NC	8.7E-06	NC	NC
Tank Group 07	GPR1117-05	SVOC	Pyrene	129-00-0	NC	Y	1.10E+00		1.10E+00	NC	NC	NC	8.0E-06	NC	NC
Tank Group 07	GPR1117-05	INORG	Lead	7439-92-1	B2	Y	6.19E+02		6.19E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-06	VOC	Benzene	71-43-2	A	Y	1.20E-03		1.20E-03	2.6E-09	3.1E-05	3.0E-11	3.0E-06	1.0E-10	4.9E-07
Tank Group 07	GPR1117-06	VOC	Cumene	98-82-8	D	Y	1.20E-03		1.20E-03	NC	2.4E-06	NC	5.5E-07	NC	NC
Tank Group 07	GPR1117-06	VOC	1,2-Dibromoethane	106-93-4	LC	N		9.40E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-06	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-06	VOC	Ethyl Benzene	100-41-4	D	Y		1.90E-03	9.50E-04	NC	7.4E-07	NC	3.6E-08	NC	1.2E-07
Tank Group 07	GPR1117-06	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-06	VOC	Toluene	108-88-3	ID	Y	2.00E-03		2.00E-03	NC	3.1E-07	NC	8.5E-08	NC	2.0E-08
Tank Group 07	GPR1117-06	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	9.00E-03		9.00E-03	NC	1.2E-04	NC	7.3E-06	NC	NC
Tank Group 07	GPR1117-06	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.50E-03		2.50E-03	NC	3.3E-05	NC	1.7E-06	NC	NC
Tank Group 07	GPR1117-06	VOC	Xylenes (total)	1330-20-7	ID	Y	4.80E-03		4.80E-03	NC	3.8E-05	NC	3.1E-06	NC	3.3E-07
Tank Group 07	GPR1117-06	SVOC	Anthracene	120-12-7	ID	Y	2.20E-01		2.20E-01	NC	NC	NC	4.8E-07	NC	NC
Tank Group 07	GPR1117-06	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	5.30E-01		5.30E-01	NC	NC	1.7E-09	NC	NC	NC
Tank Group 07	GPR1117-06	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.20E-01		7.20E-01	NC	NC	2.3E-08	9.3E-03	NC	NC
Tank Group 07	GPR1117-06	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	7.60E-01		7.60E-01	NC	NC	2.4E-09	NC	NC	NC
Tank Group 07	GPR1117-06	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	4.90E-01		4.90E-01	NC	NC	NC	3.6E-06	NC	NC
Tank Group 07	GPR1117-06	SVOC	Chrysene	218-01-9	B2	Y	7.40E-01		7.40E-01	NC	NC	2.3E-11	NC	NC	NC
Tank Group 07	GPR1117-06	SVOC	Fluorene	86-73-7	D	Y	1.20E-01		1.20E-01	NC	NC	NC	6.6E-07	NC	NC
Tank Group 07	GPR1117-06	SVOC	Napthalene	91-20-3	C	Y	1.20E+00		1.20E+00	8.1E-06	2.2E-01	2.6E-08	1.5E-02	7.2E-08	7.8E-04
Tank Group 07	GPR1117-06	SVOC	Phenanthrene	85-01-8	D	Y	5.20E-01		5.20E-01	NC	NC	NC	3.8E-06	NC	NC
Tank Group 07	GPR1117-06	SVOC	Pyrene	129-00-0	NC	Y	7.60E-01		7.60E-01	NC	NC	NC	5.5E-06	NC	NC
Tank Group 07	GPR1117-06	INORG	Lead	7439-92-1	B2	Y	6.87E+02		6.87E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-07	VOC	Benzene	71-43-2	A	Y	4.90E-04		4.90E-04	1.1E-09	1.3E-05	1.2E-11	1.2E-06	4.1E-11	2.0E-07
Tank Group 07	GPR1117-07	VOC	Cumene	98-82-8	D	Y		1.90E-03	9.50E-04	NC	1.9E-06	NC	4.4E-07	NC	NC
Tank Group 07	GPR1117-07	VOC	1,2-Dibromoethane	106-93-4	LC	N		9.70E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-07	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-07	VOC	Ethyl Benzene	100-41-4	D	Y		1.90E-03	9.50E-04	NC	7.4E-07	NC	3.6E-08	NC	1.2E-07
Tank Group 07	GPR1117-07	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-07	VOC	Toluene	108-88-3	ID	Y		1.90E-03	9.50E-04	NC	1.5E-07	NC	4.0E-08	NC	9.7E-09
Tank Group 07	GPR1117-07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		3.90E-03	1.95E-03	NC	2.5E-05	NC	1.6E-06	NC	NC
Tank Group 07	GPR1117-07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		3.90E-03	1.95E-03	NC	2.5E-05	NC	1.3E-06	NC	NC
Tank Group 07	GPR1117-07	VOC	Xylenes (total)	1330-20-7	ID	Y		3.90E-03	1.95E-03	NC	1.5E-05	NC	1.3E-06	NC	1.3E-07
Tank Group 07	GPR1117-07	SVOC	Anthracene	120-12-7	ID	Y	9.80E-02		9.80E-02	NC	NC	NC	2.1E-07	NC	NC
Tank Group 07	GPR1117-07	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.60E-01		2.60E-01	NC	NC	8.1E-10	NC	NC	NC
Tank Group 07	GPR1117-07	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	3.00E-01		3.00E-01	NC	NC	9.4E-09	3.9E-03	NC	NC
Tank Group 07	GPR1117-07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.60E-01		3.60E-01	NC	NC	1.1E-09	NC	NC	NC
Tank Group 07	GPR1117-07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.00E-01		2.00E-01	NC	NC	NC	1.5E-06	NC	NC
Tank Group 07	GPR1117-07	SVOC	Chrysene	218-01-9	B2	Y	2.70E-01		2.70E-01	NC	NC	8.4E-12	NC	NC	NC
Tank Group 07	GPR1117-07	SVOC	Fluorene	86-73-7	D	Y	1.10E-01		1.10E-01	NC	NC	NC	6.0E-07	NC	NC
Tank Group 07	GPR1117-07	SVOC	Napthalene	91-20-3	C	Y	4.50E-01		4.50E-01	3.0E-06	8.3E-02	9.7E-09	5.5E-03	2.7E-08	2.9E-04
Tank Group 07	GPR1117-07	SVOC	Phenanthrene	85-01-8	D	Y	3.90E-01		3.90E-01	NC	NC	NC	2.8E-06	NC	NC
Tank Group 07	GPR1117-07	SVOC	Pyrene	129-00-0	NC	Y	3.90E-01		3.90E-01	NC	NC	NC	2.8E-06	NC	NC
Tank Group 07	GPR1117-07	INORG	Lead	7439-92-1	B2	Y	9.81E+02		9.81E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	Benzene	71-43-2	A	Y	5.40E-03		5.40E-03	1.2E-08	1.4E-04	1.3E-10	1.4E-05	4.6E-10	2.2E-06
Tank Group 07	GPR1117-08	VOC	Cumene	98-82-8	D	Y	2.80E-04		2.80E-04	NC	5.5E-07	NC	1.3E-07	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR1117-08	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.90E-04	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E-03	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	Ethyl Benzene	100-41-4	D	Y		1.20E-03	NC	4.7E-07	NC	2.3E-08	NC	7.3E-08	NC
Tank Group 07	GPR1117-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E-03	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	Toluene	108-88-3	ID	Y		1.20E-03	NC	9.4E-08	NC	2.6E-08	NC	6.1E-09	NC
Tank Group 07	GPR1117-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		2.40E-03	NC	1.6E-05	NC	9.7E-07	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.40E-03	NC	1.6E-05	NC	8.1E-07	NC	NC	NC
Tank Group 07	GPR1117-08	VOC	Xylenes (total)	1330-20-7	ID	Y		2.40E-03	NC	9.4E-06	NC	7.8E-07	NC	8.2E-08	NC
Tank Group 07	GPR1117-08	SVOC	Anthracene	120-12-7	ID	Y	3.00E-01	3.00E-01	NC	NC	NC	6.6E-07	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	5.90E-01	5.90E-01	NC	NC	1.8E-09	NC	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	5.40E-01	5.40E-01	NC	NC	1.7E-08	7.0E-03	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	6.10E-01	6.10E-01	NC	NC	1.9E-09	NC	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.60E-01	2.60E-01	NC	NC	NC	1.9E-06	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Chrysene	218-01-9	B2	Y	5.80E-01	5.80E-01	NC	NC	1.8E-11	NC	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Fluorene	86-73-7	D	Y	1.20E-01	1.20E-01	NC	NC	NC	6.6E-07	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Naphthalene	91-20-3	C	Y	1.40E-01	1.40E-01	9.5E-07	2.6E-02	3.0E-09	1.7E-03	8.4E-09	9.1E-05	NC
Tank Group 07	GPR1117-08	SVOC	Phenanthrene	85-01-8	D	Y	1.10E+00	1.10E+00	NC	NC	NC	8.0E-06	NC	NC	NC
Tank Group 07	GPR1117-08	SVOC	Pyrene	129-00-0	NC	Y	1.00E+00	1.00E+00	NC	NC	NC	7.3E-06	NC	NC	NC
Tank Group 07	GPR1117-08	INORG	Lead	7439-92-1	B2	Y	2.04E+01	2.04E+01	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-01	VOC	Benzene	71-43-2	A	Y		2.50E-02	2.7E-08	3.3E-04	3.1E-10	3.2E-05	1.1E-09	5.1E-06	NC
Tank Group 07	GPR494-01	VOC	Cumene	98-82-8	D	Y		4.90E-02	NC	4.8E-05	NC	1.1E-05	NC	NC	NC
Tank Group 07	GPR494-01	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.50E-02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-01	VOC	1,2-Dichloroethane	107-06-2	B2	N		4.90E-02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-01	VOC	Ethyl Benzene	100-41-4	D	Y	2.20E-02	2.20E-02	NC	1.7E-05	NC	8.4E-07	NC	2.7E-06	NC
Tank Group 07	GPR494-01	VOC	Methyl tert-butyl ether	1634-04-4	C	N		9.90E-02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-01	VOC	Toluene	108-88-3	ID	Y		4.90E-02	NC	3.8E-06	NC	1.0E-06	NC	2.5E-07	NC
Tank Group 07	GPR494-01	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.20E-01	2.20E-01	NC	2.9E-03	NC	1.8E-04	NC	NC	NC
Tank Group 07	GPR494-01	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	6.00E-02	6.00E-02	NC	7.8E-04	NC	4.0E-05	NC	NC	NC
Tank Group 07	GPR494-01	VOC	Xylenes (total)	1330-20-7	ID	Y	1.16E-01	1.16E-01	NC	9.1E-04	NC	7.5E-05	NC	7.9E-06	NC
Tank Group 07	GPR494-01	SVOC	Anthracene	120-12-7	ID	Y	4.80E+00	4.80E+00	NC	NC	NC	1.0E-05	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	9.70E+00	9.70E+00	NC	NC	3.0E-08	NC	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.70E+00	7.70E+00	NC	NC	2.4E-07	1.0E-01	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.70E+00	3.70E+00	NC	NC	1.2E-08	NC	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.50E+00	2.50E+00	NC	NC	NC	1.8E-05	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Chrysene	218-01-9	B2	Y	1.30E+01	1.30E+01	NC	NC	4.1E-10	NC	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Fluorene	86-73-7	D	Y	5.20E+00	5.20E+00	NC	NC	NC	2.8E-05	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Naphthalene	91-20-3	C	Y	1.30E+00	1.30E+00	8.8E-06	2.4E-01	2.8E-08	1.6E-02	7.8E-08	8.4E-04	NC
Tank Group 07	GPR494-01	SVOC	Phenanthrene	85-01-8	D	Y	3.00E+01	3.00E+01	NC	NC	NC	2.2E-04	NC	NC	NC
Tank Group 07	GPR494-01	SVOC	Pyrene	129-00-0	NC	Y	1.10E+01	1.10E+01	NC	NC	NC	8.0E-05	NC	NC	NC
Tank Group 07	GPR494-01	INORG	Lead	7439-92-1	B2	Y	5.17E+02	5.17E+02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-02	VOC	Benzene	71-43-2	A	Y	3.70E-02	3.70E-02	8.1E-08	9.7E-04	9.2E-10	9.3E-05	3.1E-09	1.5E-05	NC
Tank Group 07	GPR494-02	VOC	Cumene	98-82-8	D	Y	6.30E-01	6.30E-01	NC	1.2E-03	NC	2.9E-04	NC	NC	NC
Tank Group 07	GPR494-02	VOC	1,2-Dibromoethane	106-93-4	LC	N		3.60E-02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-02	VOC	1,2-Dichloroethane	107-06-2	B2	N		7.20E-02	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-02	VOC	Ethyl Benzene	100-41-4	D	Y	6.40E-02	6.40E-02	NC	5.0E-05	NC	2.4E-06	NC	7.8E-06	NC
Tank Group 07	GPR494-02	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.40E-01	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-02	VOC	Toluene	108-88-3	ID	Y	4.70E-02	4.70E-02	NC	7.4E-06	NC	2.0E-06	NC	4.8E-07	NC
Tank Group 07	GPR494-02	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	6.10E-02	6.10E-02	NC	8.0E-04	NC	4.9E-05	NC	NC	NC
Tank Group 07	GPR494-02	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		1.40E-01	NC	9.1E-04	NC	4.7E-05	NC	NC	NC
Tank Group 07	GPR494-02	VOC	Xylenes (total)	1330-20-7	ID	Y	2.18E-01	2.18E-01	NC	1.7E-03	NC	1.4E-04	NC	1.5E-05	NC
Tank Group 07	GPR494-02	SVOC	Anthracene	120-12-7	ID	Y	7.10E+00	7.10E+00	NC	NC	NC	1.6E-05	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.00E+01	2.00E+01	NC	NC	6.3E-08	NC	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.80E+01	1.80E+01	NC	NC	5.6E-07	2.3E-01	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	8.40E+00	8.40E+00	NC	NC	2.6E-08	NC	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	7.00E+00	7.00E+00	NC	NC	NC	5.1E-05	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Chrysene	218-01-9	B2	Y	3.40E+01	3.40E+01	NC	NC	1.1E-09	NC	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Fluorene	86-73-7	D	Y	9.00E+00	9.00E+00	NC	NC	NC	4.9E-05	NC	NC	NC
Tank Group 07	GPR494-02	SVOC	Naphthalene	91-20-3	C	Y	1.40E+00	1.40E+00	9.5E-06	2.6E-01	3.0E-08	1.7E-02	8.4E-08	9.1E-04	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR494-02	SVOC	Phenanthrene	85-01-8	D	Y	7.10E+01		7.10E+01	NC	NC	NC	5.2E-04	NC	NC
Tank Group 07	GPR494-02	SVOC	Pyrene	129-00-0	NC	Y	3.90E+01		3.90E+01	NC	NC	NC	2.8E-04	NC	NC
Tank Group 07	GPR494-02	INORG	Lead	7439-92-1	B2	Y	9.03E+01		9.03E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-03	VOC	Benzene	71-43-2	A	Y	4.00E-04		4.00E-04	8.7E-10	1.0E-05	1.0E-11	1.0E-06	3.4E-11	1.6E-07
Tank Group 07	GPR494-03	VOC	Cumene	98-82-8	D	Y	3.40E-02		3.40E-02	NC	6.7E-05	NC	1.6E-05	NC	NC
Tank Group 07	GPR494-03	VOC	1,2-Dibromoethane	106-93-4	LC	N		4.80E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-03	VOC	1,2-Dichloroethane	107-06-2	B2	N		9.60E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-03	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E-03		1.20E-03	NC	9.4E-07	NC	4.6E-08	NC	1.5E-07
Tank Group 07	GPR494-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.90E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-03	VOC	Toluene	108-88-3	ID	Y	8.20E-04		8.20E-04	NC	1.3E-07	NC	3.5E-08	NC	8.4E-09
Tank Group 07	GPR494-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.70E-03		1.70E-03	NC	2.2E-05	NC	1.4E-06	NC	NC
Tank Group 07	GPR494-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	4.00E-04		4.00E-04	NC	5.2E-06	NC	2.7E-07	NC	NC
Tank Group 07	GPR494-03	VOC	Xylenes (total)	1330-20-7	ID	Y	1.32E-02		1.32E-02	NC	1.0E-04	NC	8.6E-06	NC	9.0E-07
Tank Group 07	GPR494-03	SVOC	Anthracene	120-12-7	ID	Y	4.00E+00		4.00E+00	NC	NC	NC	8.7E-06	NC	NC
Tank Group 07	GPR494-03	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	7.80E+00		7.80E+00	NC	NC	2.4E-08	NC	NC	NC
Tank Group 07	GPR494-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.40E+00		7.40E+00	NC	NC	2.3E-07	9.6E-02	NC	NC
Tank Group 07	GPR494-03	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.60E+00		3.60E+00	NC	NC	1.1E-08	NC	NC	NC
Tank Group 07	GPR494-03	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.40E+00		2.40E+00	NC	NC	NC	1.7E-05	NC	NC
Tank Group 07	GPR494-03	SVOC	Chrysene	218-01-9	B2	Y	1.40E+01		1.40E+01	NC	NC	4.4E-10	NC	NC	NC
Tank Group 07	GPR494-03	SVOC	Fluorene	86-73-7	D	Y	4.80E+00		4.80E+00	NC	NC	NC	2.6E-05	NC	NC
Tank Group 07	GPR494-03	SVOC	Naphthalene	91-20-3	C	Y		9.10E-01	4.55E-01	3.1E-06	8.4E-02	9.8E-09	5.6E-03	2.7E-08	2.9E-04
Tank Group 07	GPR494-03	SVOC	Phenanthrene	85-01-8	D	Y	2.90E+01		2.90E+01	NC	NC	NC	2.1E-04	NC	NC
Tank Group 07	GPR494-03	SVOC	Pyrene	129-00-0	NC	Y	2.00E+01		2.00E+01	NC	NC	NC	1.5E-04	NC	NC
Tank Group 07	GPR494-03	INORG	Lead	7439-92-1	B2	Y	1.29E+01		1.29E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-04	VOC	Benzene	71-43-2	A	Y	3.60E-04		3.60E-04	7.9E-10	9.4E-06	9.0E-12	9.1E-07	3.0E-11	1.5E-07
Tank Group 07	GPR494-04	VOC	Cumene	98-82-8	D	Y	7.20E-03		7.20E-03	NC	1.4E-05	NC	3.3E-06	NC	NC
Tank Group 07	GPR494-04	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.10E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-04	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-04	VOC	Ethyl Benzene	100-41-4	D	Y	1.00E-03		1.00E-03	NC	7.8E-07	NC	3.8E-08	NC	1.2E-07
Tank Group 07	GPR494-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-04	VOC	Toluene	108-88-3	ID	Y	1.10E-03		1.10E-03	NC	1.7E-07	NC	4.7E-08	NC	1.1E-08
Tank Group 07	GPR494-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.00E-03		1.00E-03	NC	1.3E-05	NC	8.1E-07	NC	NC
Tank Group 07	GPR494-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	7.40E-03		7.40E-03	NC	9.7E-05	NC	5.0E-06	NC	NC
Tank Group 07	GPR494-04	VOC	Xylenes (total)	1330-20-7	ID	Y	6.80E-03		6.80E-03	NC	5.3E-05	NC	4.4E-06	NC	4.6E-07
Tank Group 07	GPR494-04	SVOC	Anthracene	120-12-7	ID	Y	5.90E-01		5.90E-01	NC	NC	NC	1.3E-06	NC	NC
Tank Group 07	GPR494-04	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.90E+00		3.90E+00	NC	NC	1.2E-08	NC	NC	NC
Tank Group 07	GPR494-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.40E+00		7.40E+00	NC	NC	2.3E-07	9.6E-02	NC	NC
Tank Group 07	GPR494-04	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	4.60E+00		4.60E+00	NC	NC	1.4E-08	NC	NC	NC
Tank Group 07	GPR494-04	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.50E+00		3.50E+00	NC	NC	NC	2.5E-05	NC	NC
Tank Group 07	GPR494-04	SVOC	Chrysene	218-01-9	B2	Y	9.70E+00		9.70E+00	NC	NC	3.0E-10	NC	NC	NC
Tank Group 07	GPR494-04	SVOC	Fluorene	86-73-7	D	Y	5.70E-01		5.70E-01	NC	NC	NC	3.1E-06	NC	NC
Tank Group 07	GPR494-04	SVOC	Naphthalene	91-20-3	C	Y	3.60E-01		3.60E-01	2.4E-06	6.7E-02	7.8E-09	4.4E-03	2.2E-08	2.3E-04
Tank Group 07	GPR494-04	SVOC	Phenanthrene	85-01-8	D	Y	1.10E+00		1.10E+00	NC	NC	NC	8.0E-06	NC	NC
Tank Group 07	GPR494-04	SVOC	Pyrene	129-00-0	NC	Y	8.60E+00		8.60E+00	NC	NC	NC	6.3E-05	NC	NC
Tank Group 07	GPR494-04	INORG	Lead	7439-92-1	B2	Y	2.38E+02		2.38E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-05	VOC	Benzene	71-43-2	A	Y		6.80E-02	3.40E-02	7.4E-08	8.9E-04	8.5E-10	8.6E-05	2.9E-09	1.4E-05
Tank Group 07	GPR494-05	VOC	Cumene	98-82-8	D	Y	2.10E+00		2.10E+00	NC	4.1E-03	NC	9.6E-04	NC	NC
Tank Group 07	GPR494-05	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.80E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-05	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.40E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-05	VOC	Ethyl Benzene	100-41-4	D	Y	4.60E-02		4.60E-02	NC	3.6E-05	NC	1.8E-06	NC	5.6E-06
Tank Group 07	GPR494-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.70E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-05	VOC	Toluene	108-88-3	ID	Y	8.90E-02		8.90E-02	NC	1.4E-05	NC	3.8E-06	NC	9.1E-07
Tank Group 07	GPR494-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.50E-01		1.50E-01	NC	2.0E-03	NC	1.2E-04	NC	NC
Tank Group 07	GPR494-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.70E-01	1.35E-01	NC	1.8E-03	NC	9.1E-05	NC	NC
Tank Group 07	GPR494-05	VOC	Xylenes (total)	1330-20-7	ID	Y	2.46E-01		2.46E-01	NC	1.9E-03	NC	1.6E-04	NC	1.7E-05
Tank Group 07	GPR494-05	SVOC	Anthracene	120-12-7	ID	Y	4.70E+00		4.70E+00	NC	NC	NC	1.0E-05	NC	NC
Tank Group 07	GPR494-05	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.10E+01		1.10E+01	NC	NC	3.4E-08	NC	NC	NC
Tank Group 07	GPR494-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	8.70E+00		8.70E+00	NC	NC	2.7E-07	1.1E-01	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW		
										Vapor Intrusion		Outdoor Activities		Nonpotable Use		
									Risk	HQ	Risk	HQ	Risk	HQ		
Tank Group 07	GPR494-05	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.90E+00		3.90E+00	NC	NC	1.2E-08	NC	NC	NC	
Tank Group 07	GPR494-05	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.70E+00		2.70E+00	NC	NC	NC	2.0E-05	NC	NC	
Tank Group 07	GPR494-05	SVOC	Chrysene	218-01-9	B2	Y	1.60E+01		1.60E+01	NC	NC	5.0E-10	NC	NC	NC	
Tank Group 07	GPR494-05	SVOC	Fluorene	86-73-7	D	Y	8.10E+00		8.10E+00	NC	NC	NC	4.4E-05	NC	NC	
Tank Group 07	GPR494-05	SVOC	Naphthalene	91-20-3	C	Y	9.40E-01		9.40E-01	6.4E-06	1.7E-01	2.0E-08	1.2E-02	5.6E-08	6.1E-04	
Tank Group 07	GPR494-05	SVOC	Phenanthrene	85-01-8	D	Y	3.60E+01		3.60E+01	NC	NC	NC	2.6E-04	NC	NC	
Tank Group 07	GPR494-05	SVOC	Pyrene	129-00-0	NC	Y	1.50E+01		1.50E+01	NC	NC	NC	1.1E-04	NC	NC	
Tank Group 07	GPR494-05	INORG	Lead	7439-92-1	B2	Y	3.20E+01		3.20E+01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-06	VOC	Benzene	71-43-2	A	Y	5.90E-04		5.90E-04	1.3E-09	1.5E-05	1.5E-11	1.5E-06	5.0E-11	2.4E-07	
Tank Group 07	GPR494-06	VOC	Cumene	98-82-8	D	Y	9.10E-03		9.10E-03	NC	1.8E-05	NC	4.2E-06	NC	NC	
Tank Group 07	GPR494-06	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.60E-04		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-06	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.10E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-06	VOC	Ethyl Benzene	100-41-4	D	Y	6.70E-04		6.70E-04	NC	5.3E-07	NC	2.6E-08	NC	8.2E-08	
Tank Group 07	GPR494-06	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.20E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-06	VOC	Toluene	108-88-3	ID	Y	1.20E-03		1.20E-03	NC	1.9E-07	NC	5.1E-08	NC	1.2E-08	
Tank Group 07	GPR494-06	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.00E-03		2.00E-03	NC	2.6E-05	NC	1.6E-06	NC	NC	
Tank Group 07	GPR494-06	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.20E-03		1.10E-03	NC	1.4E-05	NC	7.4E-07	NC	NC
Tank Group 07	GPR494-06	VOC	Xylenes (total)	1330-20-7	ID	Y	8.40E-03		8.40E-03	NC	6.6E-05	NC	5.5E-06	NC	5.7E-07	
Tank Group 07	GPR494-06	SVOC	Anthracene	120-12-7	ID	Y	1.80E+00		1.80E+00	NC	NC	NC	3.9E-06	NC	NC	
Tank Group 07	GPR494-06	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.80E+00		2.80E+00	NC	NC	8.8E-09	NC	NC	NC	
Tank Group 07	GPR494-06	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	2.10E+00		2.10E+00	NC	NC	6.6E-08	2.7E-02	NC	NC	
Tank Group 07	GPR494-06	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.20E+00		1.20E+00	NC	NC	3.8E-09	NC	NC	NC	
Tank Group 07	GPR494-06	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	7.50E-01		7.50E-01	NC	NC	NC	5.5E-06	NC	NC	
Tank Group 07	GPR494-06	SVOC	Chrysene	218-01-9	B2	Y	3.10E+00		3.10E+00	NC	NC	9.7E-11	NC	NC	NC	
Tank Group 07	GPR494-06	SVOC	Fluorene	86-73-7	D	Y	1.40E+00		1.40E+00	NC	NC	NC	7.6E-06	NC	NC	
Tank Group 07	GPR494-06	SVOC	Naphthalene	91-20-3	C	Y	4.20E-01		4.20E-01	2.8E-06	7.8E-02	9.1E-09	5.2E-03	2.5E-08	2.7E-04	
Tank Group 07	GPR494-06	SVOC	Phenanthrene	85-01-8	D	Y	7.60E+00		7.60E+00	NC	NC	NC	5.5E-05	NC	NC	
Tank Group 07	GPR494-06	SVOC	Pyrene	129-00-0	NC	Y	2.30E+00		2.30E+00	NC	NC	NC	1.7E-05	NC	NC	
Tank Group 07	GPR494-06	INORG	Lead	7439-92-1	B2	Y	7.81E+01		7.81E+01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-07	VOC	Benzene	71-43-2	A	Y	5.00E-04		5.00E-04	1.1E-09	1.3E-05	1.2E-11	1.3E-06	4.2E-11	2.0E-07	
Tank Group 07	GPR494-07	VOC	Cumene	98-82-8	D	Y	1.40E-01		1.40E-01	NC	2.7E-04	NC	6.4E-05	NC	NC	
Tank Group 07	GPR494-07	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.90E-04		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-07	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-07	VOC	Ethyl Benzene	100-41-4	D	Y	2.80E-03		2.80E-03	NC	2.2E-06	NC	1.1E-07	NC	3.4E-07	
Tank Group 07	GPR494-07	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-07	VOC	Toluene	108-88-3	ID	Y	4.30E-03		4.30E-03	NC	6.7E-07	NC	1.8E-07	NC	4.4E-08	
Tank Group 07	GPR494-07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.80E-02		1.80E-02	NC	2.4E-04	NC	1.5E-05	NC	NC	
Tank Group 07	GPR494-07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.50E-03		2.50E-03	NC	3.3E-05	NC	1.7E-06	NC	NC	
Tank Group 07	GPR494-07	VOC	Xylenes (total)	1330-20-7	ID	Y	6.10E-02		6.10E-02	NC	4.8E-04	NC	4.0E-05	NC	4.1E-06	
Tank Group 07	GPR494-07	SVOC	Anthracene	120-12-7	ID	Y	2.80E+00		2.80E+00	NC	NC	NC	6.1E-06	NC	NC	
Tank Group 07	GPR494-07	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.50E+00		3.50E+00	NC	NC	1.1E-08	NC	NC	NC	
Tank Group 07	GPR494-07	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	2.70E+00		2.70E+00	NC	NC	8.4E-08	3.5E-02	NC	NC	
Tank Group 07	GPR494-07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.10E+00		1.10E+00	NC	NC	3.4E-09	NC	NC	NC	
Tank Group 07	GPR494-07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	7.00E-01		7.00E-01	NC	NC	NC	5.1E-06	NC	NC	
Tank Group 07	GPR494-07	SVOC	Chrysene	218-01-9	B2	Y	7.00E+00		7.00E+00	NC	NC	2.2E-10	NC	NC	NC	
Tank Group 07	GPR494-07	SVOC	Fluorene	86-73-7	D	Y	6.60E+00		6.60E+00	NC	NC	NC	3.6E-05	NC	NC	
Tank Group 07	GPR494-07	SVOC	Naphthalene	91-20-3	C	Y		9.80E-01	4.90E-01	3.3E-06	9.1E-02	1.1E-08	6.0E-03	2.9E-08	3.2E-04	
Tank Group 07	GPR494-07	SVOC	Phenanthrene	85-01-8	D	Y	3.00E+01		3.00E+01	NC	NC	NC	2.2E-04	NC	NC	
Tank Group 07	GPR494-07	SVOC	Pyrene	129-00-0	NC	Y	7.80E+00		7.80E+00	NC	NC	NC	5.7E-05	NC	NC	
Tank Group 07	GPR494-07	INORG	Lead	7439-92-1	B2	Y	1.93E+01		1.93E+01	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-08	VOC	Benzene	71-43-2	A	Y	1.60E-02		1.60E-02	3.5E-08	4.2E-04	4.0E-10	4.0E-05	1.3E-09	6.5E-06	
Tank Group 07	GPR494-08	VOC	Cumene	98-82-8	D	Y	2.90E-03	8.60E-04	2.90E-03	NC	5.7E-06	NC	1.3E-06	NC	NC	
Tank Group 07	GPR494-08	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.00E-04		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-08	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-08	VOC	Ethyl Benzene	100-41-4	D	Y	3.60E-03	8.60E-04	3.60E-03	NC	2.8E-06	NC	1.4E-07	NC	4.4E-07	
Tank Group 07	GPR494-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E-03		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR494-08	VOC	Toluene	108-88-3	ID	Y	5.70E-03	8.60E-04	5.70E-03	NC	8.9E-07	NC	2.4E-07	NC	5.8E-08	
Tank Group 07	GPR494-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.20E-02	1.70E-03	1.20E-02	NC	1.6E-04	NC	9.7E-06	NC	NC	

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR494-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.90E-03	1.70E-03	3.90E-03	NC	5.1E-05	NC	2.6E-06	NC	NC
Tank Group 07	GPR494-08	VOC	Xylenes (total)	1330-20-7	ID	Y	2.03E-02		2.03E-02	NC	1.6E-04	NC	1.3E-05	NC	1.4E-06
Tank Group 07	GPR494-08	SVOC	Anthracene	120-12-7	ID	Y	2.30E+01		2.30E+01	NC	NC	NC	5.0E-05	NC	NC
Tank Group 07	GPR494-08	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	7.10E+01		7.10E+01	NC	NC	2.2E-07	NC	NC	NC
Tank Group 07	GPR494-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	5.40E+01		5.40E+01	NC	NC	1.7E-06	7.0E-01	NC	NC
Tank Group 07	GPR494-08	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	2.80E+01		2.80E+01	NC	NC	8.8E-08	NC	NC	NC
Tank Group 07	GPR494-08	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	1.80E+01		1.80E+01	NC	NC	NC	1.3E-04	NC	NC
Tank Group 07	GPR494-08	SVOC	Chrysene	218-01-9	B2	Y	1.70E+02		1.70E+02	NC	NC	5.3E-09	NC	NC	NC
Tank Group 07	GPR494-08	SVOC	Fluorene	86-73-7	D	Y	1.10E+01		1.10E+01	NC	NC	NC	6.0E-05	NC	NC
Tank Group 07	GPR494-08	SVOC	Naphthalene	91-20-3	C	Y	4.80E+00	1.10E-01	4.80E+00	3.2E-05	8.9E-01	1.0E-07	5.9E-02	2.9E-07	3.1E-03
Tank Group 07	GPR494-08	SVOC	Phenanthrene	85-01-8	D	Y	1.10E+02		1.10E+02	NC	NC	NC	8.0E-04	NC	NC
Tank Group 07	GPR494-08	SVOC	Pyrene	129-00-0	NC	Y	1.30E+02		1.30E+02	NC	NC	NC	9.5E-04	NC	NC
Tank Group 07	GPR494-08	INORG	Lead	7439-92-1	B2	Y	1.14E+02		1.14E+02	NC	NC	NC	1.14E-02	NC	NC
Tank Group 07	GPR494-09	VOC	Benzene	71-43-2	A	Y		6.90E-04	3.45E-04	7.5E-10	9.0E-06	8.6E-12	8.7E-07	2.9E-11	1.4E-07
Tank Group 07	GPR494-09	VOC	Cumene	98-82-8	D	Y		1.40E-03	7.00E-04	NC	1.4E-06	NC	3.2E-07	NC	NC
Tank Group 07	GPR494-09	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.90E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-09	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-09	VOC	Ethyl Benzene	100-41-4	D	Y		1.40E-03	7.00E-04	NC	5.5E-07	NC	2.7E-08	NC	8.6E-08
Tank Group 07	GPR494-09	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR494-09	VOC	Toluene	108-88-3	ID	Y		1.40E-03	7.00E-04	NC	1.1E-07	NC	3.0E-08	NC	7.1E-09
Tank Group 07	GPR494-09	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		2.80E-03	1.40E-03	NC	1.8E-05	NC	1.1E-06	NC	NC
Tank Group 07	GPR494-09	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.80E-03	1.40E-03	NC	1.8E-05	NC	9.4E-07	NC	NC
Tank Group 07	GPR494-09	VOC	Xylenes (total)	1330-20-7	ID	Y		2.80E-03	1.40E-03	NC	1.1E-05	NC	9.1E-07	NC	9.5E-08
Tank Group 07	GPR494-09	SVOC	Anthracene	120-12-7	ID	Y	1.30E-01		1.30E-01	NC	NC	NC	2.8E-07	NC	NC
Tank Group 07	GPR494-09	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	7.30E-01		7.30E-01	NC	NC	2.3E-09	NC	NC	NC
Tank Group 07	GPR494-09	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.10E+00		1.10E+00	NC	NC	3.4E-08	1.4E-02	NC	NC
Tank Group 07	GPR494-09	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.20E+00		1.20E+00	NC	NC	3.8E-09	NC	NC	NC
Tank Group 07	GPR494-09	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	5.10E-01		5.10E-01	NC	NC	NC	3.7E-06	NC	NC
Tank Group 07	GPR494-09	SVOC	Chrysene	218-01-9	B2	Y	7.00E-01		7.00E-01	NC	NC	2.2E-11	NC	NC	NC
Tank Group 07	GPR494-09	SVOC	Fluorene	86-73-7	D	Y	3.00E-02		3.00E-02	NC	NC	NC	1.6E-07	NC	NC
Tank Group 07	GPR494-09	SVOC	Naphthalene	91-20-3	C	Y	5.90E-02		5.90E-02	4.0E-07	1.1E-02	1.3E-09	7.2E-04	3.5E-09	3.8E-05
Tank Group 07	GPR494-09	SVOC	Phenanthrene	85-01-8	D	Y	4.50E-01		4.50E-01	NC	NC	NC	3.3E-06	NC	NC
Tank Group 07	GPR494-09	SVOC	Pyrene	129-00-0	NC	Y	8.40E-01		8.40E-01	NC	NC	NC	6.1E-06	NC	NC
Tank Group 07	GPR494-09	INORG	Lead	7439-92-1	B2	Y	7.09E+01		7.09E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR790-01	VOC	Benzene	71-43-2	A	Y	5.20E+02		5.20E+02	1.1E-03	1.4E+01	1.3E-05	1.3E+00	4.4E-05	2.1E-01
Tank Group 07	GPR790-02	VOC	Benzene	71-43-2	A	Y	1.30E+02		1.30E+02	2.8E-04	3.4E+00	3.2E-06	3.3E-01	1.1E-05	5.3E-02
Tank Group 07	GPR790-03	VOC	Benzene	71-43-2	A	Y	2.80E+00		2.80E+00	6.1E-06	7.3E-02	7.0E-08	7.1E-03	2.4E-07	1.1E-03
Tank Group 07	GPR790-04	VOC	Benzene	71-43-2	A	Y	2.00E-01		2.00E-01	4.4E-07	5.2E-03	5.0E-09	5.1E-04	1.7E-08	8.1E-05
Tank Group 07	GPR790-05	VOC	Benzene	71-43-2	A	Y	3.00E+03		3.00E+03	6.6E-03	7.8E+01	7.5E-05	7.6E+00	2.5E-04	1.2E+00
Tank Group 07	GPR790-05	VOC	Cumene	98-82-8	D	Y	2.40E+02		2.40E+02	NC	4.7E-01	NC	1.1E-01	NC	NC
Tank Group 07	GPR790-05	VOC	Ethyl Benzene	100-41-4	D	Y	2.50E+01		2.50E+01	NC	2.0E-02	NC	9.6E-04	NC	3.1E-03
Tank Group 07	GPR790-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR790-05	VOC	Toluene	108-88-3	ID	Y	3.50E+02		3.50E+02	NC	5.5E-02	NC	1.5E-02	NC	3.6E-03
Tank Group 07	GPR790-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	6.50E+01		6.50E+01	NC	8.5E-01	NC	5.2E-02	NC	NC
Tank Group 07	GPR790-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.30E+01		3.30E+01	NC	4.3E-01	NC	2.2E-02	NC	NC
Tank Group 07	GPR790-05	VOC	Xylenes (total)	1330-20-7	ID	Y	1.41E+02		1.41E+02	NC	1.1E+00	NC	9.2E-02	NC	9.6E-03
Tank Group 07	GPR790-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		7.70E-01	3.85E-01	NC	NC	1.2E-08	5.0E-03	NC	NC
Tank Group 07	GPR790-05	SVOC	Naphthalene	91-20-3	C	Y	7.50E+00		7.50E+00	5.1E-05	1.4E+00	1.6E-07	9.2E-02	4.5E-07	4.8E-03
Tank Group 07	GPR790-06	VOC	Benzene	71-43-2	A	Y	4.60E+00		4.60E+00	1.0E-05	1.2E-01	1.1E-07	1.2E-02	3.9E-07	1.9E-03
Tank Group 07	GPR790-07	VOC	Benzene	71-43-2	A	Y	3.40E+01		3.40E+01	7.4E-05	8.9E-01	8.5E-07	8.6E-02	2.9E-06	1.4E-02
Tank Group 07	GPR790-08	VOC	Benzene	71-43-2	A	Y	7.60E-04		7.60E-04	1.7E-09	2.0E-05	1.9E-11	1.9E-06	6.4E-11	3.1E-07
Tank Group 07	GPR790-08	VOC	Cumene	98-82-8	D	Y	6.30E-03		6.30E-03	NC	1.2E-05	NC	2.9E-06	NC	NC
Tank Group 07	GPR790-08	VOC	Ethyl Benzene	100-41-4	D	Y	1.90E-04		1.90E-04	NC	1.5E-07	NC	7.3E-09	NC	2.3E-08
Tank Group 07	GPR790-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.00E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR790-08	VOC	Toluene	108-88-3	ID	Y	7.40E-04		7.40E-04	NC	1.2E-07	NC	3.1E-08	NC	7.5E-09
Tank Group 07	GPR790-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.90E-04		3.90E-04	NC	5.1E-06	NC	3.1E-07	NC	NC
Tank Group 07	GPR790-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.00E-03	1.00E-03	NC	1.3E-05	NC	6.7E-07	NC	NC
Tank Group 07	GPR790-08	VOC	Xylenes (total)	1330-20-7	ID	Y	1.18E-03		1.18E-03	NC	9.3E-06	NC	7.7E-07	NC	8.0E-08

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
									Risk	HQ	Risk	HQ	Risk	HQ	
Tank Group 07	GPR790-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.70E-01		4.70E-01	NC	NC	1.5E-08	6.1E-03	NC	NC
Tank Group 07	GPR790-08	SVOC	Naphthalene	91-20-3	C	Y	3.60E-02		3.60E-02	2.4E-07	6.7E-03	7.8E-10	4.4E-04	2.2E-09	2.3E-05
Tank Group 07	GPR791-01	VOC	Benzene	71-43-2	A	Y	1.20E+03		1.20E+03	2.6E-03	3.1E+01	3.0E-05	3.0E+00	1.0E-04	4.9E-01
Tank Group 07	GPR791-02	VOC	Benzene	71-43-2	A	Y	4.00E+00		4.00E+00	8.7E-06	1.0E-01	1.0E-07	1.0E-02	3.4E-07	1.6E-03
Tank Group 07	GPR791-03	VOC	Benzene	71-43-2	A	Y	1.60E+02		1.60E+02	3.5E-04	4.2E+00	4.0E-06	4.0E-01	1.3E-05	6.5E-02
Tank Group 07	GPR791-04	VOC	Benzene	71-43-2	A	Y	1.30E+03		1.30E+03	2.8E-03	3.4E+01	3.2E-05	3.3E+00	1.1E-04	5.3E-01
Tank Group 07	GPR791-04	VOC	Cumene	98-82-8	D	Y	3.40E+03		3.40E+03	NC	6.7E+00	NC	1.6E+00	NC	NC
Tank Group 07	GPR791-04	VOC	Ethyl Benzene	100-41-4	D	Y	2.70E+00		2.70E+00	NC	2.1E-03	NC	1.0E-04	NC	3.3E-04
Tank Group 07	GPR791-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.20E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR791-04	VOC	Toluene	108-88-3	ID	Y	3.80E+00		3.80E+00	NC	6.0E-04	NC	1.6E-04	NC	3.9E-05
Tank Group 07	GPR791-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.90E+00		4.90E+00	NC	6.4E-02	NC	4.0E-03	NC	NC
Tank Group 07	GPR791-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.80E-01	1.20E+01	2.80E-01	NC	3.7E-03	NC	1.9E-04	NC	NC
Tank Group 07	GPR791-04	VOC	Xylenes (total)	1330-20-7	ID	Y	2.63E+00	1.20E+01	2.63E+00	NC	2.1E-02	NC	1.7E-03	NC	1.8E-04
Tank Group 07	GPR791-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.80E-01	7.30E-01	1.80E-01	NC	NC	5.6E-09	2.3E-03	NC	NC
Tank Group 07	GPR791-04	SVOC	Naphthalene	91-20-3	C	Y	5.40E+00		5.40E+00	3.6E-05	1.0E+00	1.2E-07	6.6E-02	3.2E-07	3.5E-03
Tank Group 07	GPR791-05	VOC	Benzene	71-43-2	A	Y	9.80E+00		9.80E+00	2.1E-05	2.6E-01	2.4E-07	2.5E-02	8.3E-07	4.0E-03
Tank Group 07	GPR791-06	VOC	Benzene	71-43-2	A	Y	3.80E+02		3.80E+02	8.3E-04	9.9E+00	9.5E-06	9.6E-01	3.2E-05	1.5E-01
Tank Group 07	GPR791-07	VOC	Benzene	71-43-2	A	Y	1.30E+01		1.30E+01	2.8E-05	3.4E-01	3.2E-07	3.3E-02	1.1E-06	5.3E-03
Tank Group 07	GPR791-08	VOC	Benzene	71-43-2	A	Y	7.10E+00		7.10E+00	1.6E-05	1.9E-01	1.8E-07	1.8E-02	6.0E-07	2.9E-03
Tank Group 07	GPR791-09	VOC	Benzene	71-43-2	A	Y	4.60E-03		4.60E-03	1.0E-08	1.2E-04	1.1E-10	1.2E-05	3.9E-10	1.9E-06
Tank Group 07	GPR791-09	VOC	Cumene	98-82-8	D	Y	1.40E-01		1.40E-01	NC	2.7E-04	NC	6.4E-05	NC	NC
Tank Group 07	GPR791-09	VOC	Ethyl Benzene	100-41-4	D	Y	6.10E-04	9.90E-04	6.10E-04	NC	4.8E-07	NC	2.3E-08	NC	7.5E-08
Tank Group 07	GPR791-09	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.00E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR791-09	VOC	Toluene	108-88-3	ID	Y	4.50E-03		4.50E-03	NC	7.1E-07	NC	1.9E-07	NC	4.6E-08
Tank Group 07	GPR791-09	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	6.70E-04	2.00E-03	6.70E-04	NC	8.8E-06	NC	5.4E-07	NC	NC
Tank Group 07	GPR791-09	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.80E-04	2.00E-03	2.80E-04	NC	3.7E-06	NC	1.9E-07	NC	NC
Tank Group 07	GPR791-09	VOC	Xylenes (total)	1330-20-7	ID	Y	2.55E-03	2.00E-03	2.55E-03	NC	2.0E-05	NC	1.7E-06	NC	1.7E-07
Tank Group 07	GPR791-09	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	5.10E-01	1.50E-01	5.10E-01	NC	NC	1.6E-08	6.6E-03	NC	NC
Tank Group 07	GPR791-09	SVOC	Naphthalene	91-20-3	C	Y	1.20E-01	3.70E-02	1.20E-01	8.1E-07	2.2E-02	2.6E-09	1.5E-03	7.2E-09	7.8E-05
Tank Group 07	GPR792-01	VOC	Cumene	98-82-8	D	Y	2.40E+03		2.40E+03	NC	4.7E+00	NC	1.1E+00	NC	NC
Tank Group 07	GPR792-02	VOC	Cumene	98-82-8	D	Y	4.70E+03		4.70E+03	NC	9.2E+00	NC	2.2E+00	NC	NC
Tank Group 07	GPR792-03	VOC	Benzene	71-43-2	A	Y	4.60E-01		4.60E-01	1.0E-06	1.2E-02	1.1E-08	1.2E-03	3.9E-08	1.9E-04
Tank Group 07	GPR792-03	VOC	Cumene	98-82-8	D	Y	1.20E+04		1.20E+04	NC	2.4E+01	NC	5.5E+00	NC	NC
Tank Group 07	GPR792-03	VOC	Ethyl Benzene	100-41-4	D	Y	6.00E-02		6.00E-02	NC	4.7E-05	NC	2.3E-06	NC	7.3E-06
Tank Group 07	GPR792-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		5.60E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR792-03	VOC	Toluene	108-88-3	ID	Y	2.80E-01		1.40E-01	NC	2.2E-05	NC	6.0E-06	NC	1.4E-06
Tank Group 07	GPR792-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.40E-01		1.40E-01	NC	1.8E-03	NC	1.1E-04	NC	NC
Tank Group 07	GPR792-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	7.40E-02		7.40E-02	NC	9.7E-04	NC	5.0E-05	NC	NC
Tank Group 07	GPR792-03	VOC	Xylenes (total)	1330-20-7	ID	Y		5.60E-01	2.80E-01	NC	2.2E-03	NC	1.8E-04	NC	1.9E-05
Tank Group 07	GPR792-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		2.80E+00	1.40E+00	NC	NC	4.4E-08	1.8E-02	NC	NC
Tank Group 07	GPR792-03	SVOC	Naphthalene	91-20-3	C	Y		7.10E-01	3.55E-01	2.4E-06	6.6E-02	7.7E-09	4.4E-03	2.1E-08	2.3E-04
Tank Group 07	GPR792-04	VOC	Cumene	98-82-8	D	Y	5.00E+03		5.00E+03	NC	9.8E+00	NC	2.3E+00	NC	NC
Tank Group 07	GPR792-05	VOC	Cumene	98-82-8	D	Y	8.90E+03		8.90E+03	NC	1.7E+01	NC	4.1E+00	NC	NC
Tank Group 07	GPR792-06	VOC	Cumene	98-82-8	D	Y	4.60E+03		4.60E+03	NC	9.0E+00	NC	2.1E+00	NC	NC
Tank Group 07	GPR792-07	VOC	Cumene	98-82-8	D	Y	1.40E+03		1.40E+03	NC	2.7E+00	NC	6.4E-01	NC	NC
Tank Group 07	GPR793-01	VOC	Cumene	98-82-8	D	Y	5.50E+03		5.50E+03	NC	1.1E+01	NC	2.5E+00	NC	NC
Tank Group 07	GPR793-02	VOC	Cumene	98-82-8	D	Y	1.10E+04		1.10E+04	NC	2.2E+01	NC	5.0E+00	NC	NC
Tank Group 07	GPR793-03	VOC	Benzene	71-43-2	A	Y		2.80E+00	1.40E+00	3.1E-06	3.7E-02	3.5E-08	3.5E-03	1.2E-07	5.7E-04
Tank Group 07	GPR793-03	VOC	Cumene	98-82-8	D	Y	1.50E+04		1.50E+04	NC	2.9E+01	NC	6.9E+00	NC	NC
Tank Group 07	GPR793-03	VOC	Ethyl Benzene	100-41-4	D	Y		5.60E+00	2.80E+00	NC	2.2E-03	NC	1.1E-04	NC	3.4E-04
Tank Group 07	GPR793-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.10E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR793-03	VOC	Toluene	108-88-3	ID	Y		5.60E+00	2.80E+00	NC	4.4E-04	NC	1.2E-04	NC	2.9E-05
Tank Group 07	GPR793-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		1.10E+01	5.50E+00	NC	7.2E-02	NC	4.4E-03	NC	NC
Tank Group 07	GPR793-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		1.10E+01	5.50E+00	NC	7.2E-02	NC	3.7E-03	NC	NC
Tank Group 07	GPR793-03	VOC	Xylenes (total)	1330-20-7	ID	Y		1.10E+01	5.50E+00	NC	4.3E-02	NC	3.6E-03	NC	3.7E-04
Tank Group 07	GPR793-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		2.90E+00	1.45E+00	NC	NC	4.5E-08	1.9E-02	NC	NC
Tank Group 07	GPR793-03	SVOC	Naphthalene	91-20-3	C	Y		7.30E-01	3.65E-01	2.5E-06	6.8E-02	7.9E-09	4.5E-03	2.2E-08	2.4E-04
Tank Group 07	GPR793-04	VOC	Cumene	98-82-8	D	Y	1.40E+04		1.40E+04	NC	2.7E+01	NC	6.4E+00	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
									Risk	HQ	Risk	HQ	Risk	HQ	
Tank Group 07	GPR793-05	VOC	Cumene	98-82-8	D	Y	1.90E+03		1.90E+03	NC	3.7E+00	NC	8.7E-01	NC	NC
Tank Group 07	GPR793-06	VOC	Cumene	98-82-8	D	Y	1.80E+03		1.80E+03	NC	3.5E+00	NC	8.3E-01	NC	NC
Tank Group 07	GPR794-01	VOC	Benzene	71-43-2	A	Y	2.20E+03		2.20E+03	4.8E-03	5.8E+01	5.5E-05	5.6E+00	1.9E-04	8.9E-01
Tank Group 07	GPR794-01	VOC	Cumene	98-82-8	D	Y	4.00E+03		4.00E+03	NC	7.8E+00	NC	1.8E+00	NC	NC
Tank Group 07	GPR794-01	VOC	1,2-Dibromoethane	106-93-4	LC	N		1.20E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-01	VOC	1,2-Dichloroethane	107-06-2	B2	N		2.30E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-01	VOC	Ethyl Benzene	100-41-4	D	Y	7.40E+01		7.40E+01	NC	5.8E-02	NC	2.8E-03	NC	9.0E-03
Tank Group 07	GPR794-01	VOC	Methyl tert-butyl ether	1634-04-4	C	N		4.60E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-01	VOC	Toluene	108-88-3	ID	Y	3.40E+03		3.40E+03	NC	5.3E-01	NC	1.4E-01	NC	3.5E-02
Tank Group 07	GPR794-01	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.20E+01		3.20E+01	NC	4.2E-01	NC	2.6E-02	NC	NC
Tank Group 07	GPR794-01	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.60E+01		1.60E+01	NC	2.1E-01	NC	1.1E-02	NC	NC
Tank Group 07	GPR794-01	VOC	Xylenes (total)	1330-20-7	ID	Y	2.95E+02		2.95E+02	NC	2.3E+00	NC	1.9E-01	NC	2.0E-02
Tank Group 07	GPR794-01	SVOC	Anthracene	120-12-7	ID	Y	5.10E-01		5.10E-01	NC	NC	NC	1.1E-06	NC	NC
Tank Group 07	GPR794-01	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.70E-01		2.70E-01	NC	NC	8.4E-10	NC	NC	NC
Tank Group 07	GPR794-01	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.50E+00	7.50E-01	NC	NC	2.3E-08	9.7E-03	NC	NC
Tank Group 07	GPR794-01	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.20E+00	6.00E-01	NC	NC	1.9E-09	NC	NC	NC
Tank Group 07	GPR794-01	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.50E+00	7.50E-01	NC	NC	NC	5.5E-06	NC	NC
Tank Group 07	GPR794-01	SVOC	Chrysene	218-01-9	B2	Y	3.50E-01		3.50E-01	NC	NC	1.1E-11	NC	NC	NC
Tank Group 07	GPR794-01	SVOC	Fluorene	86-73-7	D	Y	2.00E+00		2.00E+00	NC	NC	NC	1.1E-05	NC	NC
Tank Group 07	GPR794-01	SVOC	Naphthalene	91-20-3	C	Y	3.50E+00		3.50E+00	2.4E-05	6.5E-01	7.6E-08	4.3E-02	2.1E-07	2.3E-03
Tank Group 07	GPR794-01	SVOC	Phenanthrene	85-01-8	D	Y	8.70E+00		8.70E+00	NC	NC	NC	6.3E-05	NC	NC
Tank Group 07	GPR794-01	SVOC	Pyrene	129-00-0	NC	Y	7.10E-01		7.10E-01	NC	NC	NC	5.2E-06	NC	NC
Tank Group 07	GPR794-01	SVOC	Tetraethylene Glycol	112-60-7	N			9.50E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-01	INORG	Lead	7439-92-1	B2	Y	4.08E+02		4.08E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-02	VOC	Benzene	71-43-2	A	Y	2.80E+03		2.80E+03	6.1E-03	7.3E+01	7.0E-05	7.1E+00	2.4E-04	1.1E+00
Tank Group 07	GPR794-02	VOC	Cumene	98-82-8	D	Y	3.00E+03		3.00E+03	NC	5.9E+00	NC	1.4E+00	NC	NC
Tank Group 07	GPR794-02	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.10E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-02	VOC	1,2-Dichloroethane	107-06-2	B2	N		4.10E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-02	VOC	Ethyl Benzene	100-41-4	D	Y	2.60E+01		2.60E+01	NC	2.0E-02	NC	9.9E-04	NC	3.2E-03
Tank Group 07	GPR794-02	VOC	Methyl tert-butyl ether	1634-04-4	C	N		8.30E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-02	VOC	Toluene	108-88-3	ID	Y	1.20E+03		1.20E+03	NC	1.9E-01	NC	5.1E-02	NC	1.2E-02
Tank Group 07	GPR794-02	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	8.40E+00		8.40E+00	NC	1.1E-01	NC	6.8E-03	NC	NC
Tank Group 07	GPR794-02	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.90E+00		3.90E+00	NC	5.1E-02	NC	2.6E-03	NC	NC
Tank Group 07	GPR794-02	VOC	Xylenes (total)	1330-20-7	ID	Y	1.11E+02		1.11E+02	NC	8.7E-01	NC	7.2E-02	NC	7.5E-03
Tank Group 07	GPR794-02	SVOC	Anthracene	120-12-7	ID	Y		1.30E+00	6.50E-01	NC	NC	NC	1.4E-06	NC	NC
Tank Group 07	GPR794-02	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.60E-01		4.60E-01	NC	NC	1.4E-09	NC	NC	NC
Tank Group 07	GPR794-02	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.70E+00	8.50E-01	NC	NC	2.7E-08	1.1E-02	NC	NC
Tank Group 07	GPR794-02	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	4.70E-01		4.70E-01	NC	NC	1.5E-09	NC	NC	NC
Tank Group 07	GPR794-02	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.70E+00	8.50E-01	NC	NC	NC	6.2E-06	NC	NC
Tank Group 07	GPR794-02	SVOC	Chrysene	218-01-9	B2	Y	4.40E-01		4.40E-01	NC	NC	1.4E-11	NC	NC	NC
Tank Group 07	GPR794-02	SVOC	Fluorene	86-73-7	D	Y	4.70E-01		4.70E-01	NC	NC	NC	2.6E-06	NC	NC
Tank Group 07	GPR794-02	SVOC	Naphthalene	91-20-3	C	Y	1.00E+00		1.00E+00	6.8E-06	1.9E-01	2.2E-08	1.2E-02	6.0E-08	6.5E-04
Tank Group 07	GPR794-02	SVOC	Phenanthrene	85-01-8	D	Y	2.90E+00		2.90E+00	NC	NC	NC	2.1E-05	NC	NC
Tank Group 07	GPR794-02	SVOC	Pyrene	129-00-0	NC	Y	8.60E-01		8.60E-01	NC	NC	NC	6.3E-06	NC	NC
Tank Group 07	GPR794-02	SVOC	Tetraethylene Glycol	112-60-7	N			9.90E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-02	INORG	Lead	7439-92-1	B2	Y	3.47E+02		3.47E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-03	VOC	Benzene	71-43-2	A	Y	4.10E-01		4.10E-01	9.0E-07	1.1E-02	1.0E-08	1.0E-03	3.5E-08	1.7E-04
Tank Group 07	GPR794-03	VOC	Cumene	98-82-8	D	Y	3.80E-01		3.80E-01	NC	7.4E-04	NC	1.7E-04	NC	NC
Tank Group 07	GPR794-03	VOC	1,2-Dibromoethane	106-93-4	LC	N		4.50E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-03	VOC	1,2-Dichloroethane	107-06-2	B2	N		9.00E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-03	VOC	Ethyl Benzene	100-41-4	D	Y	2.00E-02		2.00E-02	NC	1.6E-05	NC	7.6E-07	NC	2.4E-06
Tank Group 07	GPR794-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-03	VOC	Toluene	108-88-3	ID	Y	2.10E-01		2.10E-01	NC	3.3E-05	NC	8.9E-06	NC	2.1E-06
Tank Group 07	GPR794-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.00E-03		4.00E-03	NC	5.2E-05	NC	3.2E-06	NC	NC
Tank Group 07	GPR794-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.40E-03		2.40E-03	NC	3.1E-05	NC	1.6E-06	NC	NC
Tank Group 07	GPR794-03	VOC	Xylenes (total)	1330-20-7	ID	Y	7.30E-02		7.30E-02	NC	5.7E-04	NC	4.7E-05	NC	5.0E-06
Tank Group 07	GPR794-03	SVOC	Anthracene	120-12-7	ID	Y		1.10E-01	5.50E-02	NC	NC	NC	1.2E-07	NC	NC
Tank Group 07	GPR794-03	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.80E-02		3.80E-02	NC	NC	1.2E-10	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR794-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.90E-02		4.90E-02	NC	NC	1.5E-09	6.4E-04	NC	NC
Tank Group 07	GPR794-03	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	6.50E-02		6.50E-02	NC	NC	2.0E-10	NC	NC	NC
Tank Group 07	GPR794-03	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	3.00E-02		3.00E-02	NC	NC	NC	2.2E-07	NC	NC
Tank Group 07	GPR794-03	SVOC	Chrysene	218-01-9	B2	Y	3.80E-02		3.80E-02	NC	NC	1.2E-12	NC	NC	NC
Tank Group 07	GPR794-03	SVOC	Fluorene	86-73-7	D	Y		1.80E-01	9.00E-02	NC	NC	NC	4.9E-07	NC	NC
Tank Group 07	GPR794-03	SVOC	Naphthalene	91-20-3	C	Y		1.80E-01	9.00E-02	6.1E-07	1.7E-02	1.9E-09	1.1E-03	5.4E-09	5.8E-05
Tank Group 07	GPR794-03	SVOC	Phenanthrene	85-01-8	D	Y	3.70E-02		3.70E-02	NC	NC	NC	2.7E-07	NC	NC
Tank Group 07	GPR794-03	SVOC	Pyrene	129-00-0	NC	Y	4.90E-02		4.90E-02	NC	NC	NC	3.6E-07	NC	NC
Tank Group 07	GPR794-03	SVOC	Tetraethylene Glycol	112-60-7	N			9.90E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-03	INORG	Lead	7439-92-1	B2	Y	2.42E+01		2.42E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-04	VOC	Benzene	71-43-2	A	Y	7.80E+03		7.80E+03	1.7E-02	2.0E+02	1.9E-04	2.0E+01	6.6E-04	3.2E+00
Tank Group 07	GPR794-04	VOC	Cumene	98-82-8	D	Y	1.20E+04		1.20E+04	NC	2.4E+01	NC	5.5E+00	NC	NC
Tank Group 07	GPR794-04	VOC	1,2-Dibromoethane	106-93-4	LC	N		8.70E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-04	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.70E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-04	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E+02		1.20E+02	NC	9.4E-02	NC	4.6E-03	NC	1.5E-02
Tank Group 07	GPR794-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.50E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-04	VOC	Toluene	108-88-3	ID	Y	6.10E+03		6.10E+03	NC	9.6E-01	NC	2.6E-01	NC	6.2E-02
Tank Group 07	GPR794-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	7.90E+01		7.90E+01	NC	1.0E+00	NC	6.4E-02	NC	NC
Tank Group 07	GPR794-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.50E+01		3.50E+01	NC	4.6E-01	NC	2.3E-02	NC	NC
Tank Group 07	GPR794-04	VOC	Xylenes (total)	1330-20-7	ID	Y	5.25E+02		5.25E+02	NC	4.1E+00	NC	3.4E-01	NC	3.6E-02
Tank Group 07	GPR794-04	SVOC	Anthracene	120-12-7	ID	Y	4.60E-01		4.60E-01	NC	NC	NC	1.0E-06	NC	NC
Tank Group 07	GPR794-04	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	6.40E-01		6.40E-01	NC	NC	2.0E-09	NC	NC	NC
Tank Group 07	GPR794-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.80E-01		4.80E-01	NC	NC	1.5E-08	6.2E-03	NC	NC
Tank Group 07	GPR794-04	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	7.80E-01		7.80E-01	NC	NC	2.4E-09	NC	NC	NC
Tank Group 07	GPR794-04	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	4.10E-01		4.10E-01	NC	NC	NC	3.0E-06	NC	NC
Tank Group 07	GPR794-04	SVOC	Chrysene	218-01-9	B2	Y	1.40E+00		1.40E+00	NC	NC	4.4E-11	NC	NC	NC
Tank Group 07	GPR794-04	SVOC	Fluorene	86-73-7	D	Y	1.00E+00		1.00E+00	NC	NC	NC	5.5E-06	NC	NC
Tank Group 07	GPR794-04	SVOC	Naphthalene	91-20-3	C	Y	3.10E+00		3.10E+00	2.1E-05	5.8E-01	6.7E-08	3.8E-02	1.9E-07	2.0E-03
Tank Group 07	GPR794-04	SVOC	Phenanthrene	85-01-8	D	Y	1.90E+00		1.90E+00	NC	NC	NC	1.4E-05	NC	NC
Tank Group 07	GPR794-04	SVOC	Pyrene	129-00-0	NC	Y	2.00E+00		2.00E+00	NC	NC	NC	1.5E-05	NC	NC
Tank Group 07	GPR794-04	SVOC	Tetraethylene Glycol	112-60-7	N			9.90E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-04	INORG	Lead	7439-92-1	B2	Y	6.38E+01		6.38E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-05	VOC	Benzene	71-43-2	A	Y	2.60E+03		2.60E+03	5.7E-03	6.8E+01	6.5E-05	6.6E+00	2.2E-04	1.1E+00
Tank Group 07	GPR794-05	VOC	Cumene	98-82-8	D	Y	2.50E+03		2.50E+03	NC	4.9E+00	NC	1.1E+00	NC	NC
Tank Group 07	GPR794-05	VOC	1,2-Dibromoethane	106-93-4	LC	N		1.70E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-05	VOC	1,2-Dichloroethane	107-06-2	B2	N		3.40E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-05	VOC	Ethyl Benzene	100-41-4	D	Y	3.10E+01		3.10E+01	NC	2.4E-02	NC	1.2E-03	NC	3.8E-03
Tank Group 07	GPR794-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		6.70E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-05	VOC	Toluene	108-88-3	ID	Y	1.80E+03		1.80E+03	NC	2.8E-01	NC	7.7E-02	NC	1.8E-02
Tank Group 07	GPR794-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	7.70E+00		7.70E+00	NC	1.0E-01	NC	6.2E-03	NC	NC
Tank Group 07	GPR794-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	3.50E+00		3.50E+00	NC	4.6E-02	NC	2.3E-03	NC	NC
Tank Group 07	GPR794-05	VOC	Xylenes (total)	1330-20-7	ID	Y	1.35E+02		1.35E+02	NC	1.1E+00	NC	8.8E-02	NC	9.2E-03
Tank Group 07	GPR794-05	SVOC	Anthracene	120-12-7	ID	Y	7.00E-02		7.00E-02	NC	NC	NC	1.5E-07	NC	NC
Tank Group 07	GPR794-05	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.50E-02		3.50E-02	NC	NC	1.1E-10	NC	NC	NC
Tank Group 07	GPR794-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.60E-01	8.00E-02	NC	NC	2.5E-09	1.0E-03	NC	NC
Tank Group 07	GPR794-05	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-10	NC	NC	NC
Tank Group 07	GPR794-05	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.60E-01	8.00E-02	NC	NC	NC	5.8E-07	NC	NC
Tank Group 07	GPR794-05	SVOC	Chrysene	218-01-9	B2	Y	3.30E-02		3.30E-02	NC	NC	1.0E-12	NC	NC	NC
Tank Group 07	GPR794-05	SVOC	Fluorene	86-73-7	D	Y	1.70E-01		1.70E-01	NC	NC	NC	9.3E-07	NC	NC
Tank Group 07	GPR794-05	SVOC	Naphthalene	91-20-3	C	Y	1.70E+00		1.70E+00	1.1E-05	3.2E-01	3.7E-08	2.1E-02	1.0E-07	1.1E-03
Tank Group 07	GPR794-05	SVOC	Phenanthrene	85-01-8	D	Y	4.30E-01		4.30E-01	NC	NC	NC	3.1E-06	NC	NC
Tank Group 07	GPR794-05	SVOC	Pyrene	129-00-0	NC	Y	5.80E-02		5.80E-02	NC	NC	NC	4.2E-07	NC	NC
Tank Group 07	GPR794-05	SVOC	Tetraethylene Glycol	112-60-7	N			9.30E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-05	INORG	Lead	7439-92-1	B2	Y	2.36E+01		2.36E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-06	VOC	Benzene	71-43-2	A	Y	2.00E+03		2.00E+03	4.4E-03	5.2E+01	5.0E-05	5.1E+00	1.7E-04	8.1E-01
Tank Group 07	GPR794-06	VOC	Cumene	98-82-8	D	Y	4.80E+03		4.80E+03	NC	9.4E+00	NC	2.2E+00	NC	NC
Tank Group 07	GPR794-06	VOC	1,2-Dibromoethane	106-93-4	LC	N		5.90E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-06	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.20E+01		NC	NC	NC	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR794-06	VOC	Ethyl Benzene	100-41-4	D	Y	1.10E+02		1.10E+02	NC	8.6E-02	NC	4.2E-03	NC	1.3E-02
Tank Group 07	GPR794-06	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-06	VOC	Toluene	108-88-3	ID	Y	4.30E+03		4.30E+03	NC	6.7E-01	NC	1.8E-01	NC	4.4E-02
Tank Group 07	GPR794-06	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.80E+01		4.80E+01	NC	6.3E-01	NC	3.9E-02	NC	NC
Tank Group 07	GPR794-06	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.30E+01		2.30E+01	NC	3.0E-01	NC	1.5E-02	NC	NC
Tank Group 07	GPR794-06	VOC	Xylenes (total)	1330-20-7	ID	Y	4.90E+02		4.90E+02	NC	3.8E+00	NC	3.2E-01	NC	3.3E-02
Tank Group 07	GPR794-06	SVOC	Anthracene	120-12-7	ID	Y	6.70E-01		6.70E-01	NC	NC	NC	1.5E-06	NC	NC
Tank Group 07	GPR794-06	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.10E-01		4.10E-01	NC	NC	1.3E-09	NC	NC	NC
Tank Group 07	GPR794-06	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.50E+00	7.50E-01	NC	NC	2.3E-08	9.7E-03	NC	NC
Tank Group 07	GPR794-06	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.60E-01		3.60E-01	NC	NC	1.1E-09	NC	NC	NC
Tank Group 07	GPR794-06	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.50E+00	7.50E-01	NC	NC	NC	5.5E-06	NC	NC
Tank Group 07	GPR794-06	SVOC	Chrysene	218-01-9	B2	Y	3.50E-01		3.50E-01	NC	NC	1.1E-11	NC	NC	NC
Tank Group 07	GPR794-06	SVOC	Fluorene	86-73-7	D	Y	1.40E+00		1.40E+00	NC	NC	NC	7.6E-06	NC	NC
Tank Group 07	GPR794-06	SVOC	Naphthalene	91-20-3	C	Y	6.30E+00		6.30E+00	4.3E-05	1.2E+00	1.4E-07	7.7E-02	3.8E-07	4.1E-03
Tank Group 07	GPR794-06	SVOC	Phenanthrene	85-01-8	D	Y	3.00E+00		3.00E+00	NC	NC	NC	2.2E-05	NC	NC
Tank Group 07	GPR794-06	SVOC	Pyrene	129-00-0	NC	Y	9.40E-01		9.40E-01	NC	NC	NC	6.8E-06	NC	NC
Tank Group 07	GPR794-06	SVOC	Tetraethylene Glycol	112-60-7		N		9.10E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-06	INORG	Lead	7439-92-1	B2	Y	4.29E+02		4.29E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-07	VOC	Benzene	71-43-2	A	Y	1.30E+02		1.30E+02	2.8E-04	3.4E+00	3.2E-06	3.3E-01	1.1E-05	5.3E-02
Tank Group 07	GPR794-07	VOC	Cumene	98-82-8	D	Y	3.30E+02		3.30E+02	NC	6.5E-01	NC	1.5E-01	NC	NC
Tank Group 07	GPR794-07	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.20E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-07	VOC	1,2-Dichloroethane	107-06-2	B2	N		4.50E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-07	VOC	Ethyl Benzene	100-41-4	D	Y	1.50E+00		1.50E+00	NC	1.2E-03	NC	5.7E-05	NC	1.8E-04
Tank Group 07	GPR794-07	VOC	Methyl tert-butyl ether	1634-04-4	C	N		8.90E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-07	VOC	Toluene	108-88-3	ID	Y	8.70E+00		8.70E+00	NC	1.4E-03	NC	3.7E-04	NC	8.9E-05
Tank Group 07	GPR794-07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	8.10E-01		8.10E-01	NC	1.1E-02	NC	6.5E-04	NC	NC
Tank Group 07	GPR794-07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.00E-01		2.00E-01	NC	2.6E-03	NC	1.3E-04	NC	NC
Tank Group 07	GPR794-07	VOC	Xylenes (total)	1330-20-7	ID	Y	3.33E+00		3.33E+00	NC	2.6E-02	NC	2.2E-03	NC	2.3E-04
Tank Group 07	GPR794-07	SVOC	Anthracene	120-12-7	ID	Y		1.10E-01	5.50E-02	NC	NC	NC	1.2E-07	NC	NC
Tank Group 07	GPR794-07	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	2.70E-02		2.70E-02	NC	NC	8.4E-11	NC	NC	NC
Tank Group 07	GPR794-07	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.50E-01	7.50E-02	NC	NC	2.3E-09	9.7E-04	NC	NC
Tank Group 07	GPR794-07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	3.40E-02		3.40E-02	NC	NC	NC	1.1E-10	NC	NC
Tank Group 07	GPR794-07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.50E-01	7.50E-02	NC	NC	NC	5.5E-07	NC	NC
Tank Group 07	GPR794-07	SVOC	Chrysene	218-01-9	B2	Y	4.10E-02		4.10E-02	NC	NC	1.3E-12	NC	NC	NC
Tank Group 07	GPR794-07	SVOC	Fluorene	86-73-7	D	Y		1.80E-01	9.00E-02	NC	NC	NC	4.9E-07	NC	NC
Tank Group 07	GPR794-07	SVOC	Naphthalene	91-20-3	C	Y	5.40E-02		5.40E-02	3.6E-07	1.0E-02	1.2E-09	6.6E-04	3.2E-09	3.5E-05
Tank Group 07	GPR794-07	SVOC	Phenanthrene	85-01-8	D	Y	1.90E-01		1.90E-01	NC	NC	NC	1.4E-06	NC	NC
Tank Group 07	GPR794-07	SVOC	Pyrene	129-00-0	NC	Y	7.70E-02		7.70E-02	NC	NC	NC	5.6E-07	NC	NC
Tank Group 07	GPR794-07	SVOC	Tetraethylene Glycol	112-60-7		N		9.70E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-07	INORG	Lead	7439-92-1	B2	Y	3.73E+00		3.73E+00	NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-08	VOC	Benzene	71-43-2	A	Y	1.20E+04		1.20E+04	2.6E-02	3.1E+02	3.0E-04	3.0E+01	1.0E-03	4.9E+00
Tank Group 07	GPR794-08	VOC	Cumene	98-82-8	D	Y	7.60E+03		7.60E+03	NC	1.5E+01	NC	3.5E+00	NC	NC
Tank Group 07	GPR794-08	VOC	1,2-Dibromoethane	106-93-4	LC	N		7.60E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-08	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.50E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-08	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E+02		1.20E+02	NC	9.4E-02	NC	4.6E-03	NC	1.5E-02
Tank Group 07	GPR794-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.20E+01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR794-08	VOC	Toluene	108-88-3	ID	Y	6.20E+03		6.20E+03	NC	9.7E-01	NC	2.6E-01	NC	6.3E-02
Tank Group 07	GPR794-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.30E+02		3.30E+02	NC	4.3E+00	NC	2.7E-01	NC	NC
Tank Group 07	GPR794-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.40E+02		1.40E+02	NC	1.8E+00	NC	9.4E-02	NC	NC
Tank Group 07	GPR794-08	VOC	Xylenes (total)	1330-20-7	ID	Y	5.60E+02		5.60E+02	NC	4.4E+00	NC	3.6E-01	NC	3.8E-02
Tank Group 07	GPR794-08	SVOC	Anthracene	120-12-7	ID	Y		1.20E+00	6.00E-01	NC	NC	NC	1.3E-06	NC	NC
Tank Group 07	GPR794-08	SVOC	Benzo(a)anthracene	56-55-3	B2	Y		1.20E+00	6.00E-01	NC	NC	1.9E-09	NC	NC	NC
Tank Group 07	GPR794-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.60E+00	8.00E-01	NC	NC	2.5E-08	1.0E-02	NC	NC
Tank Group 07	GPR794-08	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.20E+00	6.00E-01	NC	NC	1.9E-09	NC	NC	NC
Tank Group 07	GPR794-08	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.60E+00	8.00E-01	NC	NC	NC	5.8E-06	NC	NC
Tank Group 07	GPR794-08	SVOC	Chrysene	218-01-9	B2	Y		1.20E+00	6.00E-01	NC	NC	1.9E-11	NC	NC	NC
Tank Group 07	GPR794-08	SVOC	Fluorene	86-73-7	D	Y	7.50E-01		7.50E-01	NC	NC	NC	4.1E-06	NC	NC
Tank Group 07	GPR794-08	SVOC	Naphthalene	91-20-3	C	Y	5.20E+01		5.20E+01	3.5E-04	9.6E+00	1.1E-06	6.4E-01	3.1E-06	3.4E-02

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW		
										Vapor Intrusion		Outdoor Activities		Nonpotable Use		
										Risk	HQ	Risk	HQ	Risk	HQ	
Tank Group 07	GPR794-08	SVOC	Phenanthrene	85-01-8	D	Y	2.30E+00		2.30E+00	NC	NC	NC	1.7E-05	NC	NC	
Tank Group 07	GPR794-08	SVOC	Pyrene	129-00-0	NC	Y	2.80E-01		2.80E-01	NC	NC	NC	2.0E-06	NC	NC	
Tank Group 07	GPR794-08	SVOC	Tetraethylene Glycol	112-60-7		N		9.30E+00		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR794-08	INORG	Lead	7439-92-1	B2	Y	1.32E+02		1.32E+02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR794-09	VOC	Benzene	71-43-2	A	Y	1.85E+00		1.85E+00	4.0E-06	4.8E-02	4.6E-08	4.7E-03	1.6E-07	7.5E-04	
Tank Group 07	GPR794-09	VOC	Cumene	98-82-8	D	Y	1.80E+01		1.80E+01	NC	3.5E-02	NC	8.3E-03	NC	NC	
Tank Group 07	GPR794-09	VOC	Ethyl Benzene	100-41-4	D	Y	2.65E-01		2.65E-01	NC	2.1E-04	NC	1.0E-05	NC	3.2E-05	
Tank Group 07	GPR794-09	VOC	Methyl tert-butyl ether	1634-04-4	C	N		9.80E-02		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR794-09	VOC	Toluene	108-88-3	ID	Y	1.27E+00		1.27E+00	NC	2.0E-04	NC	5.4E-05	NC	1.3E-05	
Tank Group 07	GPR794-09	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.45E-02	9.80E-02		NC	5.8E-04	NC	3.6E-05	NC	NC	
Tank Group 07	GPR794-09	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.70E-02	9.80E-02		NC	2.2E-04	NC	1.1E-05	NC	NC	
Tank Group 07	GPR794-09	VOC	Xylenes (total)	1330-20-7	ID	Y	9.61E-01		9.61E-01	NC	7.5E-03	NC	6.2E-04	NC	6.5E-05	
Tank Group 07	GPR794-09	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.90E-01		1.90E-01	NC	NC	5.9E-09	2.5E-03	NC	NC	
Tank Group 07	GPR794-09	SVOC	Naphthalene	91-20-3	C	Y	2.35E-01		2.35E-01	1.6E-06	4.4E-02	5.1E-09	2.9E-03	1.4E-08	1.5E-04	
Tank Group 07	GPR794-10	VOC	Benzene	71-43-2	A	Y	3.50E-01		3.50E-01	7.6E-07	9.1E-03	8.7E-09	8.8E-04	3.0E-08	1.4E-04	
Tank Group 07	GPR794-10	VOC	Cumene	98-82-8	D	Y	4.20E+01		4.20E+01	NC	8.2E-02	NC	1.9E-02	NC	NC	
Tank Group 07	GPR794-10	VOC	Ethyl Benzene	100-41-4	D	Y	2.00E-02		2.00E-02	NC	1.6E-05	NC	7.6E-07	NC	2.4E-06	
Tank Group 07	GPR794-10	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.90E-01		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR794-10	VOC	Toluene	108-88-3	ID	Y	2.70E-01		2.70E-01	NC	4.2E-05	NC	1.1E-05	NC	2.8E-06	
Tank Group 07	GPR794-10	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		1.90E-01	9.50E-02	NC	1.2E-03	NC	7.7E-05	NC	NC	
Tank Group 07	GPR794-10	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		1.90E-01	9.50E-02	NC	1.2E-03	NC	6.4E-05	NC	NC	
Tank Group 07	GPR794-10	VOC	Xylenes (total)	1330-20-7	ID	Y	1.23E-01		1.23E-01	NC	9.6E-04	NC	8.0E-05	NC	8.4E-06	
Tank Group 07	GPR794-10	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.70E-02		4.70E-02	NC	NC	1.5E-09	6.1E-04	NC	NC	
Tank Group 07	GPR794-10	SVOC	Naphthalene	91-20-3	C	Y	3.00E-01		3.00E-01	2.0E-06	5.6E-02	6.5E-09	3.7E-03	1.8E-08	1.9E-04	
Tank Group 07	GPR798-01	VOC	Benzene	71-43-2	A	Y	3.40E+00		3.40E+00	7.4E-06	8.9E-02	8.5E-08	8.6E-03	2.9E-07	1.4E-03	
Tank Group 07	GPR798-02	VOC	Benzene	71-43-2	A	Y	6.20E+00		6.20E+00	1.4E-05	1.6E-01	1.5E-07	1.6E-02	5.2E-07	2.5E-03	
Tank Group 07	GPR798-03	VOC	Benzene	71-43-2	A	Y	4.00E-01		4.00E-01	8.7E-07	1.0E-02	1.0E-08	1.0E-03	3.4E-08	1.6E-04	
Tank Group 07	GPR798-04	VOC	Benzene	71-43-2	A	Y	5.90E+03		5.90E+03	1.3E-02	1.5E+02	1.5E-04	1.5E+01	5.0E-04	2.4E+00	
Tank Group 07	GPR798-04	VOC	Cumene	98-82-8	D	Y	4.20E+01		4.20E+01	NC	8.2E-02	NC	1.9E-02	NC	NC	
Tank Group 07	GPR798-04	VOC	Ethyl Benzene	100-41-4	D	Y	8.10E-02	1.20E+00		8.10E-02	NC	6.4E-05	NC	3.1E-06	NC	9.9E-06
Tank Group 07	GPR798-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.40E+00		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR798-04	VOC	Toluene	108-88-3	ID	Y	2.80E-01	1.20E+00		2.80E-01	NC	4.4E-05	NC	1.2E-05	NC	2.9E-06
Tank Group 07	GPR798-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	5.10E-01	2.40E+00		5.10E-01	NC	6.7E-03	NC	4.1E-04	NC	NC
Tank Group 07	GPR798-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	2.40E-01	2.40E+00		2.40E-01	NC	3.1E-03	NC	1.6E-04	NC	NC
Tank Group 07	GPR798-04	VOC	Xylenes (total)	1330-20-7	ID	Y	5.30E-01	2.40E+00		5.30E-01	NC	4.2E-03	NC	3.4E-04	NC	3.6E-05
Tank Group 07	GPR798-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.60E-02	1.70E-01		7.60E-02	NC	NC	2.4E-09	9.9E-04	NC	NC
Tank Group 07	GPR798-04	SVOC	Naphthalene	91-20-3	C	Y	1.00E+00		1.00E+00	6.8E-06	1.9E-01	2.2E-08	1.2E-02	6.0E-08	6.5E-04	
Tank Group 07	GPR798-05	VOC	Benzene	71-43-2	A	Y	1.40E+00		1.40E+00	3.1E-06	3.7E-02	3.5E-08	3.5E-03	1.2E-07	5.7E-04	
Tank Group 07	GPR798-06	VOC	Benzene	71-43-2	A	Y	2.20E+00		2.20E+00	4.8E-06	5.8E-02	5.5E-08	5.6E-03	1.9E-07	8.9E-04	
Tank Group 07	GPR798-07	VOC	Benzene	71-43-2	A	Y	7.80E+00		7.80E+00	1.7E-05	2.0E-01	1.9E-07	2.0E-02	6.6E-07	3.2E-03	
Tank Group 07	GPR799-01	VOC	Benzene	71-43-2	A	Y	2.20E+00		2.20E+00	4.8E-06	5.8E-02	5.5E-08	5.6E-03	1.9E-07	8.9E-04	
Tank Group 07	GPR799-02	VOC	Benzene	71-43-2	A	Y	1.60E+00		1.60E+00	3.5E-06	4.2E-02	4.0E-08	4.0E-03	1.3E-07	6.5E-04	
Tank Group 07	GPR799-03	VOC	Benzene	71-43-2	A	Y	1.60E+01		1.60E+01	3.5E-05	4.2E-01	4.0E-07	4.0E-02	1.3E-06	6.5E-03	
Tank Group 07	GPR799-03	VOC	Cumene	98-82-8	D	Y	8.20E+00		8.20E+00	NC	1.6E-02	NC	3.8E-03	NC	NC	
Tank Group 07	GPR799-03	VOC	Ethyl Benzene	100-41-4	D	Y	1.30E-01		1.30E-01	NC	1.0E-04	NC	5.0E-06	NC	1.6E-05	
Tank Group 07	GPR799-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.60E-01		NC	NC	NC	NC	NC	NC	
Tank Group 07	GPR799-03	VOC	Toluene	108-88-3	ID	Y	4.40E-01		4.40E-01	NC	6.9E-05	NC	1.9E-05	NC	4.5E-06	
Tank Group 07	GPR799-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	8.00E-01		8.00E-01	NC	1.0E-02	NC	6.5E-04	NC	NC	
Tank Group 07	GPR799-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	6.30E-01		6.30E-01	NC	8.2E-03	NC	4.2E-04	NC	NC	
Tank Group 07	GPR799-03	VOC	Xylenes (total)	1330-20-7	ID	Y	5.28E-01		5.28E-01	NC	4.1E-03	NC	3.4E-04	NC	3.6E-05	
Tank Group 07	GPR799-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.10E+00		1.10E+00	NC	NC	3.4E-08	1.4E-02	NC	NC	
Tank Group 07	GPR799-03	SVOC	Naphthalene	91-20-3	C	Y	2.20E+00		2.20E+00	1.5E-05	4.1E-01	4.8E-08	2.7E-02	1.3E-07	1.4E-03	
Tank Group 07	GPR799-04	VOC	Benzene	71-43-2	A	Y	2.20E+01		2.20E+01	4.8E-05	5.8E-01	5.5E-07	5.6E-02	1.9E-06	8.9E-03	
Tank Group 07	GPR799-05	VOC	Benzene	71-43-2	A	Y	2.70E+00		2.70E+00	5.9E-06	7.1E-02	6.7E-08	6.8E-03	2.3E-07	1.1E-03	
Tank Group 07	GPR799-06	VOC	Benzene	71-43-2	A	Y	1.30E+00		1.30E+00	2.8E-06	3.4E-02	3.2E-08	3.3E-03	1.1E-07	5.3E-04	
Tank Group 07	GPR799-07	VOC	Benzene	71-43-2	A	Y	7.10E-01		7.10E-01	1.6E-06	1.9E-02	1.8E-08	1.8E-03	6.0E-08	2.9E-04	
Tank Group 07	GPR799-08	VOC	Benzene	71-43-2	A	Y	7.70E-01		7.70E-01	1.7E-06	2.0E-02	1.9E-08	1.9E-03	6.5E-08	3.1E-04	
Tank Group 07	GPR799-08	VOC	Cumene	98-82-8	D	Y	7.00E+02		7.00E+02	NC	1.4E+00	NC	3.2E-01	NC	NC	

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPR799-08	VOC	Ethyl Benzene	100-41-4	D	Y	1.30E-01	9.40E-04	1.30E-01	NC	1.0E-04	NC	5.0E-06	NC	1.6E-05
Tank Group 07	GPR799-08	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.60E+00		NC	NC	NC	NC	NC	NC
Tank Group 07	GPR799-08	VOC	Toluene	108-88-3	ID	Y	4.80E-03	8.00E-01	4.80E-03	NC	7.5E-07	NC	2.0E-07	NC	4.9E-08
Tank Group 07	GPR799-08	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		1.60E+00	8.00E-01	NC	1.0E-02	NC	6.5E-04	NC	NC
Tank Group 07	GPR799-08	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		1.60E+00	8.00E-01	NC	1.0E-02	NC	5.4E-04	NC	NC
Tank Group 07	GPR799-08	VOC	Xylenes (total)	1330-20-7	ID	Y	8.60E-01	1.90E-03	8.60E-01	NC	6.7E-03	NC	5.6E-04	NC	5.8E-05
Tank Group 07	GPR799-08	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	8.30E-01	1.50E-01	8.30E-01	NC	NC	2.6E-08	1.1E-02	NC	NC
Tank Group 07	GPR799-08	SVOC	Naphthalene	91-20-3	C	Y	1.60E+00		1.60E+00	1.1E-05	3.0E-01	3.5E-08	2.0E-02	9.6E-08	1.0E-03
Tank Group 07	GPU767-01	VOC	Benzene	71-43-2	A	Y		6.90E-04	3.45E-04	7.5E-10	9.0E-06	8.6E-12	8.7E-07	2.9E-11	1.4E-07
Tank Group 07	GPU767-01	VOC	Cumene	98-82-8	D	Y	1.10E-03		1.10E-03	NC	2.2E-06	NC	5.0E-07	NC	NC
Tank Group 07	GPU767-01	VOC	1,2-Dibromoethane	106-93-4	LC	N		6.90E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-01	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.40E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-01	VOC	Ethyl Benzene	100-41-4	D	Y		1.40E-03	7.00E-04	NC	5.5E-07	NC	2.7E-08	NC	8.6E-08
Tank Group 07	GPU767-01	VOC	Methyl tert-butyl ether	1634-04-4	C	N		2.80E-03		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-01	VOC	Toluene	108-88-3	ID	Y		1.40E-03	7.00E-04	NC	1.1E-07	NC	3.0E-08	NC	7.1E-09
Tank Group 07	GPU767-01	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y		2.80E-03	1.40E-03	NC	1.8E-05	NC	1.1E-06	NC	NC
Tank Group 07	GPU767-01	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		2.80E-03	1.40E-03	NC	1.8E-05	NC	9.4E-07	NC	NC
Tank Group 07	GPU767-01	VOC	Xylenes (total)	1330-20-7	ID	Y		2.80E-03	1.40E-03	NC	1.1E-05	NC	9.1E-07	NC	9.5E-08
Tank Group 07	GPU767-01	SVOC	Anthracene	120-12-7	ID	Y		1.10E-01	5.50E-02	NC	NC	NC	1.2E-07	NC	NC
Tank Group 07	GPU767-01	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	4.40E-02		4.40E-02	NC	NC	1.4E-10	NC	NC	NC
Tank Group 07	GPU767-01	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	7.00E-02		7.00E-02	NC	NC	2.2E-09	9.1E-04	NC	NC
Tank Group 07	GPU767-01	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.00E-01		1.00E-01	NC	NC	3.1E-10	NC	NC	NC
Tank Group 07	GPU767-01	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	7.60E-02		7.60E-02	NC	NC	NC	5.5E-07	NC	NC
Tank Group 07	GPU767-01	SVOC	Chrysene	218-01-9	B2	Y	4.60E-02		4.60E-02	NC	NC	1.4E-12	NC	NC	NC
Tank Group 07	GPU767-01	SVOC	Fluorene	86-73-7	D	Y		1.90E-01	9.50E-02	NC	NC	NC	5.2E-07	NC	NC
Tank Group 07	GPU767-01	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	7.70E-02		7.70E-02	NC	NC	2.4E-10	NC	NC	NC
Tank Group 07	GPU767-01	SVOC	Naphthalene	91-20-3	C	Y		1.90E-01	9.50E-02	6.4E-07	1.8E-02	2.1E-09	1.2E-03	5.7E-09	6.1E-05
Tank Group 07	GPU767-01	SVOC	Phenanthrene	85-01-8	D	Y		1.10E-01	5.50E-02	NC	NC	NC	4.0E-07	NC	NC
Tank Group 07	GPU767-01	SVOC	Pyrene	129-00-0	NC	Y	3.20E-02		3.20E-02	NC	NC	NC	2.3E-07	NC	NC
Tank Group 07	GPU767-01	INORG	Lead	7439-92-1	B2	Y	3.80E+02		3.80E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-02	VOC	Benzene	71-43-2	A	Y	7.00E-05		7.00E-05	1.5E-10	1.8E-06	1.7E-12	1.8E-07	5.9E-12	2.8E-08
Tank Group 07	GPU767-02	VOC	Cumene	98-82-8	D	Y	9.30E-03		9.30E-03	NC	1.8E-05	NC	4.3E-06	NC	NC
Tank Group 07	GPU767-02	VOC	1,2-Dibromoethane	106-93-4	LC	N		8.00E-05		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-02	VOC	1,2-Dichloroethane	107-06-2	B2	N		1.80E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-02	VOC	Ethyl Benzene	100-41-4	D	Y	1.60E-04		1.60E-04	NC	1.3E-07	NC	6.1E-09	NC	2.0E-08
Tank Group 07	GPU767-02	VOC	Methyl tert-butyl ether	1634-04-4	C	N		3.50E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-02	VOC	Toluene	108-88-3	ID	Y	1.80E-04		1.80E-04	NC	2.8E-08	NC	7.7E-09	NC	1.8E-09
Tank Group 07	GPU767-02	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	2.70E-04		2.70E-04	NC	3.5E-06	NC	2.2E-07	NC	NC
Tank Group 07	GPU767-02	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.00E-04		1.00E-04	NC	1.3E-06	NC	6.7E-08	NC	NC
Tank Group 07	GPU767-02	VOC	Xylenes (total)	1330-20-7	ID	Y	3.70E-04		3.70E-04	NC	2.9E-06	NC	2.4E-07	NC	2.5E-08
Tank Group 07	GPU767-02	SVOC	Anthracene	120-12-7	ID	Y	5.80E-02		5.80E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPU767-02	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.20E-01		1.20E-01	NC	NC	3.8E-10	NC	NC	NC
Tank Group 07	GPU767-02	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.40E-01		1.40E-01	NC	NC	4.4E-09	1.8E-03	NC	NC
Tank Group 07	GPU767-02	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.50E-01		1.50E-01	NC	NC	4.7E-10	NC	NC	NC
Tank Group 07	GPU767-02	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	7.70E-02		7.70E-02	NC	NC	NC	5.6E-07	NC	NC
Tank Group 07	GPU767-02	SVOC	Chrysene	218-01-9	B2	Y	1.20E-01		1.20E-01	NC	NC	3.8E-12	NC	NC	NC
Tank Group 07	GPU767-02	SVOC	Fluorene	86-73-7	D	Y	8.50E-02		8.50E-02	NC	NC	NC	4.6E-07	NC	NC
Tank Group 07	GPU767-02	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	9.10E-02		9.10E-02	NC	NC	2.8E-10	NC	NC	NC
Tank Group 07	GPU767-02	SVOC	Naphthalene	91-20-3	C	Y	4.80E-02		4.80E-02	3.2E-07	8.9E-03	1.0E-09	5.9E-04	2.9E-09	3.1E-05
Tank Group 07	GPU767-02	SVOC	Phenanthrene	85-01-8	D	Y	2.40E-01		2.40E-01	NC	NC	NC	1.7E-06	NC	NC
Tank Group 07	GPU767-02	SVOC	Pyrene	129-00-0	NC	Y	1.80E-01		1.80E-01	NC	NC	NC	1.3E-06	NC	NC
Tank Group 07	GPU767-02	INORG	Lead	7439-92-1	B2	Y	1.15E+02		1.15E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-03	VOC	Benzene	71-43-2	A	Y	7.10E-02		7.10E-02	1.6E-07	1.9E-03	1.8E-09	1.8E-04	6.0E-09	2.9E-05
Tank Group 07	GPU767-03	VOC	Cumene	98-82-8	D	Y	1.60E+00		1.60E+00	NC	3.1E-03	NC	7.3E-04	NC	NC
Tank Group 07	GPU767-03	VOC	1,2-Dibromoethane	106-93-4	LC	N		4.80E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-03	VOC	1,2-Dichloroethane	107-06-2	B2	N		9.50E-04		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-03	VOC	Ethyl Benzene	100-41-4	D	Y	3.00E-02		3.00E-02	NC	2.4E-05	NC	1.1E-06	NC	3.7E-06
Tank Group 07	GPU767-03	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.90E-03		NC	NC	NC	NC	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPU767-03	VOC	Toluene	108-88-3	ID	Y	5.20E-02		5.20E-02	NC	8.2E-06	NC	2.2E-06	NC	5.3E-07
Tank Group 07	GPU767-03	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.20E-02		3.20E-02	NC	4.2E-04	NC	2.6E-05	NC	NC
Tank Group 07	GPU767-03	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.60E-02		1.60E-02	NC	2.1E-04	NC	1.1E-05	NC	NC
Tank Group 07	GPU767-03	VOC	Xylenes (total)	1330-20-7	ID	Y	7.10E-02		7.10E-02	NC	5.6E-04	NC	4.6E-05	NC	4.8E-06
Tank Group 07	GPU767-03	SVOC	Anthracene	120-12-7	ID	Y		1.20E-01	6.00E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPU767-03	SVOC	Benzo(a)anthracene	56-55-3	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-10	NC	NC	NC
Tank Group 07	GPU767-03	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.60E-01	8.00E-02	NC	NC	2.5E-09	1.0E-03	NC	NC
Tank Group 07	GPU767-03	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-10	NC	NC	NC
Tank Group 07	GPU767-03	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y		1.60E-01	8.00E-02	NC	NC	NC	5.8E-07	NC	NC
Tank Group 07	GPU767-03	SVOC	Chrysene	218-01-9	B2	Y		1.20E-01	6.00E-02	NC	NC	1.9E-12	NC	NC	NC
Tank Group 07	GPU767-03	SVOC	Fluorene	86-73-7	D	Y		2.00E-01	1.00E-01	NC	NC	NC	5.5E-07	NC	NC
Tank Group 07	GPU767-03	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y		1.60E-01	8.00E-02	NC	NC	2.5E-10	NC	NC	NC
Tank Group 07	GPU767-03	SVOC	Naphthalene	91-20-3	C	Y		2.00E-01	1.00E-01	6.8E-07	1.9E-02	2.2E-09	1.2E-03	6.0E-09	6.5E-05
Tank Group 07	GPU767-03	SVOC	Phenanthrene	85-01-8	D	Y		1.20E-01	6.00E-02	NC	NC	NC	4.4E-07	NC	NC
Tank Group 07	GPU767-03	SVOC	Pyrene	129-00-0	NC	Y		1.20E-01	6.00E-02	NC	NC	NC	4.4E-07	NC	NC
Tank Group 07	GPU767-03	INORG	Lead	7439-92-1	B2	Y	7.20E+01		7.20E+01	NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-04	VOC	Benzene	71-43-2	A	Y	2.10E-02		2.10E-02	4.6E-08	5.5E-04	5.2E-10	5.3E-05	1.8E-09	8.5E-06
Tank Group 07	GPU767-04	VOC	Cumene	98-82-8	D	Y	4.80E+00		4.80E+00	NC	9.4E-03	NC	2.2E-03	NC	NC
Tank Group 07	GPU767-04	VOC	1,2-Dibromoethane	106-93-4	LC	N		3.60E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-04	VOC	1,2-Dichloroethane	107-06-2	B2	N		7.10E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-04	VOC	Ethyl Benzene	100-41-4	D	Y	4.70E-02		4.70E-02	NC	3.7E-05	NC	1.8E-06	NC	5.7E-06
Tank Group 07	GPU767-04	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.40E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-04	VOC	Toluene	108-88-3	ID	Y	1.70E-01		1.70E-01	NC	2.7E-05	NC	7.2E-06	NC	1.7E-06
Tank Group 07	GPU767-04	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	3.70E-02		3.70E-02	NC	4.8E-04	NC	3.0E-05	NC	NC
Tank Group 07	GPU767-04	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y		1.40E-01	7.00E-02	NC	9.1E-04	NC	4.7E-05	NC	NC
Tank Group 07	GPU767-04	VOC	Xylenes (total)	1330-20-7	ID	Y	1.76E-01		1.76E-01	NC	1.4E-03	NC	1.1E-04	NC	1.2E-05
Tank Group 07	GPU767-04	SVOC	Anthracene	120-12-7	ID	Y		1.20E-01	6.00E-02	NC	NC	NC	1.3E-07	NC	NC
Tank Group 07	GPU767-04	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.70E-02		3.70E-02	NC	NC	1.2E-10	NC	NC	NC
Tank Group 07	GPU767-04	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.90E-02		4.90E-02	NC	NC	1.5E-09	6.4E-04	NC	NC
Tank Group 07	GPU767-04	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	5.40E-02		5.40E-02	NC	NC	1.7E-10	NC	NC	NC
Tank Group 07	GPU767-04	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	6.40E-02		6.40E-02	NC	NC	NC	4.7E-07	NC	NC
Tank Group 07	GPU767-04	SVOC	Chrysene	218-01-9	B2	Y	9.30E-02		9.30E-02	NC	NC	2.9E-12	NC	NC	NC
Tank Group 07	GPU767-04	SVOC	Fluorene	86-73-7	D	Y		1.90E-01	9.50E-02	NC	NC	NC	5.2E-07	NC	NC
Tank Group 07	GPU767-04	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y		1.60E-01	8.00E-02	NC	NC	2.5E-10	NC	NC	NC
Tank Group 07	GPU767-04	SVOC	Naphthalene	91-20-3	C	Y		1.90E-01	9.50E-02	6.4E-07	1.8E-02	2.1E-09	1.2E-03	5.7E-09	6.1E-05
Tank Group 07	GPU767-04	SVOC	Phenanthrene	85-01-8	D	Y		1.20E-01	6.00E-02	NC	NC	NC	4.4E-07	NC	NC
Tank Group 07	GPU767-04	SVOC	Pyrene	129-00-0	NC	Y	9.00E-02		9.00E-02	NC	NC	NC	6.6E-07	NC	NC
Tank Group 07	GPU767-04	INORG	Lead	7439-92-1	B2	Y	1.21E+02		1.21E+02	NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-05	VOC	Benzene	71-43-2	A	Y	4.40E-02		4.40E-02	9.6E-08	1.2E-03	1.1E-09	1.1E-04	3.7E-09	1.8E-05
Tank Group 07	GPU767-05	VOC	Cumene	98-82-8	D	Y	2.40E+01		2.40E+01	NC	4.7E-02	NC	1.1E-02	NC	NC
Tank Group 07	GPU767-05	VOC	1,2-Dibromoethane	106-93-4	LC	N		2.90E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-05	VOC	1,2-Dichloroethane	107-06-2	B2	N		5.90E-02		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-05	VOC	Ethyl Benzene	100-41-4	D	Y	1.20E-01		1.20E-01	NC	9.4E-05	NC	4.6E-06	NC	1.5E-05
Tank Group 07	GPU767-05	VOC	Methyl tert-butyl ether	1634-04-4	C	N		1.20E-01		NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-05	VOC	Toluene	108-88-3	ID	Y	6.20E-02		6.20E-02	NC	9.7E-06	NC	2.6E-06	NC	6.3E-07
Tank Group 07	GPU767-05	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	7.50E-02		7.50E-02	NC	9.8E-04	NC	6.0E-05	NC	NC
Tank Group 07	GPU767-05	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.70E-02		1.70E-02	NC	2.2E-04	NC	1.1E-05	NC	NC
Tank Group 07	GPU767-05	VOC	Xylenes (total)	1330-20-7	ID	Y	2.11E-01		2.11E-01	NC	1.7E-03	NC	1.4E-04	NC	1.4E-05
Tank Group 07	GPU767-05	SVOC	Anthracene	120-12-7	ID	Y		1.10E-01	5.50E-02	NC	NC	NC	1.2E-07	NC	NC
Tank Group 07	GPU767-05	SVOC	Benzo(a)anthracene	56-55-3	B2	Y		1.10E-01	5.50E-02	NC	NC	1.7E-10	NC	NC	NC
Tank Group 07	GPU767-05	SVOC	Benzo(a)pyrene	50-32-8	HC	Y		1.50E-01	7.50E-02	NC	NC	2.3E-09	9.7E-04	NC	NC
Tank Group 07	GPU767-05	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y		1.10E-01	5.50E-02	NC	NC	1.7E-10	NC	NC	NC
Tank Group 07	GPU767-05	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.50E-02		2.50E-02	NC	NC	NC	1.8E-07	NC	NC
Tank Group 07	GPU767-05	SVOC	Chrysene	218-01-9	B2	Y	2.40E-02		2.40E-02	NC	NC	7.5E-13	NC	NC	NC
Tank Group 07	GPU767-05	SVOC	Fluorene	86-73-7	D	Y		1.80E-01	9.00E-02	NC	NC	NC	4.9E-07	NC	NC
Tank Group 07	GPU767-05	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y		1.50E-01	7.50E-02	NC	NC	2.3E-10	NC	NC	NC
Tank Group 07	GPU767-05	SVOC	Naphthalene	91-20-3	C	Y		1.80E-01	9.00E-02	6.1E-07	1.7E-02	1.9E-09	1.1E-03	5.4E-09	5.8E-05
Tank Group 07	GPU767-05	SVOC	Phenanthrene	85-01-8	D	Y		1.10E-01	5.50E-02	NC	NC	NC	4.0E-07	NC	NC

Attachment 7

Table 3

Location-Specific Upper Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Soil
Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Area	Location	Chem Group	Chemical	CASRN	Carc Class	Detected in Soil	Max Detect from All Depths (mg/kg)	Max Limit from All Depths (mg/kg)	Exposure Concentration (mg/kg)	Routine Worker		Construction Worker		Soil Migration to GW	
										Vapor Intrusion		Outdoor Activities		Nonpotable Use	
										Risk	HQ	Risk	HQ	Risk	HQ
Tank Group 07	GPU767-05	SVOC	Pyrene	129-00-0	NC	Y	2.20E-02	2.20E-02	NC	NC	NC	1.6E-07	NC	NC	NC
Tank Group 07	GPU767-05	INORG	Lead	7439-92-1	B2	Y	1.25E+01	1.25E+01	NC	NC	NC	NC	NC	NC	NC
Tank Group 07	GPU767-06	VOC	Benzene	71-43-2	A	Y	4.70E-04	2.35E-04	5.1E-10	6.1E-06	5.9E-12	5.9E-07	2.0E-11	9.6E-08	
Tank Group 07	GPU767-06	VOC	Cumene	98-82-8	D	Y	1.00E-03	1.00E-03	NC	2.0E-06	NC	4.6E-07	NC	NC	
Tank Group 07	GPU767-06	VOC	1,2-Dibromoethane	106-93-4	LC	N	4.70E-04	4.70E-04	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-06	VOC	1,2-Dichloroethane	107-06-2	B2	N	9.40E-04	9.40E-04	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-06	VOC	Ethyl Benzene	100-41-4	D	Y	9.40E-04	4.70E-04	NC	3.7E-07	NC	1.8E-08	NC	5.7E-08	
Tank Group 07	GPU767-06	VOC	Methyl tert-butyl ether	1634-04-4	C	N	1.90E-03	1.90E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-06	VOC	Toluene	108-88-3	ID	Y	9.40E-04	4.70E-04	NC	7.4E-08	NC	2.0E-08	NC	4.8E-09	
Tank Group 07	GPU767-06	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	1.90E-03	9.50E-04	NC	1.2E-05	NC	7.7E-07	NC	NC	
Tank Group 07	GPU767-06	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	1.90E-03	9.50E-04	NC	1.2E-05	NC	6.4E-07	NC	NC	
Tank Group 07	GPU767-06	VOC	Xylenes (total)	1330-20-7	ID	Y	1.90E-03	9.50E-04	NC	7.4E-06	NC	6.2E-07	NC	6.5E-08	
Tank Group 07	GPU767-06	SVOC	Anthracene	120-12-7	ID	Y	5.30E-02	5.30E-02	NC	NC	NC	1.2E-07	NC	NC	
Tank Group 07	GPU767-06	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	3.30E-01	3.30E-01	NC	NC	1.0E-09	NC	NC	NC	
Tank Group 07	GPU767-06	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	4.20E-01	4.20E-01	NC	NC	1.3E-08	5.5E-03	NC	NC	
Tank Group 07	GPU767-06	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	5.60E-01	5.60E-01	NC	NC	1.8E-09	NC	NC	NC	
Tank Group 07	GPU767-06	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	2.90E-01	2.90E-01	NC	NC	NC	2.1E-06	NC	NC	
Tank Group 07	GPU767-06	SVOC	Chrysene	218-01-9	B2	Y	3.80E-01	3.80E-01	NC	NC	1.2E-11	NC	NC	NC	
Tank Group 07	GPU767-06	SVOC	Fluorene	86-73-7	D	Y	3.00E-02	3.00E-02	NC	NC	NC	1.6E-07	NC	NC	
Tank Group 07	GPU767-06	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	3.50E-01	3.50E-01	NC	NC	1.1E-09	NC	NC	NC	
Tank Group 07	GPU767-06	SVOC	Naphthalene	91-20-3	C	Y	6.80E-02	6.80E-02	4.6E-07	1.3E-02	1.5E-09	8.4E-04	4.1E-09	4.4E-05	
Tank Group 07	GPU767-06	SVOC	Phenanthrene	85-01-8	D	Y	1.90E-01	1.90E-01	NC	NC	NC	1.4E-06	NC	NC	
Tank Group 07	GPU767-06	SVOC	Pyrene	129-00-0	NC	Y	3.40E-01	3.40E-01	NC	NC	NC	2.5E-06	NC	NC	
Tank Group 07	GPU767-06	INORG	Lead	7439-92-1	B2	Y	6.88E+02	6.88E+02	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-07	VOC	Benzene	71-43-2	A	Y	1.00E-03	5.00E-04	1.1E-09	1.3E-05	1.2E-11	1.3E-06	4.2E-11	2.0E-07	
Tank Group 07	GPU767-07	VOC	Cumene	98-82-8	D	Y	4.90E-04	4.90E-04	NC	9.6E-07	NC	2.2E-07	NC	NC	
Tank Group 07	GPU767-07	VOC	1,2-Dibromoethane	106-93-4	LC	N	1.00E-03	1.00E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-07	VOC	1,2-Dichloroethane	107-06-2	B2	N	2.00E-03	2.00E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-07	VOC	Ethyl Benzene	100-41-4	D	Y	2.00E-03	1.00E-03	NC	7.8E-07	NC	3.8E-08	NC	1.2E-07	
Tank Group 07	GPU767-07	VOC	Methyl tert-butyl ether	1634-04-4	C	N	4.00E-03	4.00E-03	NC	NC	NC	NC	NC	NC	
Tank Group 07	GPU767-07	VOC	Toluene	108-88-3	ID	Y	2.00E-03	1.00E-03	NC	1.6E-07	NC	4.3E-08	NC	1.0E-08	
Tank Group 07	GPU767-07	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	Y	4.00E-03	2.00E-03	NC	2.6E-05	NC	1.6E-06	NC	NC	
Tank Group 07	GPU767-07	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	Y	4.00E-03	2.00E-03	NC	2.6E-05	NC	1.3E-06	NC	NC	
Tank Group 07	GPU767-07	VOC	Xylenes (total)	1330-20-7	ID	Y	4.00E-03	2.00E-03	NC	1.6E-05	NC	1.3E-06	NC	1.4E-07	
Tank Group 07	GPU767-07	SVOC	Anthracene	120-12-7	ID	Y	1.00E-01	5.00E-02	NC	NC	NC	1.1E-07	NC	NC	
Tank Group 07	GPU767-07	SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.00E-01	5.00E-02	NC	NC	1.6E-10	NC	NC	NC	
Tank Group 07	GPU767-07	SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.40E-01	7.00E-02	NC	NC	2.2E-09	9.1E-04	NC	NC	
Tank Group 07	GPU767-07	SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.00E-01	5.00E-02	NC	NC	1.6E-10	NC	NC	NC	
Tank Group 07	GPU767-07	SVOC	Benzo(g,h,i)perylene	191-24-2	D	Y	1.40E-01	7.00E-02	NC	NC	NC	5.1E-07	NC	NC	
Tank Group 07	GPU767-07	SVOC	Chrysene	218-01-9	B2	Y	1.00E-01	5.00E-02	NC	NC	1.6E-12	NC	NC	NC	
Tank Group 07	GPU767-07	SVOC	Fluorene	86-73-7	D	Y	1.70E-01	8.50E-02	NC	NC	NC	4.6E-07	NC	NC	
Tank Group 07	GPU767-07	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	1.40E-01	7.00E-02	NC	NC	2.2E-10	NC	NC	NC	
Tank Group 07	GPU767-07	SVOC	Naphthalene	91-20-3	C	Y	1.70E-01	8.50E-02	5.7E-07	1.6E-02	1.8E-09	1.0E-03	5.1E-09	5.5E-05	
Tank Group 07	GPU767-07	SVOC	Phenanthrene	85-01-8	D	Y	1.00E-01	5.00E-02	NC	NC	NC	3.6E-07	NC	NC	
Tank Group 07	GPU767-07	SVOC	Pyrene	129-00-0	NC	Y	1.00E-01	5.00E-02	NC	NC	NC	3.6E-07	NC	NC	
Tank Group 07	GPU767-07	INORG	Lead	7439-92-1	B2	Y	8.70E+01	8.70E+01	NC	NC	NC	NC	NC	NC	

Notes:

Only constituents detected in each area are shown.

Single-chemical cancer risk and hazard quotient (HQ) estimates in excess of PADEP's thresholds for cumulative cancer risk and HI of 1E-4 and 1, respectively, are shaded and bold

Single-chemical cancer risk and HQ estimates in excess of 1/10 PADEP's thresholds for cumulative cancer risk or HI of 1E-4 and 1, respectively, are italic and bold

Where a chemical is non-detected at a location but detected within the media at the Site, half of the analytical limit is used as the exposure concentration

NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect

The concentrations for the Xylene isomers (m/p and o) were summed to Xylenes (total).

Chem Group - chemical group

Carc Class - USEPA Weight-of-Evidence Cancer Classification

Attachment 7

Table 4

Upper-Bound Single-Chemical Cancer Risk and Noncancer Hazard Quotient (HQ) for Receptor Exposure to Groundwater
 Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Dataset	Area	Wellzone	Chem Group	Chemical	CASRN	Carc Class	Max Detected (mg/L)	Routine Worker				Maintenance Worker		Construction Worker		Resident		
								Vapor Intrusion		Outdoor Air Inhalation		Groundwater Contact		Groundwater Contact		Nonpotable Use		
								Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	Risk	HQ	
AST	Tank Group 07	unconfined	VOC	Benzene	71-43-2	A	2.40E+02	5.3E-04	6.3E+00	3.1E-06	3.7E-02	5.7E-04	1.7E+01	5.7E-05	6.1E+00	8.1E-03	3.9E+01	
AST	Tank Group 07	unconfined	VOC	Cumene	98-82-8	D	7.20E+00	NC	1.1E-02	NC	6.6E-05	NC	2.4E-02	NC	2.4E-02	NC	2.0E-02	
AST	Tank Group 07	unconfined	VOC	Ethyl Benzene	100-41-4	D	3.60E-01	NC	2.4E-04	NC	1.4E-06	NC	1.3E-03	NC	9.0E-04	NC	1.8E-02	
AST	Tank Group 07	unconfined	VOC	Methyl tert-butyl ether	1634-04-4	C	3.60E-04	1.7E-11	6.2E-08	1.1E-13	3.8E-10	2.0E-11	1.9E-07	2.0E-12	1.9E-07	1.7E-10	8.1E-07	
AST	Tank Group 07	unconfined	VOC	Toluene	108-88-3	ID	2.70E+01	NC	3.9E-03	NC	2.3E-05	NC	5.9E-02	NC	1.3E-02	NC	1.1E-01	
AST	Tank Group 07	unconfined	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	2.20E-01	NC	2.3E-03	NC	1.3E-05	NC	4.9E-03	NC	1.5E-03	NC	2.5E-03	
AST	Tank Group 07	unconfined	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	7.20E-04	NC	7.9E-06	NC	4.6E-08	NC	1.6E-05	NC	4.8E-06	NC	8.2E-06	
AST	Tank Group 07	unconfined	VOC	Xylenes (total)	1330-20-7	ID	1.67E+00	NC	1.2E-02	NC	7.3E-05	NC	2.5E-02	NC	9.8E-03	NC	4.5E-02	
AST	Tank Group 07	unconfined	SVOC	Anthracene	120-12-7	ID	4.30E-04	NC	NC	NC	NC	NC	7.4E-09	NC	2.2E-09	NC	1.8E-07	
AST	Tank Group 07	unconfined	SVOC	Benzo(a)anthracene	56-55-3	B2	1.80E-04	NC	NC	NC	NC	1.3E-11	NC	1.3E-12	NC	1.7E-08	NC	
AST	Tank Group 07	unconfined	SVOC	Benzo(a)pyrene	50-32-8	HC	7.00E-05	NC	NC	NC	NC	5.1E-11	1.2E-06	5.1E-12	1.2E-06	7.0E-08	1.6E-04	
AST	Tank Group 07	unconfined	SVOC	Benzo(b)fluoranthene	205-99-2	B2	7.00E-05	NC	NC	NC	NC	5.1E-12	NC	5.1E-13	NC	4.5E-09	NC	
AST	Tank Group 07	unconfined	SVOC	Benzo(g,h,i)perylene	191-24-2	D	4.00E-05	NC	NC	NC	NC	NC	6.8E-09	NC	6.8E-10	NC	9.2E-08	
AST	Tank Group 07	unconfined	SVOC	Chrysene	218-01-9	B2	1.10E-04	NC	NC	NC	NC	8.1E-14	NC	8.1E-15	NC	7.1E-11	NC	
AST	Tank Group 07	unconfined	SVOC	Fluorene	86-73-7	D	4.80E-03	NC	NC	NC	NC	NC	6.2E-07	NC	6.2E-08	NC	5.0E-06	
AST	Tank Group 07	unconfined	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	4.00E-05	NC	NC	NC	NC	2.9E-12	NC	2.9E-13	NC	4.0E-09	NC	
AST	Tank Group 07	unconfined	SVOC	Naphthalene	91-20-3	C	1.30E-01	5.4E-07	1.5E-02	3.3E-09	9.0E-05	6.9E-07	4.7E-02	6.9E-08	4.7E-02	3.1E-06	3.4E-02	
AST	Tank Group 07	unconfined	SVOC	Phenanthrene	85-01-8	D	4.60E-03	NC	NC	NC	NC	NC	7.9E-07	NC	7.9E-08	NC	6.3E-06	
AST	Tank Group 07	unconfined	SVOC	Pyrene	129-00-0	NC	8.60E-04	NC	NC	NC	NC	NC	1.5E-07	NC	1.5E-08	NC	1.7E-06	
AST	Tank Group 07	unconfined	INORG	Lead	7439-92-1	B2	7.91E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Evergreen	Tank Group 07	unconfined	VOC	Benzene	71-43-2	A	3.34E+02	7.3E-04	8.7E+00	4.3E-06	5.1E-02	7.9E-04	2.4E+01	7.9E-05	8.4E+00	1.1E-02	5.4E+01	
Evergreen	Tank Group 07	unconfined	VOC	Cumene	98-82-8	D	1.14E+01	NC	1.8E-02	NC	1.0E-04	NC	3.8E-02	NC	3.8E-02	NC	3.1E-02	
Evergreen	Tank Group 07	unconfined	VOC	Ethyl Benzene	100-41-4	D	9.53E-01	NC	6.3E-04	NC	3.7E-06	NC	3.6E-03	NC	2.4E-03	NC	4.7E-02	
Evergreen	Tank Group 07	unconfined	VOC	Methyl tert-butyl ether	1634-04-4	C	8.50E-03	4.1E-10	1.5E-06	2.5E-12	8.9E-09	4.8E-10	4.5E-06	4.8E-11	4.5E-06	4.0E-09	1.9E-05	
Evergreen	Tank Group 07	unconfined	VOC	Toluene	108-88-3	ID	5.13E+01	NC	7.3E-03	NC	4.3E-05	NC	1.1E-01	NC	2.5E-02	NC	2.1E-01	
Evergreen	Tank Group 07	unconfined	VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.23E+00	NC	1.3E-02	NC	7.4E-05	NC	2.7E-02	NC	8.2E-03	NC	1.4E-02	
Evergreen	Tank Group 07	unconfined	VOC	1,3,5-Trimethylbenzene	108-67-8	ID	3.62E+01	NC	4.0E-03	NC	2.3E-05	NC	8.1E-03	NC	2.4E-03	NC	4.1E-03	
Evergreen	Tank Group 07	unconfined	VOC	Xylenes (total)	1330-20-7	ID	1.60E+00	NC	1.2E-02	NC	7.0E-05	NC	2.4E-02	NC	9.4E-03	NC	4.3E-02	
Evergreen	Tank Group 07	unconfined	SVOC	Anthracene	120-12-7	ID	2.48E-02	NC	NC	NC	NC	NC	4.2E-07	NC	1.3E-07	NC	1.1E-05	
Evergreen	Tank Group 07	unconfined	SVOC	Benzo(a)anthracene	56-55-3	B2	6.60E-02	NC	NC	NC	NC	4.8E-09	NC	4.8E-10	NC	6.3E-06	NC	
Evergreen	Tank Group 07	unconfined	SVOC	Benzo(a)pyrene	50-32-8	HC	1.15E-01	NC	NC	NC	NC	8.4E-08	2.0E-03	8.4E-09	2.0E-03	1.1E-04	2.6E-01	
Evergreen	Tank Group 07	unconfined	SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.61E-01	NC	NC	NC	NC	1.2E-08	NC	1.2E-09	NC	1.0E-05	NC	
Evergreen	Tank Group 07	unconfined	SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.18E-01	NC	NC	NC	NC	NC	2.0E-05	NC	2.0E-06	NC	2.7E-04	
Evergreen	Tank Group 07	unconfined	SVOC	Chrysene	218-01-9	B2	1.49E-01	NC	NC	NC	NC	1.1E-10	NC	1.1E-11	NC	9.6E-08	NC	
Evergreen	Tank Group 07	unconfined	SVOC	Fluorene	86-73-7	D	5.10E-02	NC	NC	NC	NC	NC	6.5E-06	NC	6.5E-07	NC	5.3E-05	
Evergreen	Tank Group 07	unconfined	SVOC	Naphthalene	91-20-3	C	5.73E-02	2.4E-07	6.5E-03	1.4E-09	4.0E-05	3.1E-07	2.1E-02	3.1E-08	2.1E-02	1.4E-06	1.5E-02	
Evergreen	Tank Group 07	unconfined	SVOC	Phenanthrene	85-01-8	D	9.65E-02	NC	NC	NC	NC	NC	1.7E-05	NC	1.7E-06	NC	1.3E-04	
Evergreen	Tank Group 07	unconfined	SVOC	Pyrene	129-00-0	NC	2.65E-01	NC	NC	NC	NC	NC	4.5E-05	NC	4.5E-06	NC	5.4E-04	
Evergreen	Tank Group 07	unconfined	INORG	Lead	7439-92-1	B2	1.66E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Evergreen	Tank Group 07	lower aquifer	VOC	Methyl tert-butyl ether	1634-04-4	C	1.20E-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.7E-09	2.7E-05
Evergreen	Tank Group 07	lower aquifer	SVOC	Anthracene	120-12-7	ID	4.20E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	1.8E-07
Evergreen	Tank Group 07	lower aquifer	SVOC	Benzo(a)anthracene	56-55-3	B2	4.40E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2E-09	NC
Evergreen	Tank Group 07	lower aquifer	SVOC	Chrysene	218-01-9	B2	3.40E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2E-11	NC
Evergreen	Tank Group 07	lower aquifer	SVOC	Fluorene	86-73-7	D	2.30E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	2.4E-06
Evergreen	Tank Group 07	lower aquifer	SVOC	Naphthalene	91-20-3	C	6.13E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5E-09	1.6E-05
Evergreen	Tank Group 07	lower aquifer	SVOC	Phenanthrene	85-01-8	D	2.40E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	3.3E-06
Evergreen	Tank Group 07	lower aquifer	SVOC	Pyrene	129-00-0	NC	4.30E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	8.7E-07
Evergreen	Tank Group 07	lower aquifer	INORG	Lead	7439-92-1	B2	6.40E-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NC	NC

Notes:

- Only constituents detected in each area are shown.
- Single-chemical cancer risk and hazard quotient (HQ) estimates in excess of PADEP's thresholds for cumulative cancer risk and HI of 1E-4 and 1, respectively, are shaded and bold.
- Single-chemical cancer risk and HQ estimates in excess of 1/10 PADEP's thresholds for cumulative cancer risk or HI of 1E-4 and 1, respectively, are italic and bold
- NA - Deeper groundwater exposure pathway is incomplete.
- NC - Risk and HQ estimates were not calculated for detected chemicals with inadequate toxicity or physical/chemical parameters or where chemical concentrations were non-detect
- The concentrations for the Xylene isomers (m/p and o) were summed to Xylenes (total).
- Chem Group - chemical group
- Carc Class - USEPA Weight-of-Evidence Cancer Classification

Attachment 8

Groundwater Contaminant Transport

Table 1 – Quick Domenico Model Worksheet for TG07-MW-05 (Benzene - Exceeding Resident Nonpotable Use)

Table 2 – Quick Domenico Model Worksheet for TG07-MW-05 (Cumene - Exceeding Groundwater Migration to Surface Water)

Table 3 – Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Construction Worker Direct Contact)

Table 4 – Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Groundwater Migration to Surface Water)

Table 5 – Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Maintenance Worker GW Contact)

Table 6 – Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Resident Nonpotable Use)

Table 7 – Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Routine Worker Vapor Intrusion)

Table 8 – Quick Domenico Model Worksheet for TG07-MW-07 (Cumene - Exceeding Groundwater Migration to Surface Water)



Table 1

Quick Domenico Model Worksheet for TG07-MW-05 (Benzene - Exceeding Resident Nonpotable Use)
 Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL										
Project:	Former Philadelphia Refinery TG07-MW-05									
Date:	1/24/2023	Prepared by:	Alexander Strohl							
		Contaminant:	Benzene - Exceeding Resident Nonpotable Use							
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)			
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)			
(MG/L)			>=.001	day-1	(ft)	(ft)				
	11	1.00E+02	1.00E+01	1.00E-04	0.00096	50	30	11000		
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V			
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)			
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)			
	1.21E+01	0.00244	0.3	1.7	58	2.00E-03	1.657333333	0.059380531		
Point Concentration										
x(ft)	y(ft)	z(ft)								
72	0	0								
	x(ft)	y(ft)	z(ft)							
Conc. At	72	0	0							
at	11000	days =								
			2.889							
			mg/l							
	AREAL	CALCULATION								
	MODEL	DOMAIN								
	Length (ft)	100								
	Width (ft)	24								
	10	20	30	40	50	60	70	80	90	100
24	5.325	4.743	4.187	3.675	3.224	2.832	2.492	2.199	1.944	1.722
12	8.237	6.568	5.401	4.525	3.841	3.294	2.846	2.475	2.163	1.898
0	9.309	7.296	5.875	4.848	4.072	3.464	2.975	2.574	2.241	1.961
-12	8.237	6.568	5.401	4.525	3.841	3.294	2.846	2.475	2.163	1.898
-24	5.325	4.743	4.187	3.675	3.224	2.832	2.492	2.199	1.944	1.722
Field Data:	Centerline C Concentration			11						
	Distance from Source			0						

NEW QUICK_DOMENICO.XLS

 SPREADSHEET APPLICATION OF
 "AN ANALYTICAL MODEL FOR
 MULTIDIMENSIONAL TRANSPORT OF A
 DECAYING CONTAMINANT SPECIES"
 P.A. Domenico (1987)
 Modified to Include Retardation

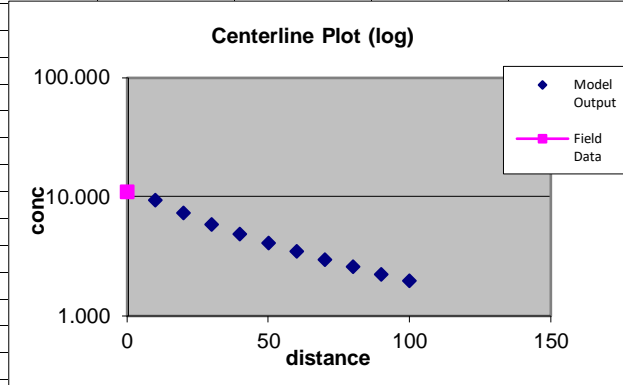
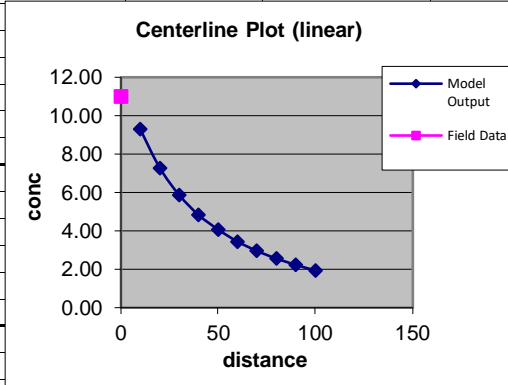
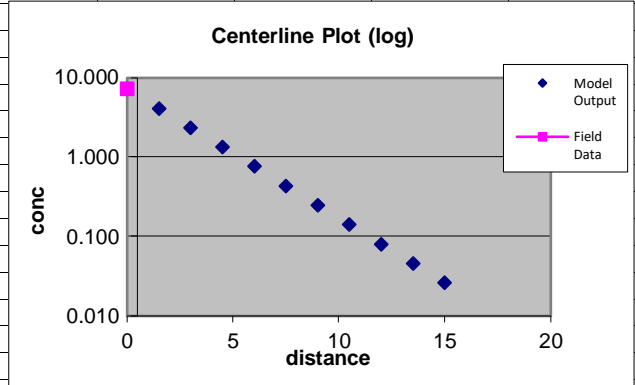
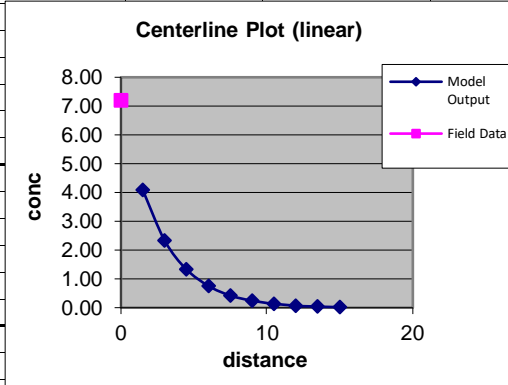


Table 2

Quick Domenico Model Worksheet for TG07-MW-05 (Cumene - Exceeding Groundwater Migration to Surface Water)
 Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL							
Project:	Former Philadelphia Refinery TG07-MW-05						
Date:	1/24/2023	Prepared by:	Alexander Strohl				
		Contaminant:	Cumene - Exceeding GWMtSW				
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)
(MG/L)			>=.001	day-1	(ft)	(ft)	
	7.2	1.00E+02	1.00E+01	1.00E-04	0.04332	100	30
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)
	1.21E+01	0.00244	0.3	1.7	2800	2.00E-03	32.73333333
							0.003006517
NEW QUICK_DOMENICO.XLS SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation							
Point Concentration							
x(ft)	y(ft)	z(ft)					
3	0	0					
	x(ft)	y(ft)	z(ft)				
Conc. At	3	0	0				
at	11000	days =					
			2.340				
			mg/l				
	AREAL	CALCULATION					
	MODEL	DOMAIN					
	Length (ft)	15					
	Width (ft)	100					
	1.5	3	4.5	6	7.5	9	10.5
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	2.052	1.170	0.667	0.380	0.217	0.124	0.070
0	4.105	2.340	1.334	0.761	0.434	0.247	0.141
							0.080
-50	2.052	1.170	0.667	0.380	0.217	0.124	0.070
							0.040
-100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
							0.023
							0.013
Field Data:	Centerline C Concentration			7.2			
	Distance from Source			0			



Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Construction Worker Direct Contact)

Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL							
Project:	Former Philadelphia Refinery TG07-MW-07						
Date:	1/24/2023	Prepared by:	Alexander Strohl				
		Contaminant:	Benzene - Exceeding Construction Worker Direct Contact				
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)
(MG/L)			>=.001	day-1	(ft)	(ft)	
	240	1.00E+02	1.00E+01	1.00E-04	0.00096	80	30
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)
	1.21E+01	0.00244	0.3	1.7	58	2.00E-03	1.657333333
							0.059380531
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p style="text-align: center;">NEW QUICK_DOMENICO.XLS</p> <p style="text-align: center;">SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation</p> </div>							
Point Concentration							
x(ft)	y(ft)	z(ft)					
151	0	0					
	x(ft)	y(ft)	z(ft)				
Conc. At	151	0	0				
at	11000	days =					
			34.602				
			mg/l				
	AREAL	CALCULATION					
	MODEL	DOMAIN					
	Length (ft)	175					
	Width (ft)	105					
	17.5	35	52.5	70	87.5	105	122.5
105	0.053	1.242	3.416	5.382	6.731	7.467	7.712
52.5	51.976	56.370	52.952	47.435	41.504	35.831	30.686
0	199.535	154.088	119.244	93.570	74.342	59.656	48.251
-52.5	51.976	56.370	52.952	47.435	41.504	35.831	30.686
-105	0.053	1.242	3.416	5.382	6.731	7.467	7.712
Field Data:	Centerline C Concentration			240			
	Distance from Source			0			

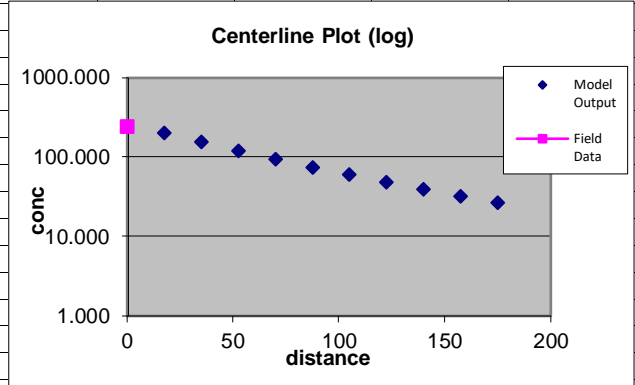
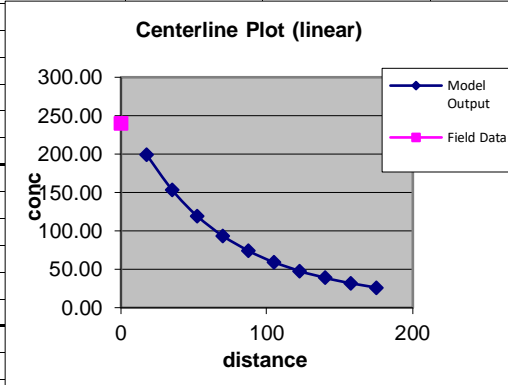


Table 4

Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Groundwater Migration to Surface Water)

Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL							
Project:	Former Philadelphia Refinery TG07-MW-07						
Date:	1/24/2023	Prepared by:	Alexander Strohl				
		Contaminant:	Benzene - Exceeding GWMtSW				
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)
CONC	(ft)	(ft)	(ft)		WIDTH	THICKNESS	(days)
(MG/L)			>=.001	day-1	(ft)	(ft)	
	240	1.00E+02	1.00E+01	1.00E-04	0.00096	85	30
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)
	1.21E+01	0.00244	0.3	1.7	58	2.00E-03	1.657333333
							0.059380531
Point Concentration							
x(ft)	y(ft)	z(ft)					
49	0	0					
	x(ft)	y(ft)	z(ft)				
Conc. At	49	0	0				
at	11000	days =					
			129.580				
			mg/l				
	AREAL	CALCULATION					
	MODEL	DOMAIN					
	Length (ft)	50					
	Width (ft)	85					
	5	10	15	20	25	30	35
85	0.002	0.292	1.490	3.389	5.542	7.656	9.588
42.5	114.913	110.042	105.378	100.909	96.619	92.489	88.498
0	229.822	219.500	207.776	195.043	182.183	169.763	158.054
-42.5	114.913	110.042	105.378	100.909	96.619	92.489	88.498
-85	0.002	0.292	1.490	3.389	5.542	7.656	9.588
							11.281
							12.722
							13.922
Field Data:	Centerline C Concentration		240				
	Distance from Source		0				

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SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

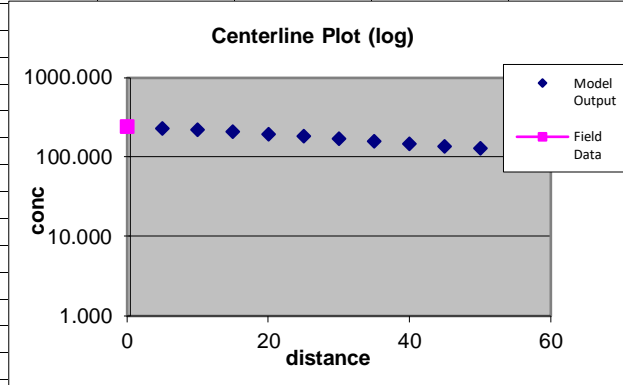
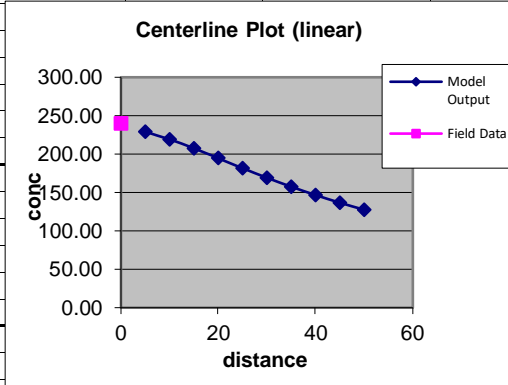


Table 5

Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Maintenance Worker GW Contact)

Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL																																																																																											
Project:	Former Philadelphia Refinery TG07-MW-07																																																																																										
Date:	1/24/2023	Prepared by:	Alexander Strohl																																																																																								
		Contaminant:	Benzene - Exceeding Maintenance Worker GW Contact																																																																																								
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)																																																																																				
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)																																																																																				
(MG/L)			>=.001	day-1	(ft)	(ft)																																																																																					
	240	1.00E+02	1.00E+01	1.00E-04	0.00096	80	30																																																																																				
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V																																																																																				
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)																																																																																				
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)																																																																																				
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NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL																																														
Project:	Former Philadelphia Refinery TG07-MW-07																																													
Date:	1/24/2023	Prepared by:	Alexander Strohl																																											
		Contaminant:	Benzene - Exceeding Resident Nonpotable Use																																											
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)																																							
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)																																							
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Table 7

Quick Domenico Model Worksheet for TG07-MW-07 (Benzene - Exceeding Routine Worker Vapor Intrusion)

Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL							
Project:	Former Philadelphia Refinery TG07-MW-07						
Date:	1/24/2023	Prepared by:	Alexander Strohl				
		Contaminant:	Benzene - Exceeding Routine Worker VI				
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)
(MG/L)			>=.001	day-1	(ft)	(ft)	
	240	1.00E+02	1.00E+01	1.00E-04	0.00096	80	30
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)
	1.21E+01	0.00244	0.3	1.7	58	2.00E-03	1.657333333
							0.059380531
Point Concentration							
x(ft)	y(ft)	z(ft)					
148	0	0					
	x(ft)	y(ft)	z(ft)				
Conc. At	148	0	0				
at	11000	days =					
			35.812				
			mg/l				
	AREAL	CALCULATION					
	MODEL	DOMAIN					
	Length (ft)	175					
	Width (ft)	105					
	17.5	35	52.5	70	87.5	105	122.5
105	0.053	1.242	3.416	5.382	6.731	7.467	7.712
52.5	51.976	56.370	52.952	47.435	41.504	35.831	30.686
0	199.535	154.088	119.244	93.570	74.342	59.656	48.251
-52.5	51.976	56.370	52.952	47.435	41.504	35.831	30.686
-105	0.053	1.242	3.416	5.382	6.731	7.467	7.712
Field Data:	Centerline C Concentration			240			
	Distance from Source			0			

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

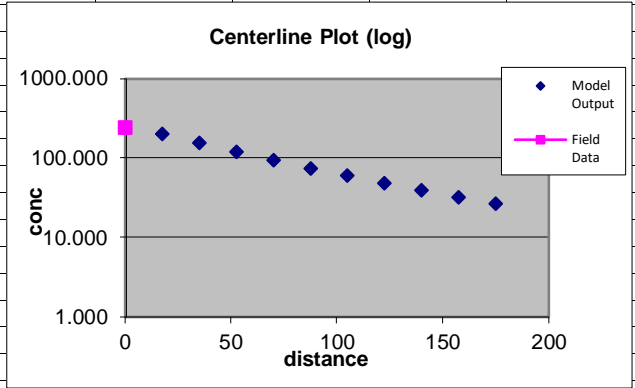
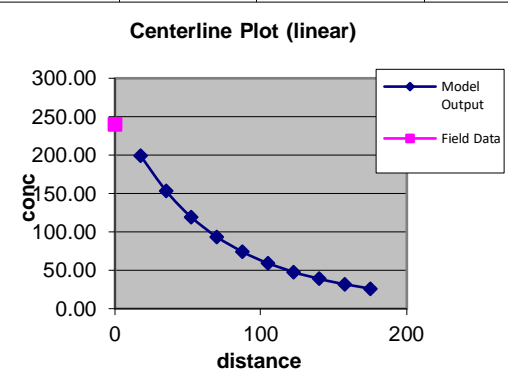


Table 8

Quick Domenico Model Worksheet for TG07-MW-07 (Cumene - Exceeding Groundwater Migration to Surface Water)

Philadelphia Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

QUICK DOMENICO

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION, 1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL							
Project:	Former Philadelphia Refinery TG07-MW-07						
Date:	1/24/2023	Prepared by:	Alexander Strohl				
		Contaminant:	Cumene - Exceeding GWMtSW				
SOURCE	Ax	Ay	Az	LAMBDA	SOURCE	SOURCE	Time (days)
CONC	(ft)	(ft)	(ft)	(ft)	WIDTH	THICKNESS	(days)
(MG/L)			>=.001	day-1	(ft)	(ft)	
	5.3	1.00E+02	1.00E+01	1.00E-04	0.04332	100	30
Hydraulic	Hydraulic		Soil Bulk		Frac.	Retard-	V
Cond	Gradient	Porosity	Density	KOC	Org. Carb.	ation	(=K*i/n*R)
(ft/day)	(ft/ft)	(dec. frac.)	(g/cm³)			(R)	(ft/day)
	1.21E+01	0.00244	0.3	1.7	2800	2.00E-03	32.73333333
							0.003006517
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>NEW QUICK_DOMENICO.XLS</p> <p>SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation</p> </div>							
Point Concentration							
x(ft)	y(ft)	z(ft)					
2	0	0					
	x(ft)	y(ft)	z(ft)				
Conc. At	2	0	0				
at	11000	days =					
			2.505				
			mg/l				
	AREAL	CALCULATION					
	MODEL	DOMAIN					
	Length (ft)	15					
	Width (ft)	100					
	1.5	3	4.5	6	7.5	9	10.5
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	1.511	0.861	0.491	0.280	0.160	0.091	0.052
0	3.022	1.723	0.982	0.560	0.319	0.182	0.104
-50	1.511	0.861	0.491	0.280	0.160	0.091	0.052
-100	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data:	Centerline C Concentration		5.3				
	Distance from Source		0				

Centerline Plot (linear)

Distance (ft)	Concentration (mg/l)
0	5.3 (Field Data)
1.5	0.000 (Model Output)
3	0.000 (Model Output)
4.5	0.000 (Model Output)
6	0.000 (Model Output)
7.5	0.000 (Model Output)
9	0.000 (Model Output)
10.5	0.000 (Model Output)
12	0.000 (Model Output)
13.5	0.000 (Model Output)
15	0.000 (Model Output)

Centerline Plot (log)

Distance (ft)	Concentration (mg/l)
0	5.3 (Field Data)
1.5	0.000 (Model Output)
3	0.000 (Model Output)
4.5	0.000 (Model Output)
6	0.000 (Model Output)
7.5	0.000 (Model Output)
9	0.000 (Model Output)
10.5	0.000 (Model Output)
12	0.000 (Model Output)
13.5	0.000 (Model Output)
15	0.000 (Model Output)

Appendix B

Risk-Based Screening Level Supporting Information and Calculations



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- 1 Risk Based Screening Levels
- 2 Routine Worker Risk Based Screening Level Calculations
- 3 Construction Worker Risk Based Screening Level Calculations
- 4 Soil Migration to Groundwater Screening Level Calculations
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- 6 Nonpotable Groundwater Use Risk Based Screening Level Calculations



1 Introduction

Terraphase Engineering, Inc. (Terraphase), on behalf of Philadelphia Energy Solutions Refining and Marketing LLC (PESRM), has prepared this appendix to document the calculation of site-specific risk-based screening levels (RBSLs) for soil and groundwater. The RBSLs have been developed to support investigation decision-making at the Facility and determine the adequacy of data collected to support site-specific risk assessments which will be performed to close out areas of the Facility which are subject to various investigation/remedial action as part of redevelopment. This includes efforts to complete Site Assessment and Characterization for aboveground storage tanks under Act 32, efforts to investigate and obtain liability protection for several areas with suspected releases to the environment in accordance with Act 2, and efforts to investigate and attain closure of hazardous waste units in accordance with the Code of Federal Regulations Title 40, Part 264 Subpart G (as incorporated by reference in 25 Pa. Code Chapter 264a).

The RBSLs are developed with consideration for current and reasonably expected future land and groundwater use at and in the immediate vicinity of the Facility and use methods and assumptions consistent with Pennsylvania Department of Environmental Protection (PADEP) and United States Environmental Protection Agency (USEPA) risk assessment guidance.

RBSLs are developed for the following exposure scenarios:

Soil Exposure

- Routine worker exposure to constituents of potential concern (COPC) in soil via direct contact¹ and vapor intrusion
- Construction worker exposure to COPC in soil via direct contact
- Migration of COPC in soil to groundwater²

Groundwater Exposure

- Routine worker exposure to COPC in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPC in groundwater via direct contact
- Off-site resident exposure to COPC in groundwater via vapor intrusion
- Receptor exposure to COPC in groundwater via nonpotable groundwater use
- Migration of COPC in groundwater to surface water

¹ Includes incidental ingestion and dermal contact with COPCs in soil and inhalation of COPCs in soil-derived vapor and particulates.

² Uses groundwater RBSLs as target groundwater concentrations.



RBSLs are calculated for each of the COPC that have been (or will be) included in the soil and groundwater sampling performed by PESRM. A list of these COPC is provided in Attachment 1, Table 1.

The general assumptions used in the calculation of the human health-based RBSLs are summarized in Attachment 1, Table 2. The exposure factors for each receptor and exposure scenario are presented in Attachment 1, Table 3. Human health-based RBSLs are calculated at a target cancer risk level of 1×10^{-5} and a target noncancer hazard quotient of 0.1 and are presented in Attachment 1, Table 4. The target cancer risk level and target noncancer hazard quotient are used with consideration for the risk management goals established in Section 250.402(b) for attainment of the Site-Specific Standard (i.e., a cumulative excess cancer risk greater than 1×10^{-4} and a noncancer hazard index greater than 1³).

For efficiency, the RBSLs are developed in a manner that allows them to be used site-wide to complete Site Characterization at each area (e.g., Tank Group).

2 Risk-Based Screening Levels for Soil

This section details how RBSLs for soil are calculated accounting for routine worker (Section 2.1) and construction worker (Section 2.2) exposure scenarios. RBSLs which consider potential soil migration-to-groundwater assuming site-specific target groundwater concentrations are detailed in Section 2.3. The calculation of an RBSL for lead is summarized in Section 2.4.

The resulting RBSLs are presented in Attachment 1, Table 4.

2.1 Routine Workers

The RBSLs were calculated to evaluate commercial/industrial worker exposures to COPC in soil via: (1) direct contact and inhalation during outdoor activities and (2) vapor intrusion.

2.1.1 Exposure to Soil During Outdoor Activities

RBSLs for routine worker exposure to COPC in soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors were estimated from unit risks and unit HQs as described below.

Lifetime Average Daily Dose

The lifetime average daily doses for soil ingestion ($LADD_{ing}$) and soil dermal contact ($LADD_{derm}$) are calculated as follows:

$$LADD_{ing} = C_{soil} \cdot \frac{IR \cdot FC \cdot EF \cdot ED}{BW \cdot AT_c}$$

$$LADD_{derm} = C_{soil} \cdot \frac{SA \cdot AF \cdot ABS_{derm} \cdot FC \cdot EF \cdot ED}{BW \cdot AT_c}$$

³ As estimated from exposure to COPC with the same target organ or target effect.



where C_{soil} is the chemical concentration in soil, IR is the ingestion rate, FC is the fraction of the soil that is contaminated, SA is the exposed skin surface area, AF is the soil-to-skin adherence factor, and ABS_{derm} is the chemical-specific dermal absorption factor.

Average Daily Dose

The average daily doses for soil ingestion (ADD_{ing}) and soil dermal contact (ADD_{derm}) are calculated as follows:

$$ADD_{ing} = C_{soil} \cdot \frac{IR \cdot FC \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

$$ADD_{derm} = C_{soil} \cdot \frac{SA \cdot AF \cdot ABS_{derm} \cdot FC \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Soil Ingestion and Dermal Exposure Routes

For the soil ingestion and dermal exposure routes, the unit cancer risk and unit noncancer HQ are calculated as follows:

$$Unit\ Risk = LADD \cdot SF$$

$$Unit\ HQ = \frac{ADD}{RfD}$$

The resulting RBSLs for each route (i) were calculated as follows:

$$Cancer\ RBSL_i = \frac{C_{unit} \cdot TCRL}{UnitRisk_i}$$

$$Noncancer\ RBSL_i = \frac{C_{unit} \cdot THQ}{UnitHQ_i}$$

The RBSLs for each route (i) are conservatively combined to give cancer and noncancer-based RBSLs that are based upon the combined receptor-specific exposure:

$$RBSL = \left(\sum_i RBSL_i^{-1} \right)^{-1}$$

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the soil ingestion and dermal exposure routes are presented in Attachment 2. The exposure factors used for routine workers are presented in Attachment 1, Table 3. The RBSLs for routine worker exposure to soil are provided in Attachment 1, Table 4.

Estimating Air Concentrations

For the inhalation route, the air concentrations (C_{air}) of vapors and particulates from soil are calculated as follows:



$$C_{air} = J \cdot \frac{C}{Q}$$

where $J \cdot C/Q$ is an air concentration that is normalized to unit concentration (i.e., 1 milligram per kilogram [mg/kg]) in soil. The J term is the normalized average vapor (J_v) or particulate flux ($J_{10,w}$), and the C/Q term is the air concentration normalized to a unit flux (i.e., C/Q is an air dispersion factor).

The normalized average vapor flux J_v of a chemical from unsaturated soil is conservatively estimated using an unsteady-state model derived by Jury et al. (1983). This model conservatively assumes that volatile chemicals are present in the soil to a finite depth equal to the approximate depth to groundwater at the Facility of 19 feet (ft) below ground surface (bgs)⁴. The equation for J_v is given by:

$$J_v = \frac{C_0}{T} \left[Z_1 \operatorname{erfc} \left(\frac{Z_1}{2\sqrt{D_E T}} \right) + 2 \sqrt{\frac{D_E T}{\pi}} \left(1 - e^{-\frac{Z_1^2}{4D_E T}} \right) \right]$$

where,

$$D_E = \frac{D_G H + D_L}{\rho_b K_d + \theta_w + \theta_a H}$$

$$D_G = D_{air} \cdot \frac{\theta_a^{10/3}}{n^2}$$

$$D_L = D_{water} \cdot \frac{\theta_w^{10/3}}{n^2}$$

$C_{s,0}$ is the concentration in soil, ρ_b is the soil bulk density, T is the averaging period (equivalent to ED), H is the Henry's law constant, K_d is the equilibrium-partitioning coefficient, θ_w is the water-filled soil porosity, θ_a is the air-filled soil porosity, D_{air} is diffusion rate through air, D_{water} is the diffusion rate through water, and n is total porosity. For this risk assessment, Henry's law constants have been adjusted to reflect a specific subsurface temperature of 18°C (PADEP 2021).

Derivation of these equations and definition of the equation parameters can be found in the Jury et al. 1983 journal article and in USEPA guidance (1996a, 1996b), and therefore, are not repeated here. The calculation of J_v was performed using values for chemical-specific parameters and default soil parameters recommended in the USEPA guidance (2004a) using a soil type of sand, which is

⁴ Depth to groundwater varies across the Facility. 19 ft bgs is the average depth to groundwater in Tanks Groups 02, 03, 04, and 05. The average depth to groundwater in Tank Group 01 is 10 ft bgs. The average depth to groundwater in Tank Groups 06, 07, and 08 is 3 ft bgs. Using a depth to groundwater of 19 ft bgs results in the most conservative RBSLs for this exposure route in comparison to using groundwater depths observed at other areas of the Facility.



representative of the soil type found at the Facility. The calculation of J_v is shown in Attachment 2, Table 1.

The normalized average particulate flux $J_{10,w}$ of a chemical from soil is conservatively estimated using the “unlimited reservoir” model that USEPA has adapted for screening-level analysis of particulate emissions from soil (USEPA 1996a, 1996b). This model assumes that particulate emissions are created by wind erosion. The equation for $J_{10,w}$ is given by:

$$J_{10,w} = 0.036 \cdot (1 - G) \cdot \left(\frac{u_m}{u_t}\right)^3 \cdot F(x) \frac{g}{m^2 hr} \cdot \frac{hr}{60^2 sec} \cdot \frac{10^{-3} kg}{g}$$

where G is fraction of ground/vegetative cover, u_m is the mean annual wind speed at the nearest weather station which is located in Philadelphia, Pennsylvania (NOAA 2018), u_t is the equivalent threshold wind speed at the anemometer height at which u_m was measured in Philadelphia, Pennsylvania, and $F(x)$ is a function dependent on u_m/u_t . The details of this model can be found in USEPA guidance (1996a, 1996b), and are not repeated here. The default parameter values recommended in the USEPA guidance (1996a, 1996b) are used with site-specific wind speed in calculating $J_{10,w}$. The calculation of $J_{10,w}$ is shown in Attachment 2, Table 2.

The C/Q term is estimated using the empirical correlation in USEPA’s *Supplemental Soil Screening Guidance* (2002), using the correlation coefficients for Philadelphia, Pennsylvania, and assuming a source area of 70.6 acres. This source area size is a conservative estimate using the largest area evaluated currently being characterized by PESRM. The calculation of C/Q is shown in Attachment 2, Table 4.

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Inhalation Route

For the inhalation route, the inhalation cancer unit risk and noncancer unit HQ are calculated using the chemical concentration in air (C_{air}), as follows:

$$Unit\ Risk_{inh} = C_{air} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

$$Unit\ HQ_{inh} = \frac{C_{air}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

The resulting RBSLs for the inhalation route were calculated as follows:

$$Cancer\ RBSL_{inh} = \frac{C_{unit} \cdot TCRL}{UnitRisk_{inh}}$$

$$Noncancer\ RBSL_{inh} = \frac{C_{unit} \cdot THQ}{UnitHQ_{inh}}$$

The RBSLs for each route (i) were conservatively combined to give cancer and noncancer-based RBSLs that are based upon the combined receptor-specific exposure:



$$RBSL = \left(\sum_i RBSL_i^{-1} \right)^{-1}$$

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the inhalation route are presented in Attachment 2. The exposure factors used for routine workers are presented in Attachment 1, Table 3. The RBSLs for routine worker exposure to soil are provided in Attachment 1, Table 4.

2.1.2 Vapor Intrusion

RBSLs for routine worker exposure to COPC in soil via vapor intrusion were estimated from unit risks and unit HQs in accordance with the general methodology described in Section 2.1.1.

Modeling Vapor Intrusion from Soil

For the indoor air exposure pathway, the unit cancer risk and unit noncancer HQ are calculated as follows:

$$Unit\ Risk = C_{building} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

$$Unit\ HQ = \frac{C_{building}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

where $C_{building}$ is the concentration in indoor air. For assessing routine worker exposures, chronic $RfCs$ are used. The indoor air concentration is estimated using the modeling approach and input parameter values discussed below.

The indoor air concentrations are estimated using the following relationships described by Johnson and Ettinger (1991):

$$C_{building} = \alpha \cdot C_{source}$$

where α is an attenuation coefficient and C_{source} is the source vapor concentration that is given by the following equation:

$$C_{source} = C_{soil} \left(\frac{K_d}{H} + \frac{\theta_w}{\rho_b H} + \frac{\theta_a}{\rho_b} \right)^{-1}$$

The attenuation coefficient, assuming that chemicals are present in the soil at constant concentrations, is given by the following equation:

$$\alpha = \frac{\left[\frac{D_T^{eff} A_B}{Q_{building} L_T} \right] \exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right)}{\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right) + \left[\frac{D_T^{eff} A_B}{Q_{building} L_T} \right] + \left[\frac{D_T^{eff} A_B}{Q_{soil} L_T} \right] \left[\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}} \right) - 1 \right]}$$



Derivation of this equation and definition of the equation parameters can be found in Johnson and Ettinger's 1991 journal article and therefore are not repeated here.

The effective diffusion coefficient term D_T^{eff} in the equation for the attenuation coefficient α is calculated using a soil-water profile that is estimated using a soil type of sand, which is a conservative assumption for the range of soil types found at the Facility. The soil-water profile in the vadose zone is estimated using the van Genuchten soil-water retention equation with default water retention parameters appropriate for sand (USEPA 2004a). It is conservatively assumed that the building cracks are filled with sand. These parameters and the resulting soil-water profile in the vadose zone are shown in Attachment 2 of this appendix.

The remaining parameters in the equation for the attenuation coefficient α , which relate to building characteristics, are conservatively based on the default values for a slab-on-grade nonresidential building with an air exchange rate (ER) of 0.60 per hour as recommended by PADEP (2021). The values used in the calculations are shown in Attachment 2 of this appendix and their bases are discussed in PADEP (2021) and USEPA (2004a) guidance.

Indoor air concentrations from the soil vapor intrusion are calculated with a mass balance check. The mass balance check ensures that the assumed mass of a chemical infiltrating into the building over the assumed exposure period does not exceed an upper-bound estimate of the chemical's mass in the vadose zone underlying the building. The upper-bound estimate of the constituent's mass in the vadose zone is conservatively estimated using the highest concentration of the constituent from any depth at each area and assuming this concentration represents the soil concentration from slab to the water table. The attenuation coefficient α_{ML} used in the mass balance check is given by the following equation:

$$\alpha_{ML} = \left(\frac{\rho_b K_d}{H} + \frac{\theta_w}{H} + \theta_a \right) \cdot \left(\frac{L_B \cdot W_B \cdot \Delta H}{Q_{building} \cdot ED} \right)$$

where L_B is the length of the building, W_B is the width of the building, ΔH is the contaminant thickness (conservatively assumed to be the distance between groundwater and a building foundation (L_{T-gw})), and $Q_{building}$ is the air flow rate through the building. The depth to groundwater is conservatively assumed to be 19 ft bgs⁵. All parameters are shown in Attachment 2 of this appendix.

$Q_{building}$ is a function of the size of the building (or unit) and the amount of air exchanges that occur as a result of operating the air handling and ventilation system. It can be calculated as follows (USEPA 2004a, 2017b):

$$Q_{building} = L_B \cdot W_B \cdot H_B \cdot ER$$

where H_B is the occupied height of the building and ER is the air exchange rate.

⁵ Depth to groundwater varies across the Facility. 19 ft bgs is the average depth to groundwater in Tanks Groups 02, 03, 04, and 05. The average depth to groundwater in Tank Group 01 is 10 ft bgs. The average depth to groundwater in Tank Groups 06, 07, and 08 is 3 ft bgs. Using a depth to groundwater of 19 ft bgs results in the most conservative RBSLs for this exposure route in comparison to using groundwater depths observed at other areas of the Facility.



For $Q_{building}$, the length (10 m), width (10 m), and height (2.44 m) of the generic nonresidential building were assumed, consistent with PADEP's recommended default assumptions for generic slab-on-grade nonresidential buildings (PADEP 2021). A conservative estimate of ER (i.e., 0.60/hr) was assumed based upon PADEP's (2021) recommended default for a generic nonresidential building.

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the inhalation route are presented in Attachment 2 of this appendix. The RBSLs for routine worker exposure to soil are provided in Attachment 1, Table 4.

2.2 Construction Workers

RBSLs for construction worker exposure to COPC in soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors were estimated from unit risks and unit HQs in a manner analogous to the calculation described in Section 2.1.1 for routine workers. The only differences are the use of exposure factors for construction workers and that airborne dust concentrations are estimated as discussed below.

During construction activities the PM_{10} level is set at 50 micrograms per cubic meter, which is the former annual average National Ambient Air Quality Standard for PM_{10} since construction workers are assumed to be performing excavations for a work year. It is conservatively assumed that the PM_{10} concentration would be at this limit every day for the entire period of construction worker exposure.

The unit risk, unit HQ, and resulting RBSL calculations for each COPC are presented in Attachment 3. The exposure factors used for construction workers are presented in Attachment 1, Table 3. The RBSLs for construction worker exposure to soil are provided in Attachment 1, Table 4.

2.3 Soil Migration-to-Groundwater

RBSLs developed to conservatively evaluate the potential for COPC in soil to leach to groundwater at concentrations that may pose an unacceptable risk to human health or the environment are calculated using the methodologies described in the *Soil Screening Guidance: User's Guide* (USEPA 1996a).

RBSLs were calculated using both an "equilibrium partitioning" (also called soil/water partitioning [USEPA 1996a]) and a "leach test" methodology, as described below. For each COPC, the soil screening level corresponding to the more realistic of the two calculation methods is used as a soil migration-to-groundwater screening level. For COPC that are relatively immobile in the subsurface (e.g., semivolatile organic compounds), the equilibrium partitioning method provides a more realistic, yet conservative, soil leachate concentration because it assumes that the chemical concentration in soil remains constant over time (since the chemical is immobile, its concentration in soil does not significantly decrease over time). For chemicals that are relatively mobile (e.g., volatile organic compounds), the leach test method provides a more realistic, yet conservative, soil leachate concentration because it accounts for a finite amount of chemical mass in the soil. These two approaches of estimating soil leachate concentrations are conservative since they ignore attenuation of the chemical concentration in the vadose zone and dilution at the water table.



Equilibrium Partitioning

The soil/water partition equation, which assumes an infinite source of the chemical, can be used to estimate concentrations of chemicals in soil leachate for a given soil concentration.

$$C_{soil} = C_{pw} \left(K_d + \frac{\theta_w + \theta_a H}{\rho_b} \right)$$

In this relationship, C_{soil} is the soil concentration (mg/kg), C_{pw} is the soil leachate concentration (milligrams per liter [mg/L]), K_d is the chemical specific soil-water partition coefficient (liter per kilogram), θ_w is the water-filled soil porosity (unitless), θ_a is the air-filled soil porosity (unitless), H is the chemical-specific Henry's Law constant (unitless), and ρ_b is the dry soil bulk density (kilogram per liter [kg/L]). For organic chemicals, K_d is equal to the product of the chemical-specific soil organic carbon/water partition coefficient, K_{oc} (liter per kg), and the fraction organic carbon in soil, f_{oc} (unitless). For this analysis, the soil properties are based upon sand, the most conservative soil type identified at the Site. Specifically, θ_w is assumed to be 0.05 (liters per liter), θ_a is assumed to be 0.32 (liters per liter), and ρ_b is assumed to be 1.66 kg/L (USEPA 2004a).⁶ The f_{oc} is assumed to be 0.005 (grams per gram) (USEPA 1996a). The chemical-specific K_d , and K_{oc} , and H (and their sources) used are presented in Attachment 4.

Leach Test Method

USEPA's leach test method (SW-846, Method 1312)⁷ can be simulated by assuming a hypothetical worst-case leach test outcome in which the entire mass of the chemical in soil is extracted into the leaching fluid. With this assumption, the concentration of the COPC in soil can be divided by 20 (which is the ratio of the mass of leaching fluid to the mass of soil in the leaching test protocol) to estimate its leachate concentration as follows:

$$C_{soil} = C_{pw} \times \frac{mr_{fluid:solid}}{\rho_{fluid}}$$

In the relationship above, C_{soil} is the soil concentration (mg/kg), C_{pw} is the soil leachate concentration (mg/L), $mr_{fluid:solid}$ (kilogram per kilogram) is the mass ratio of the extraction fluid to soil used in the leach test (i.e., 20 kg fluid per 1 kg soil), and ρ_{fluid} (kg/L) is the density of the extraction fluid (assumed to be 1 kg/L).

Dilution Attenuation Factor and Calculation of Soil Migration to Groundwater Screening Levels

As soil leachate moves through soil and groundwater, chemical concentrations are attenuated. The reduction in concentrations can be expressed by a dilution attenuation factor (DAF) defined as a ratio of soil leachate concentration to receptor point concentration (USEPA 1996a).

⁶ Water-filled and air-filled porosity were estimated using the soil properties for sand (USEPA 2004) and the van Genuchten equation (van Genuchten 1980), assuming a depth to groundwater of 19 ft.

⁷ Method 1312: Synthetic Precipitation Leaching Procedure, <https://www.epa.gov/sites/production/files/2015-12/documents/1312.pdf>.



Rather than independently model leachate migration to calculate a site-specific *DAF*, a generic *DAF* of 20 was conservatively used in the development of the RBSLs. This default *DAF* is recommended by USEPA (1996a) for contaminated soil sources up to 0.5 acres.

To calculate soil migration to groundwater screening levels, the equations presented above can be further refined as follows:

$$C_{soil-SPLP} = C_{pw} \times \frac{m_{fluid:solid}}{\rho_{fluid}} \times DAF$$

$$C_{soil-Kd} = C_{pw} \left(K_d + \frac{\theta_w + \theta_a H}{\rho_b} \right) \times DAF$$

By substituting target groundwater concentrations for C_{pw} in the leach test method and equilibrium-partitioning method equations, and assuming a *DAF*, two possible soil screening levels are calculated. The higher of the two estimated values was used as the RBSL as the higher represents the more realistic, yet conservative, soil screening level for this pathway.

The target groundwater concentration for these screening levels is based on the minimum of the following groundwater RBSLs:

- Routine worker exposure to COPC in groundwater via volatilization to outdoor air and vapor intrusion
- Construction worker exposure to COPC in groundwater via direct contact
- Off-site resident exposure to COPC in groundwater via vapor intrusion
- Receptor exposure to COPC in groundwater via nonpotable groundwater use
- Migration of COPC in groundwater to surface water

The acceptable groundwater concentrations are presented in Attachment 4. The soil migration-to-groundwater screening levels are presented in Attachment 1, Table 4.

2.4 Lead

Exposure of routine workers to lead in soil during outdoor activities is evaluated using a screening level of 2,520 mg/kg. This screening level is calculated following USEPA guidance (USEPA 2003), including updates (USEPA 2009, 2017a). The screening level is intended to protect female workers of child-bearing age who contact soil.

The derivation of the industrial soil screening level is presented in Attachment 2, Table 12.



3 Risk-Based Screening Levels for Groundwater

This section details how RBSLs for groundwater are calculated for the routine worker (Section 3.1), construction worker (Section 3.2), and off-facility residential (Section 3.3) exposure scenarios. RBSLs which consider potential off-facility nonpotable groundwater use and surface water exposure are detailed in Sections 3.4 and 3.5, respectively.

The resulting RBSLs are presented in Attachment 1, Table 4.

3.1 Routine Workers

The RBSLs are calculated to evaluate commercial/industrial worker exposures to COPC via: (1) volatilization to outdoor air from groundwater and (2) vapor intrusion from groundwater.

3.1.1 Exposure to Groundwater Via Volatilization to Outdoor Air

RBSLs for routine worker exposure to COPC in groundwater via volatilization to outdoor air were estimated from unit risks and unit HQs in accordance with the general methodology discussed in Section 2.1.1, except for the calculation of the vapor flux J .

Vapor emissions from groundwater (not exposed) are calculated using the steady-state diffusion equation in one-dimension assuming a constant source concentration and a maximum concentration gradient, as follows:

$$J = D_e \cdot \frac{C_v}{L}$$

where D_e is the effective diffusion coefficient of the chemical in the vapor phase, C_v is the vapor concentration in equilibrium with the groundwater concentration, and L is the distance from the water table to the ground surface. The equilibrium “source” vapor concentration in the above equations is related to the chemicals’ groundwater concentration (C_{gw}) using Henry’s law (H):

$$C_{source} = C_{gw} \cdot H$$

D_e for the vapor phase is calculated using a soil-water profile that is estimated using a soil type of sand, the most conservative soil type identified at the Facility. The soil-water profile in the vadose zone, shown in Attachment 2, is estimated using the van Genuchten soil-water retention equation with default water retention parameters appropriate for sand (USEPA 2004a). The depth to groundwater is assumed to be 3 ft bgs⁸.

⁸ Depth to groundwater varies across the Facility. 19 ft bgs is the average depth to groundwater in Tanks Groups 02, 03, 04, and 05. The average depth to groundwater in Tank Group 01 is 10 ft bgs. The average depth to groundwater in Tank Groups 06, 07, and 08 is 3 ft bgs. Using a depth to groundwater of 3 ft bgs results in the most conservative RBSLs for this exposure route in comparison to using groundwater depths observed at other areas of the Facility.



The calculation of D_e is shown in Attachment 2.

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the inhalation route are presented in Attachment 2. The exposure factors used for routine workers are presented in Attachment 1, Table 3. The RBSLs for routine worker exposure to groundwater are provided in Attachment 1, Table 4.

3.1.2 Vapor Intrusion

RBSLs for routine worker exposure to COPC via vapor intrusion from groundwater are estimated from unit risks and unit HQs in accordance with the general methodology described in Section 2.1.2, except for the calculation of source vapor concentration.

The source vapor concentration for a chemical in groundwater is calculated from the chemical's concentration in groundwater C_{gw} using Henry's law as follows:

$$C_{source} = C_{gw} \cdot H$$

In calculating the attenuation coefficient α , the depth to groundwater was conservatively assumed to be 3 ft bgs below the basement slab. The calculation of α is shown in Attachment 2 of this appendix.

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the inhalation route are presented in Attachment 2. The exposure factors used for routine workers are presented in Attachment 1, Table 3. The RBSLs for routine worker exposure to groundwater are provided in Attachment 1, Table 4.

3.2 Construction Workers

RBSLs for construction worker exposure to COPC in groundwater via incidental ingestion, dermal contact, and inhalation of vapors during excavations that extend into the water table are estimated from unit risks and unit HQs in accordance with the general methodology described in Section 2.1.1.

Lifetime Average Daily Dose

The LADD for groundwater ingestion ($LADD_{ing}$) and groundwater dermal contact ($LADD_{derm}$) were calculated as follows:

$$LADD_{ing} = C_{gw} \frac{IR \cdot EF \cdot ED}{BW \cdot AT_c}$$

$$LADD_{derm} = C_{gw} \frac{DA_{event} \cdot SA \cdot EV \cdot EF \cdot ED}{BW \cdot AT_c}$$

where C_{gw} is the chemical concentration in groundwater (assumed to be a unit concentration of 1 mg/L), IR is the groundwater ingestion rate, DA_{event} is the absorbed dose per event, SA is the exposed skin surface area, and EV is the event frequency.



The DA_{event} for organic chemicals is estimated using an unsteady-state approach (USEPA 2004b, Equations 3.2 and 3.3), which is more conservative than the steady-state approach (USEPA 1989), particularly for hydrophobic chemicals. The DA_{event} for inorganic chemicals is estimated using a steady-state approach (USEPA 2004b, Equation 3.4). The details of the calculation of DA_{event} for organic and inorganic chemicals are provided by USEPA (2004b) and not repeated here.

Average Daily Dose

Average daily dose (ADD) for groundwater ingestion (ADD_{ing}) and groundwater dermal contact (ADD_{derm}) were calculated as follows:

$$ADD_{ing} = C_{gw} \frac{IR \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

$$ADD_{derm} = C_{gw} \frac{DA_{event} \cdot SA \cdot EV \cdot EF \cdot ED}{BW \cdot AT_{nc}}$$

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Groundwater Ingestion and Dermal Exposure Routes

For the groundwater ingestion and dermal exposure routes, the unit cancer risk and unit noncancer HQ were calculated as follows:

$$Unit\ Risk = LADD \cdot SF$$

$$Unit\ HQ = \frac{ADD}{RfD}$$

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the groundwater ingestion and dermal exposure routes are presented in Attachment 3. The exposure factors used for construction workers are presented in Attachment 1, Table 3. The RBSLs for construction worker exposure to groundwater are provided in Attachment 1, Table 4.

Estimating Air Concentrations

For the inhalation route, the air concentrations (C_{air}) resulting from the volatilization of COCs from groundwater in an excavation were calculated as follows:

$$C_{air} = J \cdot C/Q$$

Where $J \cdot C/Q$ is an air concentration that is normalized to unit concentration (i.e., 1 mg/L) in groundwater. The J term is the normalized average vapor and the C/Q term is the air concentration normalized to a unit flux (i.e., C/Q is an air dispersion factor).

The normalized vapor flux J of a chemical from groundwater was estimated using an overall mass transfer coefficient that is recommended by USEPA (1995b):

$$J = \left(\frac{1}{k_l} + \frac{1}{Hk_g} \right)^{-1} \left(\frac{m}{10^2 cm} \right) \left(\frac{10^3 L}{m^3} \right)$$



Where k_l and k_g are the liquid-phase and gas-phase mass transfer coefficients given by the following:

$$k_l = \left(\frac{MW_o}{MW}\right)^{0.5} \left(\frac{T}{298K}\right) k_{l,o}$$

$$k_g = \left(\frac{MW_w}{MW}\right)^{0.335} \left(\frac{T}{298K}\right)^{1.005} k_{g,w}$$

Where MW , MW_o , and MW_w are the molecular weights of the chemical, oxygen, and water, respectively, T is the absolute temperature of the groundwater, $k_{l,o}$ is the liquid-phase mass transfer coefficient for oxygen (0.002 centimeters per second), and $k_{g,w}$ is the gas-phase mass transfer coefficient for water vapor (0.833 centimeters per second).

For groundwater exposures during excavations to the water table, C/Q is based on a source area of a 15- by 15-foot excavation area, and an averaging period of 24 hours. The maximum 24-hour average air concentration is estimated from the annual average air concentration by using a conservative factor of 0.4/0.19 or 2.1 (USEPA 2002).

Unit Cancer Risk, Unit Noncancer HQ, and RBSL for Inhalation Route

For the inhalation route, the inhalation cancer unit risk and noncancer unit HQ are calculated using the chemical concentration in air (C_{air}), as follows:

$$Unit\ Risk_{inh} = C_{air} \cdot URF \cdot \frac{ET \cdot EF \cdot ED}{AT_c}$$

$$Unit\ HQ_{inh} = \frac{C_{air}}{RfC} \cdot \frac{ET \cdot EF \cdot ED}{AT_{nc}}$$

The unit risk, unit HQ, and resulting RBSLs calculations for each COPC for the inhalation route are presented in Attachment 3. The exposure factors used for construction workers are presented in Attachment 1, Table 3. The RBSLs for construction worker exposure to groundwater are provided in Attachment 1, Table 4.

3.3 Off-Facility Resident

RBSLs for off-facility resident exposure to COPC via vapor intrusion from groundwater were estimated from unit risks and unit HQs in accordance with the general methodology described in Section 2.1.2 for routine workers. The only differences are the use of exposure factors for off-facility residents and that a depth to groundwater of 19 ft bgs was used, consistent with the average depth to groundwater identified in areas currently being investigated by PESRM that are in closest proximity to off-facility residential areas.⁹

⁹ Tank Groups 02, 03, 04, and 05



The unit risk, unit HQ, and resulting RBSL calculations for each COPC are presented in Attachment 5. The exposure factors used for routine workers are presented in Attachment 1, Table 3. The RBSLs for off-facility resident exposure to groundwater are provided in Attachment 1, Table 4.

3.4 Nonpotable Groundwater Use

Potential exposures to COPC in groundwater via nonpotable groundwater use are evaluated using a hypothetical scenario where groundwater is used to fill a backyard wading pool (“kiddie” pool). This scenario represents a reasonable worst case exposure scenario in which the estimated exposure is expected to be higher than those associated with other nonpotable uses (e.g., watering lawns, washing cars). Potential routes of exposure in this scenario include incidental ingestion, dermal contact, and inhalation of vapors. RBSLs were estimated from unit risks and unit HQs in accordance with the general methodology described in Section 2.1.1 and the following exposure factors:

Exposure Factors

For this evaluation, standard default exposure factors recommended by PADEP and USEPA for estimating RME are used where available and appropriate. Where standard default exposure factors are not available or appropriate for an exposure scenario, the evaluation is conducted using similarly conservative exposure factors that are based on site-specific considerations and professional judgment.

Exposure Frequency and Duration

The exposure frequency for the kiddie pool scenario is 96 days/year, which is based on 4 days per week for the number of months, 6 months, when the average daily temperature is above 65 degrees Fahrenheit in Philadelphia, Pennsylvania (NOAA 2018). Residents are assumed to be exposed to groundwater for 26 years (6 years as children and 20 years as adults; USEPA 2014). This combination of exposure frequency and exposure duration is expected to be conservative for the amount of time that residents would actually spend using groundwater off-facility.

Incidental Water Ingestion

The rate of 0.05 L/hour is the USEPA-recommended value for ingestion of water while swimming (USEPA 1989).

Dermal Contact Rate

The exposed skin surface areas of 6,365 cm² and 19,652 cm² are USEPA’s recommended values for evaluating RME with groundwater by children and adults, respectively (USEPA 2014). Child and adult residents are assumed to wade in the pool for 2 hours per event, and one event per day, based on professional judgment. The absorbed dose for organic chemicals is estimated using the nonsteady-state approach (USEPA 2004b), which is more conservative than the steady-state approach (USEPA 1989), particularly for hydrophobic chemicals. The permeability coefficient (K_p) for dermal absorption of organic chemicals from groundwater is estimated following USEPA guidance (USEPA 2004b).



Water Concentration in Kiddie Pool

The model for estimating vapor emission from a residential kiddie pool is based on models for estimating vapor emissions from open-top batch tanks (USEPA 1995a, 1995b). The residential kiddie pool is modeled as a 6-ft diameter tank that is 9 inches deep and is assumed to be filled with groundwater once per day. The concentration of volatile organic chemicals in the kiddie pool water decreases over time as the chemicals volatilize into the air. The average concentration over a period t is given by:

$$\bar{C}_w = C_{w,o} \frac{d}{K \cdot t} (1 - e^{-Kt/d})$$

where $C_{w,o}$ is the initial concentration, d is the depth of water in the pool and K is the chemical's overall mass transfer coefficient (USEPA 1995b). K is calculated as follows:

$$K = \frac{k_l \cdot H k_g}{k_l + H k_g}$$

where H is the Henry's law constant, and k_l and k_g are the liquid-phase and gas-phase mass transfer coefficients given by the following equations (USEPA 1995a):

$$k_l = 10^{-6} + 144 \cdot 10^{-4} (0.01 u_{10} \sqrt{6.1 + 0.63 u_{10}})^{2.2} S_{c_l}^{-0.5}$$

$$k_g = 4.82 \cdot 10^{-3} u_{10}^{0.78} S_{c_g}^{-0.67} d_e^{-0.11}$$

where S_{c_l} and S_{c_g} are liquid-phase and gas-phase Schmidt numbers, d_e is the effective diameter of the water surface (m), and u_{10} is wind speed at 10 m above the water surface, which is 4.2 m/s based on the annual average wind speed in Philadelphia, Pennsylvania (NOAA 2018).

Air Concentration from Kiddie Pool

The concentration of the chemical in air at the water surface is given by the following:

$$C_{air} = \bar{C}_w \cdot K \cdot (C/Q)$$

The C/Q term is estimated using the empirical correlation in USEPA's *Supplemental Soil Screening Guidance* (2002), using the correlation coefficients for Philadelphia, Pennsylvania, and assuming a source area of a 6 by 6 foot kiddie pool. This air concentration is expected to be higher than actual air concentrations to which individuals would be exposed while in the kiddie pool.

Unit Cancer Risk, Unit Noncancer HQ, and RBSL

The unit risk, unit HQ, and resulting RBSL calculations for each COPC for the groundwater ingestion, dermal, and inhalation of vapor exposure routes are presented in Attachment 6. The RBSLs for off-facility nonpotable groundwater use are provided in Attachment 1, Table 4.



3.5 Groundwater Migration-to-Surface Water

This section explains how groundwater screening levels are derived to support the evaluation of groundwater-to-surface water exposure scenarios.

The groundwater (MtsW) screening levels are based upon specific water quality criteria consistent with the designated water use of the Schuylkill River¹⁰ and the National Recommended Water Quality Criteria for human health consumption of organisms only¹¹. The minimum of these criteria was conservatively selected. Where criteria were not available for a specific chemical, the criteria were selected from the USEPA Region 3 Biological Technical Assistance Group Freshwater Screening Benchmarks¹² or the USEPA Region 4 Ecological Screening Values¹³.

Per the analysis conducted by Baird (2002), a conservative estimate of the groundwater-surface water mixing ratio of 0.0013 (or a dilution factor ~ 1000) was used to conservatively derive groundwater concentrations that would be protective of surface water exposures in the Schuylkill River.

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Attachment 1

Risk Based Screening Levels

Table 1 – Chemicals of Potential Concern (COPC)

Table 2 – General Assumptions

Table 3 – High End Exposure Factors

Table 4 – Site-Specific Risk Based Screening Levels (Target Risk of 1×10^{-5} and HQ of 0.1)



Attachment 1**Table 1:****Constituents of Potential Concern (COPC)**

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN
VOC	Benzene	71-43-2
VOC	Cumene	98-82-8
VOC	1,2-Dibromoethane	106-93-4
VOC	1,2-Dichloroethane	107-06-2
VOC	Ethyl Benzene	100-41-4
VOC	Methyl tert-butyl ether	1634-04-4
VOC	Toluene	108-88-3
VOC	1,2,4-Trimethylbenzene	95-63-6
VOC	1,3,5-Trimethylbenzene	108-67-8
VOC	Xylenes (total)	1330-20-7
SVOC	Acenaphthene	83-32-9
SVOC	Anthracene	120-12-7
SVOC	Benzo(a)anthracene	56-55-3
SVOC	Benzo(a)pyrene	50-32-8
SVOC	Benzo(b)fluoranthene	205-99-2
SVOC	Benzo(g,h,i)perylene	191-24-2
SVOC	Benzo(k)fluoranthene	207-08-9
SVOC	Chrysene	218-01-9
SVOC	Dibenz(a,h)anthracene	53-70-3
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6
SVOC	Ethanol	64-17-5
SVOC	Fluorene	86-73-7
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5
SVOC	Naphthalene	91-20-3
SVOC	Phenanthrene	85-01-8
SVOC	Pyrene	129-00-0
SVOC	Tetraethylene Glycol	112-60-7
PCB	PCBs (total)	1336-36-3
INORG	Antimony	7440-36-0
INORG	Arsenic	7440-38-2
INORG	Chromium III	16065-83-1
INORG	Chromium VI	18540-29-9
INORG	Cyanide (total)	57-12-5
INORG	Lead	7439-92-1
INORG	Nickel	7440-02-0
INORG	Vanadium	7440-62-2

Abbreviations:

Chem Group - chemical group

VOC - volatile organic compounds

SVOC - semi-volatile organic compounds

PCB - polychlorinated biphenyls

INORG - metals

Attachment 1

Table 2:

General Assumptions

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Value	Units	Basis
Exposure Factors	Various	-	High-end exposure factors compiled for each receptor/exposure scenario. Based upon standard default exposure factors used by PADEP [25 Pa Code 250.602(c)(2)] and USEPA (1991, 2011, 2014) for estimating reasonable maximum exposures.
Toxicity Values	Various	-	Compiled in accordance with USEPA (2003)
Target Cancer Risk Level	1x10 ⁻⁵	-	Project-Specific
Target Noncancer Hazard Quotient	0.1	-	Project-Specific
Dispersion Model Correlation Area	Philadelphia	-	Per USEPA (2002)
Emission Area for Soil and Noncontact GW Exposures	70.6	acres	Total area of the largest Tank Group (i.e., Tank Group 04)
Mean Annual Wind Speed	9.3	mph	NOAA (2018), For Philadelphia
Depth to Groundwater			
Tank Group 01	10	ft bgs	Temporal and spatial average depth to groundwater
Tank Group 02, 03, 04, and 05	19	ft bgs	
Tank Group 06, 07, 08	3	ft bgs	
Soil Type	Sand	-	Based upon the extensive presence of fill material across the Site
Fraction Organic Carbon	0.005	unitless	Per PADEP (2021)
Building Parameter Assumptions			
Commercial/Industrial			PADEP (2021) Default
Bldg foundation thickness	0.1	m	
Bldg foundation length	10	m	
Bldg foundation width	10	m	
Bldg occupied height	2.44	m	
Occupied depth below ground	0.15	m	
Air exchange rate	0.6	hr ⁻¹	
Crack radius	1E-03	m	
Distance from contaminated soil to foundation	0.001	m	
Soil gas entry flow rate (Q _{soil})	5	L/min	
Off-Site Residential			
Bldg foundation thickness	0.1	m	
Bldg foundation length	10	m	
Bldg foundation width	10	m	
Bldg occupied height	3.66	m	
Occupied depth below ground	2	m	
Air exchange rate	0.18	hr ⁻¹	
Crack radius	1E-03	m	
Distance from contaminated soil to foundation	0.001	m	
Soil gas entry flow rate (Q _{soil})	5	L/min	

Attachment 1

Table 3:

High-End Exposure Factors

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

		Resident Age 0-2	Resident Age 2-6	Resident Age 6-16	Resident Age 16-26	Routine Worker	Maintenance Worker	Construction Worker
Soil Ingestion								
Ingestion Rate (mg/d)	IR	100	100	50	50	50	100	200
Conversion Factor (kg/mg)	CF	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Fraction Contacted (unitless)	FC	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Exposure Frequency (d/yr)	EF	250	250	250	250	180	30	250
Exposure Duration (yr)	ED	2	4	10	10	25	10	1
Body Weight (kg-bw)	BW	15	15	80	80	80	80	80
Averaging Time, carc (d)	AT _c	25,550	25,550	25,550	25,550	25,550	25,550	25,550
Averaging Time, noncarc (d)	AT _{nc}	9,490	9,490	9,490	9,490	9,125	3,650	365

Soil Dermal Contact								
Adherence Factor (mg/cm ²)	AD	0.2	0.2	0.07	0.07	0.12	0.12	0.12
Skin Surface Area (cm ² /d)	SA	2,373	2,373	6,032	6,032	3,527	3,527	3,527
Conversion Factor (kg/mg)	CF	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Fraction Contacted (unitless)	FC	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Exposure Frequency (d/yr)	EF	250	250	250	250	180	30	250
Exposure Duration (yr)	ED	2	4	10	10	25	10	1
Body Weight (kg-bw)	BW	15	15	80	80	80	80	80
Averaging Time, carc (d)	AT _c	25,550	25,550	25,550	25,550	25,550	25,550	25,550
Averaging Time, noncarc (d)	AT _{nc}	9,490	9,490	9,490	9,490	9,125	3,650	365

Outdoor Air Inhalation of Soil Vapor and/or Particulates								
Exposure Time (h/d)	ET	24	24	24	24	8	8	8
Exposure Frequency (d/yr)	EF	250	250	250	250	180	30	250
Exposure Duration (yr)	ED	2	4	10	10	25	10	1
Averaging Time, carc (h)	AT _c	613,200	613,200	613,200	613,200	613,200	613,200	613,200
Averaging Time, noncarc (h)	AT _{nc}	227,760	227,760	227,760	227,760	219,000	87,600	8,760

Incidental Groundwater Ingestion								
Ingestion Rate (L/hr)	DR						0.005	0.005
Exposure Time (h/d)	ET						2	2
Exposure Frequency (d/yr)	EF						15	15
Exposure Duration (yr)	ED						10	1
Body Weight (kg-bw)	BW						80	80
Averaging Time, carc (d)	AT _c						25,550	25,550
Averaging Time, noncanc (d)	AT _{nc}						3,650	365

Groundwater Dermal Contact								
Event Time (hr)	t						2	2
Skin Surface Area (cm ²)	SA						3,527	3,527
Events per Day (event/d)	EV						1	1
Exposure Frequency (d/yr)	EF						15	15
Exposure Duration (yr)	ED						10	1
Body Weight (kg)	BW						80	80
Averaging Time, cancer (days)	AT _c						25,550	25,550
Averaging Time, noncancer (days)	AT _{nc}						3,650	365

Outdoor Groundwater Vapor Inhalation								
Exposure Time (h/d)	ET	24	24	24	24	8	8	8
Exposure Frequency (d/yr)	EF	250	250	250	250	180	15	15
Exposure Duration (yr)	ED	2	4	10	10	25	10	1
Averaging Time, carc (h)	AT _c	613,200	613,200	613,200	613,200	613,200	613,200	613,200
Averaging Time, noncarc (h)	AT _{nc}	227,760	227,760	227,760	227,760	219,000	87,600	8,760

Indoor Soil and/or Groundwater Vapor Inhalation								
Exposure Time (h/d)	ET	24	24	24	24	8		
Exposure Frequency (d/yr)	EF	350	350	350	350	250		
Exposure Duration (yr)	ED	2	4	10	10	25		
Averaging Time, carc (h)	AT _c	613,200	613,200	613,200	613,200	613,200		
Averaging Time, noncarc (h)	AT _{nc}	227,760	227,760	227,760	227,760	219,000		

Attachment 1

Table 4:

Site-Specific Risk Based Screening Levels (Target Risk of 1x10⁻⁵ and HQ of 0.1)

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Soil				Groundwater					
			Routine Worker Direct Contact (mg/kg)	Routine Worker Vapor Intrusion (mg/kg)	Construction Worker Direct Contact (mg/kg)	Soil MtGW (mg/kg)	Nonpotable Groundwater Use (mg/L)	Routine Worker Volatilization to Outdoor Air (mg/L)	Routine Worker Vapor Intrusion (mg/L)	Construction Worker Direct Contact (mg/L)	Off-Site Resident Vapor Intrusion (mg/L)	Groundwater MTSW (mg/L)
VOC	Benzene	71-43-2	6.3E+01	4.6E-01	8.7E+00	9.8E+01	3.0E-01	5.5E+02	3.8E+00	4.0E+00	2.5E-01	1.3E+02
VOC	Cumene	98-82-8	1.0E+03	6.1E+00	8.7E+01	1.0E+03	3.7E+01	9.1E+03	6.3E+01	3.0E+01	4.0E+00	2.6E+00
VOC	1,2-Dibromoethane	106-93-4	1.2E+00	7.1E-03	1.8E+00	3.2E+00	1.7E-02	1.6E+01	1.1E-01	9.1E-01	7.9E-03	NSW
VOC	1,2-Dichloroethane	107-06-2	1.6E+01	1.1E-01	8.1E+00	3.3E+01	3.3E-01	1.7E+02	1.2E+00	4.9E+00	8.2E-02	3.1E+03
VOC	Ethyl Benzene	100-41-4	2.3E+03	1.5E+01	1.3E+03	8.2E+02	2.0E+00	2.2E+04	1.5E+02	4.0E+01	9.7E+00	1.3E+01
VOC	Methyl tert-butyl ether	1634-04-4	2.4E+03	1.6E+01	3.9E+02	5.9E+03	2.1E+01	2.9E+04	2.1E+02	1.9E+02	1.5E+01	1.1E+04
VOC	Toluene	108-88-3	8.0E+03	7.6E+01	6.5E+02	9.8E+03	2.5E+01	1.0E+05	7.0E+02	2.0E+02	4.5E+01	5.2E+01
VOC	1,2,4-Trimethylbenzene	95-63-6	1.8E+02	9.2E-01	7.0E+01	2.5E+02	8.7E+00	1.4E+03	9.7E+00	1.5E+01	6.3E-01	3.3E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	2.2E+02	9.2E-01	9.9E+01	2.4E+02	8.8E+00	1.3E+03	9.1E+00	1.5E+01	5.9E-01	7.1E+01
VOC	Xylenes (total)	1330-20-7	2.4E+02	1.5E+00	5.1E+01	3.4E+02	3.7E+00	1.9E+03	1.3E+01	1.7E+01	8.6E-01	2.1E+02
SVOC	Acenaphthene	83-32-9	9.3E+03	WIT	9.2E+03	NA	5.7E+01	WIT	WIT	3.9E+03	WIT	9.0E+00
SVOC	Anthracene	120-12-7	4.6E+04	WIT	4.6E+04	NA	2.4E+02	WIT	WIT	1.9E+04	WIT	4.0E+01
SVOC	Benzo(a)anthracene	56-55-3	4.3E+02	NV	3.2E+03	NA	1.0E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Benzo(a)pyrene	50-32-8	4.3E+01	NV	7.7E+00	NA	1.0E-02	NV	NV	5.8E+00	NV	1.3E-03
SVOC	Benzo(b)fluoranthene	205-99-2	4.3E+02	NV	3.2E+03	NA	1.6E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Benzo(g,h,i)perylene	191-24-2	4.6E+03	NV	1.4E+04	NA	4.4E+01	NV	NV	5.8E+03	NV	1.2E-02
SVOC	Benzo(k)fluoranthene	207-08-9	4.3E+03	NV	3.2E+04	NA	9.9E-01	NV	NV	1.4E+04	NV	1.3E-01
SVOC	Chrysene	218-01-9	4.3E+04	NV	3.2E+05	NA	1.6E+01	NV	NV	1.4E+05	NV	1.3E+00
SVOC	Dibenz(a,h)anthracene	53-70-3	4.3E+01	NV	3.2E+02	NA	9.8E-03	NV	NV	1.4E+02	NV	1.3E-03
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	2.0E-01	NV	1.3E+00	2.0E+00	3.9E-05	NV	NV	5.5E-01	NV	NSW
SVOC	Ethanol	64-17-5	1.0E+06	NV	1.0E+06	1.0E+06	1.0E+04	NV	NV	8.3E+05	NV	NSW
SVOC	Fluorene	86-73-7	6.2E+03	WIT	1.8E+04	NA	9.7E+01	WIT	WIT	7.8E+03	WIT	7.0E+00
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	4.3E+02	NV	3.2E+03	NA	1.0E-01	NV	NV	1.4E+03	NV	1.3E-02
SVOC	Naphthalene	91-20-3	4.1E+01	5.4E-01	6.0E+00	2.7E+01	3.9E-01	1.2E+02	8.8E-01	2.8E-01	6.7E-02	4.3E+01
SVOC	Phenanthrene	85-01-8	4.6E+03	WIT	1.4E+04	NA	7.3E+01	WIT	WIT	5.8E+03	WIT	1.0E+00
SVOC	Pyrene	129-00-0	4.6E+03	NV	1.4E+04	NA	5.0E+01	NV	NV	5.8E+03	NV	3.0E+00
SVOC	Tetraethylene Glycol	112-60-7	3.5E+05	NV	9.6E+04	1.2E+05	2.9E+02	NV	NV	3.9E+04	NV	1.9E+05
PCB	PCBs (total)	1336-36-3	3.0E+00	NV	2.3E+00	NA	1.5E-02	NV	NV	9.7E-01	NV	6.4E-04
INORG	Antimony	7440-36-0	1.3E+02	NV	2.3E+01	2.0E+01	2.2E-02	NV	NV	1.4E+00	NV	6.4E+01
INORG	Arsenic	7440-38-2	7.1E+01	NV	1.0E+02	1.2E+01	2.1E-02	NV	NV	5.3E+01	NV	1.4E+00
INORG	Chromium III	16065-83-1	4.6E+05	NV	2.9E+04	1.0E+06	1.1E+01	NV	NV	5.3E+02	NV	7.4E+01
INORG	Chromium VI	18540-29-9	1.8E+02	NV	2.8E+02	1.5E+00	3.9E-03	NV	NV	1.7E+00	NV	1.1E+01
INORG	Cyanide (total)	57-12-5	1.5E+01	8.6E-01	8.8E+00	9.9E+00	3.0E-01	2.4E+01	2.4E-01	2.6E-01	2.5E-02	4.0E+01
INORG	Lead	7439-92-1	2.5E+03	NV	2.5E+03	4.5E+04	IE	NV	NV	IE	NV	2.5E+00
INORG	Nickel	7440-02-0	6.2E+03	NV	7.0E+02	1.7E+03	1.3E+00	NV	NV	8.6E+01	NV	5.2E+01
INORG	Vanadium	7440-62-2	1.6E+03	NV	3.5E+02	2.8E+03	1.4E-01	NV	NV	6.9E+00	NV	1.0E+02

Abbreviations:

Chem Group - chemical group

INORG - metals

SVOC - semi-volatile organic compounds

VOC - volatile organic compounds

MtGW - migration to groundwater

MTSW - migration to surface water

NV - not volatile

WIT - without inhalation toxicity data

NA - not applicable: target groundwater concentration times DAF is greater than constituent's solubility.

IE - inadequate exposure

NSW - no surface water quality criteria available

Attachment 2

Routine Worker Risk Based Screening Level Calculations

Table 1 – Normalized Average Vapor Flux from Soil to Outdoor Air

Table 2 – Soil PM₁₀ Emission from Wind Erosion

Table 3 – Dispersion Factor to Outdoor Air

Table 4 – Concentrations in Outdoor Air from Soil

Table 5a – Unit Risk and Cancer-Based RBSLs for Exposure of Routine Workers to Soil

Table 5b – Unit HQ and Noncancer-Based RBSLs for Exposure of Routine Workers to Soil

Figure 1 – Soil Moisture Profile for Default PADEP Nonresidential Building (Slab-On-Grade)

Table 6 – Normalized Indoor Air Concentrations in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Table 7 – Unit Risk, Unit HQ, and RBSLs for Soil Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Table 8 – Normalized Vapor Flux to Outdoor Air from Groundwater

Table 9 – Unit Risk, Unit HQ, and RBSLs for Exposure of Routine Workers to Groundwater-derived Vapors in Outdoor Air

Table 10 – Normalized Indoor Air Concentrations in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Table 11 – Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Table 12 – Blood Lead Model for Adult Exposure to Lead in Soil



Attachment 2

Table 1:

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	D _G (m ² /d)	D _L (m ² /d)	D _E (m ² /d)	J _v (kg/m ² -s)
VOC	Benzene	71-43-2	5.82E+01		1.68E-01	7.60E-01	8.47E-05	1.23E-01	3.46E-08	3.51E-02	1.11E-05
VOC	Cumene	98-82-8	7.05E+02		3.28E-01	5.62E-01	6.13E-05	9.10E-02	2.51E-08	4.96E-03	9.32E-06
VOC	1,2-Dibromoethane	106-93-4	2.22E+01		2.37E-02	3.72E-01	7.29E-05	6.02E-02	2.98E-08	5.83E-03	9.53E-06
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.92E-02	8.99E-01	8.55E-05	1.46E-01	3.50E-08	2.04E-02	1.07E-05
VOC	Ethyl Benzene	100-41-4	3.67E+02		2.20E-01	6.48E-01	6.74E-05	1.05E-01	2.76E-08	7.27E-03	9.80E-06
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.83E-02	7.42E-01	8.73E-05	1.20E-01	3.57E-08	1.43E-02	1.05E-05
VOC	Toluene	108-88-3	1.80E+02		1.93E-01	7.52E-01	7.43E-05	1.22E-01	3.04E-08	1.46E-02	1.05E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.61E-01	5.24E-01	6.84E-05	8.48E-02	2.80E-08	1.81E-03	7.67E-06
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.54E-01	5.20E-01	7.49E-05	8.42E-02	3.06E-08	8.81E-04	6.17E-06
VOC	Xylenes (total)	1330-20-7	3.86E+02		2.52E-01	6.74E-01	7.56E-05	1.09E-01	3.09E-08	8.23E-03	9.94E-06
SVOC	Acenaphthene	83-32-9	7.14E+03		3.40E-03	3.64E-01	6.64E-05	5.89E-02	2.72E-08	3.38E-06	4.17E-07
SVOC	Anthracene	120-12-7	2.97E+04		1.30E-03	2.80E-01	6.69E-05	4.53E-02	2.74E-08	2.40E-07	1.11E-07
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		5.55E-05	4.41E-01	7.78E-05	7.14E-02	3.18E-08	1.20E-09	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		1.49E-05	3.72E-01	7.78E-05	6.02E-02	3.18E-08	1.11E-10	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		1.66E-03	1.95E-01	4.80E-05	3.16E-02	1.97E-08	5.08E-09	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		1.10E-05	1.88E-01	4.54E-05	3.04E-02	1.86E-08	3.32E-12	
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.16E-05	1.95E-01	4.80E-05	3.16E-02	1.97E-08	3.73E-11	
SVOC	Chrysene	218-01-9	4.01E+05		1.48E-03	2.14E-01	5.37E-05	3.47E-02	2.20E-08	1.54E-08	
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		9.57E-08	1.75E-01	4.48E-05	2.83E-02	1.83E-08	6.71E-13	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	5.03E+05		1.03E-06	6.91E-01	6.91E-05	1.12E-01	2.83E-08	3.45E-11	
SVOC	Ethanol	64-17-5	6.81E-01		1.96E-04	1.06E+00	1.12E-04	1.72E-01	4.60E-08	5.71E-04	
SVOC	Fluorene	86-73-7	1.38E+04		1.39E-03	3.14E-01	6.81E-05	5.08E-02	2.79E-08	6.17E-07	1.78E-07
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		2.03E-05	1.64E-01	4.89E-05	2.66E-02	2.00E-08	1.96E-11	
SVOC	Naphthalene	91-20-3	2.01E+03		1.20E-02	5.10E-01	6.48E-05	8.26E-02	2.65E-08	5.94E-05	1.75E-06
SVOC	Phenanthrene	85-01-8	2.42E+04		1.41E-03	3.24E-01	6.45E-05	5.25E-02	2.64E-08	3.67E-07	1.37E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.00E-04	2.35E-01	6.26E-05	3.81E-02	2.56E-08	8.73E-09	
SVOC	Tetraethylene Glycol	112-60-7	3.00E-02		1.62E-11	4.39E-01	6.96E-05	7.11E-02	2.85E-08	5.30E-07	
PCB	PCBs (total)	1336-36-3	2.45E+06		6.64E-02	1.75E-01	4.32E-05	2.83E-02	1.77E-08	9.22E-08	
INORG	Antimony	7440-36-0		4.50E+01							
INORG	Arsenic	7440-38-2		2.90E+01							
INORG	Chromium III	16065-83-1		1.80E+06							
INORG	Chromium VI	18540-29-9		1.90E+01							
INORG	Cyanide (total)	57-12-5		9.90E+00	1.97E-03	1.35E+00	1.53E-04	2.18E-01	6.26E-08	2.61E-05	1.16E-06
INORG	Lead	7439-92-1		9.00E+02							
INORG	Nickel	7440-02-0		6.50E+01							
INORG	Vanadium	7440-62-2		1.00E+03							

Attachment 2

Table 1:

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Soil bulk density	kg/L	ρ_b	1.66
Soil porosity	L/L-soil	θ	0.38
Soil water content	L/L-soil	θ_w	0.05
Soil air-filled porosity	L/L-soil	θ_a	0.32
Soil organic carbon fraction	unitless	f_{oc}	0.005
Averaging period (Exposure Duration)	years	T	25
	days	T	9125
Temperature	$^{\circ}\text{C}$	Temp	18
Clean soil above source	m	Z_1	
Bottom of source depth	m	Z_2	5.79

Based on the volatilization model developed by Jury et. al. (1983) for finite sources as described in USEPA's (1996) Soil Screening Guidance: Technical Background Document. The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 2

Table 2:

Soil PM₁₀ Emission from Wind Erosion

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Unlimited Reservoir Model

Parameter	Units	Variable	Value
Aerodynamic particle size multiplier			0.036
Ground cover fraction		G	0.5
Mode of aggregate size distribution	mm		0.50
Threshold friction velocity	m/s	u'_t	0.50
Correction factor			1.25
Corrected friction velocity	m/s	u*_t	0.6252
Roughness height	m	z₀	0.005
Anemometer height	m		8.0
Friction velocity at anemometer height	m/s	u_t	11.53
Mean annual wind speed	mph	u_m	9.3
Mean annual wind speed	m/s	u_m	4.16
u_m/u_t			0.361
$x = 0.886 u_t/u_m$			2.46
F(x)			0.064
Annual average PM₁₀ flux	kg-soil/m²-s	J_{10,w}	1.5E-11

Model described in more detail in USEPA's (1996) *Soil Screening Guidance: Technical Background Document* .

Attachment 2

Table 3:

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Soil source area	acres	70.6
		Annual
Soil C/Q averaging time		Max
Conversion factor from 1-Hr Max for soil		0.19
C/Q for soil	(kg/m³)/(kg/m²-s)	25.06

Groundwater source area	acres	70.6000
		Annual
Groundwater averaging time for C/Q		Max
Conversion factor from 1-Hr Max for groundwater		0.19
C/Q for Groundwater	(L/m³)/(L/m²-s)	25.06

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 2

Table 4:

Concentrations in Outdoor Air from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Chem	Chemical	CASRN	C/Q (kg/m ³ per kg/m ² -s):		2.5E+01	
			Vapor		PM ₁₀	
			C _{soil} (mg/kg)	C _{air} (mg/m ³)	C _{soil} (mg/kg)	C _{air} (mg/m ³)
VOC	Benzene	71-43-2	1.00E+00	2.78E-04	1.00E+00	3.73E-10
VOC	Cumene	98-82-8	1.00E+00	2.34E-04	1.00E+00	3.73E-10
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	2.39E-04	1.00E+00	3.73E-10
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	2.69E-04	1.00E+00	3.73E-10
VOC	Ethyl Benzene	100-41-4	1.00E+00	2.46E-04	1.00E+00	3.73E-10
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	2.62E-04	1.00E+00	3.73E-10
VOC	Toluene	108-88-3	1.00E+00	2.63E-04	1.00E+00	3.73E-10
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	1.92E-04	1.00E+00	3.73E-10
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	1.55E-04	1.00E+00	3.73E-10
VOC	Xylenes (total)	1330-20-7	1.00E+00	2.49E-04	1.00E+00	3.73E-10
SVOC	Acenaphthene	83-32-9	1.00E+00	1.04E-05	1.00E+00	3.73E-10
SVOC	Anthracene	120-12-7	1.00E+00	2.78E-06	1.00E+00	3.73E-10
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.00E+00	3.73E-10
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.00E+00	3.73E-10
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.00E+00	3.73E-10
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.00E+00	3.73E-10
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00		1.00E+00	3.73E-10
SVOC	Chrysene	218-01-9	1.00E+00		1.00E+00	3.73E-10
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00		1.00E+00	3.73E-10
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00		1.00E+00	3.73E-10
SVOC	Ethanol	64-17-5	1.00E+00		1.00E+00	3.73E-10
SVOC	Fluorene	86-73-7	1.00E+00	4.47E-06	1.00E+00	3.73E-10
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.00E+00	3.73E-10
SVOC	Naphthalene	91-20-3	1.00E+00	4.38E-05	1.00E+00	3.73E-10
SVOC	Phenanthrene	85-01-8	1.00E+00	3.44E-06	1.00E+00	3.73E-10
SVOC	Pyrene	129-00-0	1.00E+00		1.00E+00	3.73E-10
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.00E+00	3.73E-10
PCB	PCBs (total)	1336-36-3	1.00E+00		1.00E+00	3.73E-10
INORG	Antimony	7440-36-0	1.00E+00		1.00E+00	3.73E-10
INORG	Arsenic	7440-38-2	1.00E+00		1.00E+00	3.73E-10
INORG	Chromium III	16065-83-1	1.00E+00		1.00E+00	3.73E-10
INORG	Chromium VI	18540-29-9	1.00E+00		1.00E+00	3.73E-10
INORG	Cyanide (total)	57-12-5	1.00E+00	2.90E-05	1.00E+00	3.73E-10
INORG	Lead	7439-92-1	1.00E+00		1.00E+00	3.73E-10
INORG	Nickel	7440-02-0	1.00E+00		1.00E+00	3.73E-10
INORG	Vanadium	7440-62-2	1.00E+00		1.00E+00	3.73E-10

Attachment 2

Table 5a:

Unit Risk and Cancer-Based RBSLs for Exposure of Routine Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{soil} (mg/kg)	Soil Ingestion					Soil Dermal Contact					Soil Vapor Inhalation				Soil Particulate Inhalation				All Routes		
					RBA	LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	RBSL (mg/kg)	ABS _{derm}	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	RBSL (mg/kg)	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	RBSL (mg/kg)	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	RBSL (mg/kg)	Risk	RBSL (mg/kg)	
VOC	Benzene	71-43-2	A	1.00E+00		1.10E-07	5.5E-02	6.1E-09	1.7E+03			5.5E-02			2.78E-04	7.8E-03	1.3E-07	7.9E+01	3.73E-10	7.8E-03	1.7E-13	5.8E+07	1.3E-07	7.5E+01	
VOC	Cumene	98-82-8	D	1.00E+00		1.10E-07									2.34E-04				3.73E-10						
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00		1.10E-07	2.0E+00	2.2E-07	4.5E+01			2.0E+00			2.39E-04	6.0E-01	8.4E-06	1.2E+00	3.73E-10	6.0E-01	1.3E-11	7.6E+05	8.6E-06	1.2E+00	
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00		1.10E-07	9.1E-02	1.0E-08	1.0E+03			9.1E-02			2.69E-04	2.6E-02	4.1E-07	2.4E+01	3.73E-10	2.6E-02	5.7E-13	1.8E+07	4.2E-07	2.4E+01	
VOC	Ethyl Benzene	100-41-4	D	1.00E+00		1.10E-07									2.46E-04				3.73E-10						
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00		1.10E-07	1.8E-03	2.0E-10	5.0E+04			1.8E-03			2.62E-04	2.6E-04	4.0E-09	2.5E+03	3.73E-10	2.6E-04	5.7E-15	1.8E+09	4.2E-09	2.4E+03	
VOC	Toluene	108-88-3	ID	1.00E+00		1.10E-07									2.63E-04				3.73E-10						
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00		1.10E-07									1.92E-04				3.73E-10						
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00		1.10E-07									1.55E-04				3.73E-10						
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00		1.10E-07									2.49E-04				3.73E-10						
SVOC	Acenaphthene	83-32-9	ID	1.00E+00		1.10E-07				1.30E-01	1.21E-07				1.04E-05				3.73E-10						
SVOC	Anthracene	120-12-7	ID	1.00E+00		1.10E-07				1.30E-01	1.21E-07				2.78E-06				3.73E-10						
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	9.1E+02	1.30E-01	1.21E-07	1.0E-01	1.2E-08	8.3E+02		6.0E-02			3.73E-10	6.0E-02	1.3E-12	7.6E+06	2.3E-08	4.3E+02	
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		1.10E-07	1.0E+00	1.1E-07	9.1E+01	1.30E-01	1.21E-07	1.0E+00	1.2E-07	8.3E+01		6.0E-01			3.73E-10	6.0E-01	1.3E-11	7.6E+05	2.3E-07	4.3E+01	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	9.1E+02	1.30E-01	1.21E-07	1.0E-01	1.2E-08	8.3E+02		6.0E-02			3.73E-10	6.0E-02	1.3E-12	7.6E+06	2.3E-08	4.3E+02	
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00		1.10E-07				1.30E-01	1.21E-07								3.73E-10						
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		1.10E-07	1.0E-02	1.1E-09	9.1E+03	1.30E-01	1.21E-07	1.0E-02	1.2E-09	8.3E+03		6.0E-03			3.73E-10	6.0E-03	1.3E-13	7.6E+07	2.3E-09	4.3E+03	
SVOC	Chrysene	218-01-9	B2	1.00E+00		1.10E-07	1.0E-03	1.1E-10	9.1E+04	1.30E-01	1.21E-07	1.0E-03	1.2E-10	8.3E+04		6.0E-04			3.73E-10	6.0E-04	1.3E-14	7.6E+08	2.3E-10	4.3E+04	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		1.10E-07	1.0E+00	1.1E-07	9.1E+01	1.30E-01	1.21E-07	1.0E+00	1.2E-07	8.3E+01		6.0E-01			3.73E-10	6.0E-01	1.3E-11	7.6E+05	2.3E-07	4.3E+01	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		1.10E-07	2.5E+02	2.8E-05	3.6E-01	1.00E-01	9.32E-08	2.5E+02	2.3E-05	4.3E-01		7.1E+01			3.73E-10	7.1E+01	1.6E-09	6.4E+03	5.1E-05	2.0E-01	
SVOC	Ethanol	64-17-5		1.00E+00		1.10E-07													3.73E-10						
SVOC	Fluorene	86-73-7	D	1.00E+00		1.10E-07				1.30E-01	1.21E-07				4.47E-06				3.73E-10						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		1.10E-07	1.0E-01	1.1E-08	9.1E+02	1.30E-01	1.21E-07	1.0E-01	1.2E-08	8.3E+02		6.0E-02			3.73E-10	6.0E-02	1.3E-12	7.6E+06	2.3E-08	4.3E+02	
SVOC	Naphthalene	91-20-3	C	1.00E+00		1.10E-07	1.2E-01	1.3E-08	7.6E+02	1.30E-01	1.21E-07	1.2E-01	1.5E-08	6.9E+02		4.38E-05	3.4E-02	8.7E-08	1.1E+02	3.73E-10	3.4E-02	7.5E-13	1.3E+07	1.2E-07	8.7E+01
SVOC	Phenanthrene	85-01-8	D	1.00E+00		1.10E-07				1.30E-01	1.21E-07				3.44E-06				3.73E-10						
SVOC	Pyrene	129-00-0	NC	1.00E+00		1.10E-07				1.30E-01	1.21E-07								3.73E-10						
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00		1.10E-07				1.00E-01	9.32E-08								3.73E-10						
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		1.10E-07	2.0E+00	2.2E-07	4.5E+01	1.40E-01	1.30E-07	2.0E+00	2.6E-07	3.8E+01		5.7E-01			3.73E-10	5.7E-01	1.3E-11	8.0E+05	4.8E-07	2.1E+01	
INORG	Antimony	7440-36-0	ID	1.00E+00		1.10E-07													3.73E-10						
INORG	Arsenic	7440-38-2	A	1.00E+00	0.6	1.10E-07	1.5E+00	9.9E-08	1.0E+02	3.00E-02	2.80E-08	1.5E+00	4.2E-08	2.4E+02		4.3E+00			3.73E-10	4.3E+00	9.4E-11	1.1E+05	1.4E-07	7.1E+01	
INORG	Chromium III	16065-83-1	D	1.00E+00		1.10E-07													3.73E-10						
INORG	Chromium VI	18540-29-9	A	1.00E+00		1.10E-07	5.0E-01	5.5E-08	1.8E+02			2.0E+01				1.2E+01			3.73E-10	1.2E+01	2.6E-10	3.8E+04	5.5E-08	1.8E+02	
INORG	Cyanide (total)	57-12-5		1.00E+00		1.10E-07									2.90E-05				3.73E-10						
INORG	Lead	7439-92-1	B2	1.00E+00		1.10E-07													3.73E-10						
INORG	Nickel	7440-02-0	A	1.00E+00		1.10E-07										2.4E-01			3.73E-10	2.4E-01	5.3E-12	1.9E+06	5.3E-12	1.9E+06	
INORG	Vanadium	7440-62-2	ID	1.00E+00		1.10E-07													3.73E-10						

Notes:
Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Attachment 2

Table 5b:

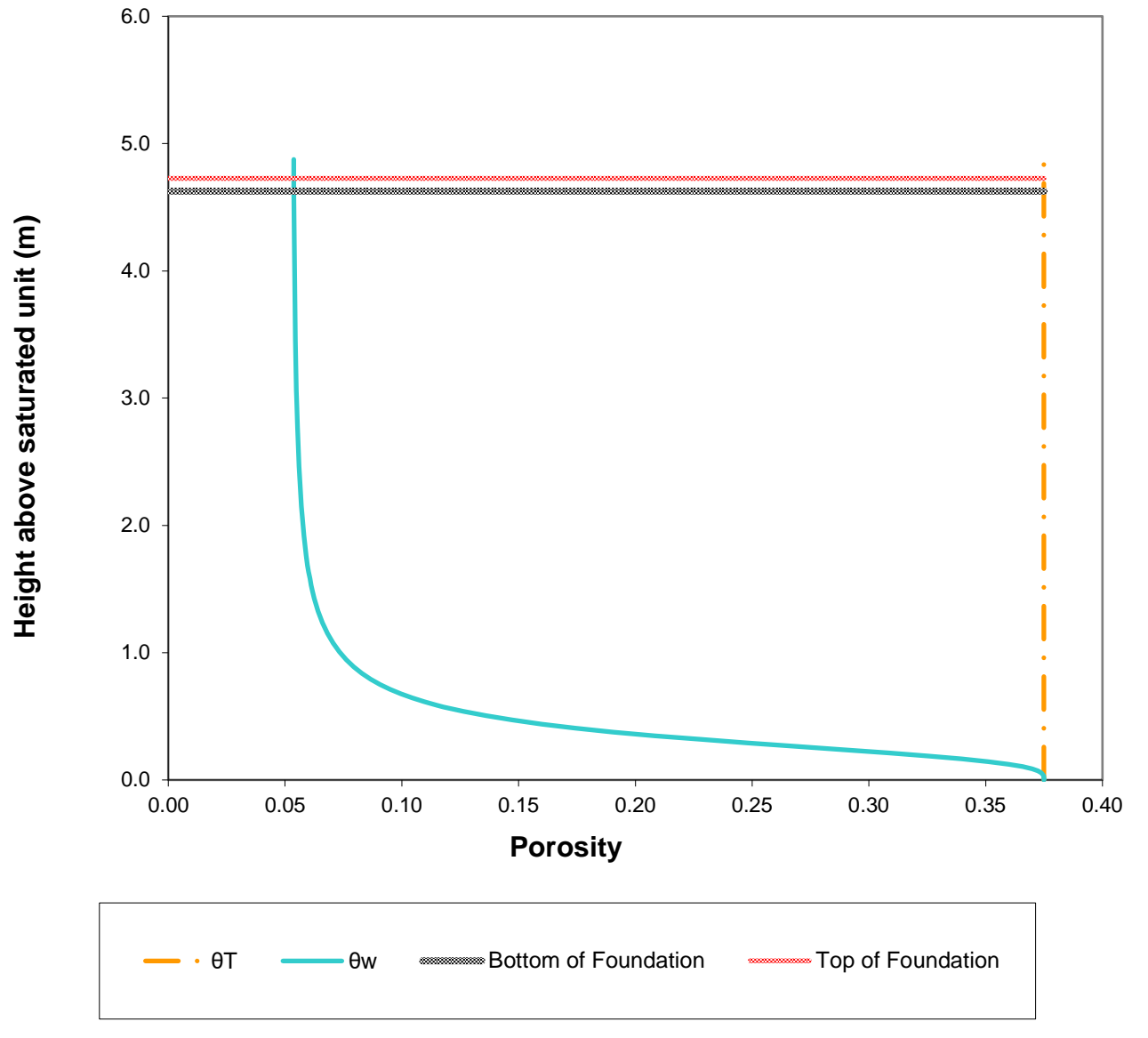
Unit HQ and Noncancer-Based RBSLs for Exposure of Routine Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{soil} (mg/kg)	Soil Ingestion					Soil Dermal Contact					Soil Vapor Inhalation				Soil Particulate Inhalation				All Routes		
				RBA	ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	RBSL (mg/kg)	ABS _{derm}	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	RBSL (mg/kg)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/kg)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/kg)	HQ	RBSL (mg/kg)	
VOC	Benzene	71-43-2	1.00E+00		3.08E-07	4.0E-03	7.7E-05	1.3E+03				4.0E-03			2.78E-04	3.0E-02	1.5E-03	6.6E+01	3.73E-10	3.0E-02	2.0E-09	4.9E+07	1.6E-03	6.3E+01
VOC	Cumene	98-82-8	1.00E+00		3.08E-07	1.0E-01	3.1E-06	3.2E+04				1.0E-01			2.34E-04	4.0E-01	9.6E-05	1.0E+03	3.73E-10	4.0E-01	1.5E-10	6.5E+08	9.9E-05	1.0E+03
VOC	1,2-Dibromoethane	106-93-4	1.00E+00		3.08E-07	9.0E-03	3.4E-05	2.9E+03				9.0E-03			2.39E-04	9.0E-03	4.4E-03	2.3E+01	3.73E-10	9.0E-03	6.8E-09	1.5E+07	4.4E-03	2.3E+01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00		3.08E-07	6.0E-03	5.1E-05	1.9E+03				6.0E-03			2.69E-04	7.0E-03	6.3E-03	1.6E+01	3.73E-10	7.0E-03	8.8E-09	1.1E+07	6.4E-03	1.6E+01
VOC	Ethyl Benzene	100-41-4	1.00E+00		3.08E-07	1.0E-01	3.1E-06	3.2E+04				1.0E-01			2.46E-04	1.0E+00	4.0E-05	2.5E+03	3.73E-10	1.0E+00	6.1E-11	1.6E+09	4.3E-05	2.3E+03
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00		3.08E-07	3.0E-01	1.0E-06	9.7E+04				3.0E-01			2.62E-04	3.0E+00	1.4E-05	7.0E+03	3.73E-10	3.0E+00	2.0E-11	4.9E+09	1.5E-05	6.5E+03
VOC	Toluene	108-88-3	1.00E+00		3.08E-07	8.0E-02	3.9E-06	2.6E+04				8.0E-02			2.63E-04	5.0E+00	8.6E-06	1.2E+04	3.73E-10	5.0E+00	1.2E-11	8.1E+09	1.2E-05	8.0E+03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00		3.08E-07	1.0E-02	3.1E-05	3.2E+03				1.0E-02			1.92E-04	6.0E-02	5.3E-04	1.9E+02	3.73E-10	6.0E-02	1.0E-09	9.8E+07	5.6E-04	1.8E+02
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00		3.08E-07	1.0E-02	3.1E-05	3.2E+03				1.0E-02			1.55E-04	6.0E-02	4.2E-04	2.4E+02	3.73E-10	6.0E-02	1.0E-09	9.8E+07	4.5E-04	2.2E+02
VOC	Xylenes (total)	1330-20-7	1.00E+00		3.08E-07	2.0E-01	1.5E-06	6.5E+04				2.0E-01			2.49E-04	1.0E-01	4.1E-04	2.4E+02	3.73E-10	1.0E-01	6.1E-10	1.6E+08	4.1E-04	2.4E+02
SVOC	Acenaphthene	83-32-9	1.00E+00		3.08E-07	6.0E-02	5.1E-06	1.9E+04	1.30E-01	3.39E-07	6.0E-02	5.7E-06	1.8E+04	1.04E-05					3.73E-10				1.1E-05	9.3E+03
SVOC	Anthracene	120-12-7	1.00E+00		3.08E-07	3.0E-01	1.0E-06	9.7E+04	1.30E-01	3.39E-07	3.0E-01	1.1E-06	8.8E+04	2.78E-06					3.73E-10				2.2E-06	4.6E+04
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		3.08E-07	3.0E-04	1.0E-03	9.7E+01	1.30E-01	3.39E-07	3.0E-04	1.1E-03	8.8E+01		2.0E-06				3.73E-10	2.0E-06	3.1E-05	3.3E+03	2.2E-03	4.6E+01
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		3.08E-07	3.0E-02	1.0E-05	9.7E+03	1.30E-01	3.39E-07	3.0E-02	1.1E-05	8.8E+03						3.73E-10				2.2E-05	4.6E+03
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	Chrysene	218-01-9	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00		3.08E-07				1.00E-01	2.61E-07									3.73E-10					
SVOC	Ethanol	64-17-5	1.00E+00		3.08E-07	6.2E+01	5.0E-09	2.0E+07				6.2E+01				1.9E+01			3.73E-10	1.9E+01	3.2E-12	3.1E+10	5.0E-09	2.0E+07
SVOC	Fluorene	86-73-7	1.00E+00		3.08E-07	4.0E-02	7.7E-06	1.3E+04	1.30E-01	3.39E-07	4.0E-02	8.5E-06	1.2E+04	4.47E-06					3.73E-10				1.6E-05	6.2E+03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		3.08E-07				1.30E-01	3.39E-07									3.73E-10					
SVOC	Naphthalene	91-20-3	1.00E+00		3.08E-07	2.0E-02	1.5E-05	6.5E+03	1.30E-01	3.39E-07	2.0E-02	1.7E-05	5.9E+03	4.38E-05	3.0E-03	2.4E-03	4.2E+01	3.73E-10	3.0E-03	2.0E-08	4.9E+06	2.4E-03	4.1E+01	
SVOC	Phenanthrene	85-01-8	1.00E+00		3.08E-07	3.0E-02	1.0E-05	9.7E+03	1.30E-01	3.39E-07	3.0E-02	1.1E-05	8.8E+03	3.44E-06					3.73E-10				2.2E-05	4.6E+03
SVOC	Pyrene	129-00-0	1.00E+00		3.08E-07	3.0E-02	1.0E-05	9.7E+03	1.30E-01	3.39E-07	3.0E-02	1.1E-05	8.8E+03						3.73E-10				2.2E-05	4.6E+03
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		3.08E-07	2.0E+00	1.5E-07	6.5E+05	1.00E-01	2.61E-07	2.0E+00	1.3E-07	7.7E+05						3.73E-10				2.8E-07	3.5E+05
PCB	PCBs (total)	1336-36-3	1.00E+00		3.08E-07				1.40E-01	3.65E-07									3.73E-10					
INORG	Antimony	7440-36-0	1.00E+00		3.08E-07	4.0E-04	7.7E-04	1.3E+02			6.0E-05								3.73E-10				7.7E-04	1.3E+02
INORG	Arsenic	7440-38-2	1.00E+00	0.6	3.08E-07	3.0E-04	6.2E-04	1.6E+02	3.00E-02	7.83E-08	3.0E-04	2.6E-04	3.8E+02		1.5E-05				3.73E-10	1.5E-05	4.1E-06	2.4E+04	8.8E-04	1.1E+02
INORG	Chromium III	16065-83-1	1.00E+00		3.08E-07	1.5E+00	2.1E-07	4.9E+05			2.0E-02				5.0E-03				3.73E-10	5.0E-03	1.2E-08	8.1E+06	2.2E-07	4.6E+05
INORG	Chromium VI	18540-29-9	1.00E+00		3.08E-07	3.0E-03	1.0E-04	9.7E+02			7.5E-05				1.0E-04				3.73E-10	1.0E-04	6.1E-07	1.6E+05	1.0E-04	9.7E+02
INORG	Cyanide (total)	57-12-5	1.00E+00		3.08E-07	6.0E-04	5.1E-04	1.9E+02			6.0E-04			2.90E-05	8.0E-04	6.0E-03	1.7E+01	3.73E-10	8.0E-04	7.7E-08	1.3E+06	6.5E-03	1.5E+01	
INORG	Lead	7439-92-1	1.00E+00		3.08E-07														3.73E-10					
INORG	Nickel	7440-02-0	1.00E+00		3.08E-07	2.0E-02	1.5E-05	6.5E+03			8.0E-04				9.0E-05				3.73E-10	9.0E-05	6.8E-07	1.5E+05	1.6E-05	6.2E+03
INORG	Vanadium	7440-62-2	1.00E+00		3.08E-07	5.0E-03	6.2E-05	1.6E+03			1.3E-04				1.0E-04				3.73E-10	1.0E-04	6.1E-07	1.6E+05	6.2E-05	1.6E+03

Notes:
Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 2
Figure 1: Soil Moisture Profile for Default PADEP Nonresidential Building (Slab-On-Grade)
PESRM Philadelphia Refining Complex, Philadelphia, Pennsylvania



Attachment 2

Table 6:

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	D _{air} (m ² /day)	D _{water} (m ² /day)	H (unitless)	D _{crack} (m ² /day)	D _{eff} ^T (m ² /day)	α _∞	K _{oc} (L/kg)	K _d (L/kg)	C _{s, vap} (kg-soil/m ³)	C _{b, ∞} (kg-soil/m ³)	α _{ML}	C _{b, ML} (kg-soil/m ³)	C _{b, norm} (kg-soil/m ³)	
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.68E-01	1.23E-01	1.23E-01	2.05E-03	5.82E+01	2.91E-01	4.73E+02	9.69E-01	6.06E-05	2.87E-02	2.87E-02	
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	3.28E-01	9.09E-02	9.09E-02	2.05E-03	7.05E+02	3.53E+00	9.05E+01	1.85E-01	3.17E-04	2.87E-02	2.87E-02	
VOC	1,2-Dibromoethane	106-93-4	3.72E-01	7.29E-05	2.37E-02	6.02E-02	6.01E-02	2.05E-03	2.22E+01	1.11E-01	1.61E+02	3.29E-01	1.78E-04	2.87E-02	2.87E-02	
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.92E-02	1.46E-01	1.45E-01	2.05E-03	1.75E+01	8.74E-02	2.33E+02	4.77E-01	1.23E-04	2.87E-02	2.87E-02	
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	2.20E-01	1.05E-01	1.05E-01	2.05E-03	3.67E+02	1.84E+00	1.15E+02	2.36E-01	2.49E-04	2.87E-02	2.87E-02	
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.83E-02	1.20E-01	1.20E-01	2.05E-03	1.15E+01	5.75E-02	1.97E+02	4.03E-01	1.46E-04	2.87E-02	2.87E-02	
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.93E-01	1.22E-01	1.22E-01	2.05E-03	1.80E+02	9.02E-01	1.98E+02	4.06E-01	1.45E-04	2.87E-02	2.87E-02	
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.61E-01	8.48E-02	8.48E-02	2.05E-03	8.97E+02	4.49E+00	3.54E+01	7.25E-02	8.10E-04	2.87E-02	2.87E-02	
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.54E-01	8.42E-02	8.42E-02	2.05E-03	1.76E+03	8.81E+00	1.74E+01	3.55E-02	1.65E-03	2.87E-02	2.87E-02	
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	2.52E-01	1.09E-01	1.09E-01	2.05E-03	3.86E+02	1.93E+00	1.25E+02	2.56E-01	2.29E-04	2.87E-02	2.87E-02	
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.40E-03	5.89E-02	5.89E-02	2.05E-03	7.14E+03	3.57E+01	9.51E-02	1.95E-04	3.02E-01	2.87E-02	1.95E-04	
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.30E-03	4.54E-02	4.53E-02	2.05E-03	2.97E+04	1.49E+02	8.77E-03	1.80E-05	3.27E+00	2.87E-02	1.80E-05	
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	5.55E-05	7.19E-02	7.19E-02	2.05E-03	4.01E+05	2.01E+03	2.77E-05	5.67E-08	1.04E+03	2.87E-02		
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	1.49E-05	6.23E-02	6.23E-02	2.05E-03	1.01E+06	5.07E+03	2.95E-06	6.03E-09	9.74E+03	2.87E-02		
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	1.66E-03	3.16E-02	3.16E-02	2.04E-03	1.24E+06	6.22E+03	2.67E-04	5.45E-07	1.08E+02	2.87E-02		
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	1.10E-05	3.21E-02	3.21E-02	2.04E-03	1.28E+07	6.40E+04	1.72E-07	3.51E-10	1.67E+05	2.87E-02		
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.16E-05	3.33E-02	3.33E-02	2.05E-03	1.24E+06	6.22E+03	1.86E-06	3.80E-09	1.54E+04	2.87E-02		
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.48E-03	3.47E-02	3.47E-02	2.05E-03	4.01E+05	2.01E+03	7.38E-04	1.51E-06	3.89E+01	2.87E-02		
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	9.57E-08	2.20E-01	2.20E-01	2.05E-03	3.77E+06	1.89E+04	5.08E-09	1.04E-11	5.65E+06	2.87E-02		
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	6.91E-01	6.91E-05	1.03E-06	1.39E-01	1.39E-01	2.05E-03	5.03E+05	2.52E+03	4.11E-07	8.41E-10	6.99E+04	2.87E-02		
SVOC	Ethanol	64-17-5	1.06E+00	1.12E-04	1.96E-04	1.72E-01	1.72E-01	2.05E-03	6.81E-01	3.40E-03	5.50E+00	1.13E-02	5.22E-03	2.87E-02		
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.39E-03	5.08E-02	5.08E-02	2.05E-03	1.38E+04	6.88E+01	2.02E-02	4.12E-05	1.42E+00	2.87E-02	4.12E-05	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	2.03E-05	2.76E-02	2.76E-02	2.04E-03	3.45E+06	1.72E+04	1.18E-06	2.41E-09	2.44E+04	2.87E-02		
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	1.20E-02	8.25E-02	8.25E-02	2.05E-03	2.01E+03	1.00E+01	1.19E+00	2.45E-03	2.40E-02	2.87E-02	2.45E-03	
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	1.41E-03	5.25E-02	5.25E-02	2.05E-03	2.42E+04	1.21E+02	1.16E-02	2.37E-05	2.47E+00	2.87E-02	2.37E-05	
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.00E-04	3.82E-02	3.82E-02	2.05E-03	1.06E+05	5.28E+02	3.79E-04	7.76E-07	7.56E+01	2.87E-02		
SVOC	Tetraethylene Glycol	112-60-7	4.39E-01	6.96E-05	1.62E-11	1.76E+03	1.76E+03	1.68E-01	3.00E-02	1.50E-04	5.01E-07	8.40E-08	5.73E+04	2.87E-02		
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	6.64E-02	2.83E-02	2.83E-02	2.04E-03	2.45E+06	1.23E+04	5.42E-03	1.11E-05	5.30E+00	2.87E-02		
INORG	Antimony	7440-36-0														
INORG	Arsenic	7440-38-2														
INORG	Chromium III	16065-83-1														
INORG	Chromium VI	18540-29-9														
INORG	Cyanide (total)	57-12-5	1.35E+00	1.53E-04	1.97E-03	2.18E-01	2.18E-01	2.05E-03			9.90E+00	1.99E-01	4.07E-04	1.44E-01	2.87E-02	4.07E-04
INORG	Lead	7439-92-1														
INORG	Nickel	7440-02-0														
INORG	Vanadium	7440-62-2														

Attachment 2

Table 6:

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes: Subsurface and Building Characteristics			Crack Soil
SCS Soil texture class			Sand
Bulk density	kg/L	ρ_b	1.66
Total porosity	L/L-soil	θ_T	0.375
Water-filled porosity	L/L-soil	θ_w	0.053
Air-filled porosity	L/L-soil	θ_a	0.322
Organic carbon fraction	unitless	f_{OC}	NA
Residual saturation	L/L-soil	θ_r	0.053
Hydraulic conductivity	cm/s	K	7.4E-03
Dynamic viscosity of water	g/cm-s	μ_w	0.01307
Density of water	g/cm ³	ρ_w	1.0
Gravitational acceleration	cm/s ²	g	980.7
Intrinsic permeability	cm ²	k	9.9E-08
Relative saturation	unitless	S_e	0.001
van Genuchten N	unitless	N	3.18
van Genuchten M	unitless	M	0.685
Relative air permeability	unitless	k_{rg}	0.999
Permeability to vapor	cm ²	k_v	9.9E-08
Distance from building foundation to source	m	L_{T-soil}	0.001
Bldg foundation thickness	m	L_{crack}	0.1
Bldg foundation length	m		10.00
Bldg foundation width	m		10.00
Bldg occupied height	m		2.44
Bldg occupied volume	m ³		244.00
Occupied depth below ground	m		0.2
Bldg area for vapor intrusion	m ²	A_B	106.0
Ratio of A_{crack} to A_B		η	4E-04
Area of cracks	m ²	A_{crack}	4.00E-02
Air exchange rate	hour ⁻¹	ach	0.6
Building ventilation rate	m ³ /day	Q_{bldg}	3.51E+03
Pressure difference between outdoors-indoors	kg/m-s ²	ΔP	1.0
Viscosity of air	kg/m-s	μ_a	1.8E-05
Crack length (bldg perimeter)	m	X_{crack}	40
Crack depth below ground	m	Z_{crack}	0.25
Crack radius	m	r_{crack}	1E-03
Soil gas flow rate into bldg	m ³ /day	Q_{soil}	7.20E+00
Averaging period	d	ED	9.13E+03
Contaminant thickness	m	ΔH	5.5

Attachment 2

Table 7:

Unit Risk, Unit HQ, and RBSLs for Soil Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Routine Worker

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{soil} (mg/kg)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/kg)	RfC (mg/m ³)	HQ	RBSL (mg/kg)
VOC	Benzene	71-43-2	A	1.00E+00	2.87E-02	7.8E-03	1.8E-05	5.5E-01	3.0E-02	2.2E-01	4.6E-01
VOC	Cumene	98-82-8	D	1.00E+00	2.87E-02				4.0E-01	1.6E-02	6.1E+00
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	2.87E-02	6.0E-01	1.4E-03	7.1E-03	9.0E-03	7.3E-01	1.4E-01
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	2.87E-02	2.6E-02	6.1E-05	1.6E-01	7.0E-03	9.4E-01	1.1E-01
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	2.87E-02				1.0E+00	6.5E-03	1.5E+01
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	2.87E-02	2.6E-04	6.1E-07	1.6E+01	3.0E+00	2.2E-03	4.6E+01
VOC	Toluene	108-88-3	ID	1.00E+00	2.87E-02				5.0E+00	1.3E-03	7.6E+01
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	2.87E-02				6.0E-02	1.1E-01	9.2E-01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	2.87E-02				6.0E-02	1.1E-01	9.2E-01
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	2.87E-02				1.0E-01	6.5E-02	1.5E+00
SVOC	Acenaphthene	83-32-9	ID	1.00E+00	1.95E-04						
SVOC	Anthracene	120-12-7	ID	1.00E+00	1.80E-05						
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02					
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01			2.0E-06		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02					
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00							
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		6.0E-03					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04					
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		6.0E-01					
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		7.1E+01					
SVOC	Ethanol	64-17-5		1.00E+00					1.9E+01		
SVOC	Fluorene	86-73-7	D	1.00E+00	4.12E-05						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02					
SVOC	Naphthalene	91-20-3	C	1.00E+00	2.45E-03	3.4E-02	6.8E-06	1.5E+00	3.0E-03	1.9E-01	5.4E-01
SVOC	Phenanthrene	85-01-8	D	1.00E+00	2.37E-05						
SVOC	Pyrene	129-00-0	NC	1.00E+00							
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00							
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		5.7E-01					
INORG	Antimony	7440-36-0	ID	1.00E+00							
INORG	Arsenic	7440-38-2	A	1.00E+00		4.3E+00			1.5E-05		
INORG	Chromium III	16065-83-1	D	1.00E+00					5.0E-03		
INORG	Chromium VI	18540-29-9	A	1.00E+00		1.2E+01			1.0E-04		
INORG	Cyanide (total)	57-12-5		1.00E+00	4.07E-04				8.0E-04	1.2E-01	8.6E-01
INORG	Lead	7439-92-1	B2	1.00E+00							
INORG	Nickel	7440-02-0	A	1.00E+00		2.4E-01			9.0E-05		
INORG	Vanadium	7440-62-2	ID	1.00E+00					1.0E-04		

Note:

Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 2

Table 8:

Normalized Vapor Flux to Outdoor Air from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	D _{eff} ^T (m ² /day)	J (L/m ² -s)	C _{air} (L/m ³)
VOC	Benzene	71-43-2	1.68E-01	6.25E-04	1.33E-06	3.34E-05
VOC	Cumene	98-82-8	3.28E-01	2.57E-04	1.06E-06	2.67E-05
VOC	1,2-Dibromoethane	106-93-4	2.37E-02	2.38E-03	7.16E-07	1.79E-05
VOC	1,2-Dichloroethane	107-06-2	2.92E-02	2.78E-03	1.03E-06	2.57E-05
VOC	Ethyl Benzene	100-41-4	2.20E-01	4.00E-04	1.11E-06	2.79E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.83E-02	3.92E-03	9.10E-07	2.28E-05
VOC	Toluene	108-88-3	1.93E-01	4.97E-04	1.21E-06	3.04E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.61E-01	5.12E-04	1.04E-06	2.62E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.54E-01	5.74E-04	1.12E-06	2.80E-05
VOC	Xylenes (total)	1330-20-7	2.52E-01	3.95E-04	1.26E-06	3.15E-05
SVOC	Acenaphthene	83-32-9	3.40E-03	8.55E-03	3.68E-07	9.22E-06
SVOC	Anthracene	120-12-7	1.30E-03	1.31E-02	2.15E-07	5.40E-06
SVOC	Benzo(a)anthracene	56-55-3	5.55E-05	6.47E-02	4.55E-08	
SVOC	Benzo(a)pyrene	50-32-8	1.49E-05	9.62E-02	1.82E-08	
SVOC	Benzo(b)fluoranthene	205-99-2	1.66E-03	8.18E-03	1.72E-07	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.10E-05	5.98E-02	8.33E-09	
SVOC	Benzo(k)fluoranthene	207-08-9	1.16E-05	6.13E-02	8.96E-09	
SVOC	Chrysene	218-01-9	1.48E-03	9.60E-03	1.80E-07	
SVOC	Dibenz(a,h)anthracene	53-70-3	9.57E-08	2.65E+00	3.21E-09	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.03E-06	5.36E-01	7.01E-09	
SVOC	Ethanol	64-17-5	1.96E-04	8.08E-02	2.01E-07	
SVOC	Fluorene	86-73-7	1.39E-03	1.35E-02	2.37E-07	5.94E-06
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.03E-05	4.34E-02	1.11E-08	
SVOC	Naphthalene	91-20-3	1.20E-02	3.93E-03	5.99E-07	1.50E-05
SVOC	Phenanthrene	85-01-8	1.41E-03	1.33E-02	2.36E-07	5.91E-06
SVOC	Pyrene	129-00-0	2.00E-04	2.53E-02	6.41E-08	
SVOC	Tetraethylene Glycol	112-60-7	1.62E-11	2.39E+04	4.90E-09	
PCB	PCBs (total)	1336-36-3	6.64E-02	6.01E-04	5.05E-07	
INORG	Antimony	7440-36-0				
INORG	Arsenic	7440-38-2				
INORG	Chromium III	16065-83-1				
INORG	Chromium VI	18540-29-9				
INORG	Cyanide (total)	57-12-5	1.97E-03	3.30E-02	8.25E-07	2.07E-05
INORG	Lead	7439-92-1				
INORG	Nickel	7440-02-0				
INORG	Vanadium	7440-62-2				

Parameters

Depth to groundwater	m	DTW	0.91
Dispersion coefficient	(L/m ³) / (L/m ² /s)	C/Q	25.1

Attachment 2

Table 9:

Unit Risk, Unit HQ, and RBSLs for Exposure of Routine Workers to Groundwater-derived Vapors in Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{GW} (mg/L)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	RfC (mg/m ³)	HQ	RBSL (mg/L)
VOC	Benzene	71-43-2	A	1.00E+00	3.34E-05	7.8E-03	1.5E-08	6.5E+02	3.0E-02	1.8E-04	5.5E+02
VOC	Cumene	98-82-8	D	1.00E+00	2.67E-05				4.0E-01	1.1E-05	9.1E+03
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	1.79E-05	6.0E-01	6.3E-07	1.6E+01	9.0E-03	3.3E-04	3.1E+02
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	2.57E-05	2.6E-02	3.9E-08	2.5E+02	7.0E-03	6.0E-04	1.7E+02
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	2.79E-05				1.0E+00	4.6E-06	2.2E+04
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	2.28E-05	2.6E-04	3.5E-10	2.9E+04	3.0E+00	1.2E-06	8.0E+04
VOC	Toluene	108-88-3	ID	1.00E+00	3.04E-05				5.0E+00	1.0E-06	1.0E+05
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	2.62E-05				6.0E-02	7.2E-05	1.4E+03
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	2.80E-05				6.0E-02	7.7E-05	1.3E+03
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	3.15E-05				1.0E-01	5.2E-05	1.9E+03
SVOC	Acenaphthene	83-32-9	ID	1.00E+00	9.22E-06						
SVOC	Anthracene	120-12-7	ID	1.00E+00	5.40E-06						
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02					
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01			2.0E-06		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02					
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00							
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		6.0E-03					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04					
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		6.0E-01					
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		7.1E+01					
SVOC	Ethanol	64-17-5		1.00E+00					1.9E+01		
SVOC	Fluorene	86-73-7	D	1.00E+00	5.94E-06						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02					
SVOC	Naphthalene	91-20-3	C	1.00E+00	1.50E-05	3.4E-02	3.0E-08	3.3E+02	3.0E-03	8.2E-04	1.2E+02
SVOC	Phenanthrene	85-01-8	D	1.00E+00	5.91E-06						
SVOC	Pyrene	129-00-0	NC	1.00E+00							
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00							
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		5.7E-01					
INORG	Antimony	7440-36-0	ID	1.00E+00							
INORG	Arsenic	7440-38-2	A	1.00E+00		4.3E+00			1.5E-05		
INORG	Chromium III	16065-83-1	D	1.00E+00					5.0E-03		
INORG	Chromium VI	18540-29-9	A	1.00E+00		1.2E+01			1.0E-04		
INORG	Cyanide (total)	57-12-5		1.00E+00	2.07E-05				8.0E-04	4.2E-03	2.4E+01
INORG	Lead	7439-92-1	B2	1.00E+00							
INORG	Nickel	7440-02-0	A	1.00E+00		2.4E-01			9.0E-05		
INORG	Vanadium	7440-62-2	ID	1.00E+00					1.0E-04		

Attachment 2

Table 10:

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	D _{air} (m ² /day)	D _{water} (m ² /day)	H (unitless)	D _{crack} (m ² /day)	D _{eff} ^T (m ² /day)	α _{soil}	α _{slab}	α _∞	C _{b, norm} (L-water/m ³)
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.68E-01	8.24E-02	4.54E-04	9.96E-03	2.05E-03	2.04E-05	3.44E-03
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	3.28E-01	6.09E-02	1.86E-04	4.11E-03	2.05E-03	8.43E-06	2.76E-03
VOC	1,2-Dibromoethane	106-93-4	3.72E-01	7.29E-05	2.37E-02	4.03E-02	1.76E-03	3.75E-02	2.05E-03	7.68E-05	1.82E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.92E-02	9.74E-02	2.03E-03	4.31E-02	2.05E-03	8.84E-05	2.58E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	2.20E-01	7.02E-02	2.91E-04	6.40E-03	2.05E-03	1.31E-05	2.88E-03
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.83E-02	8.04E-02	2.88E-03	6.00E-02	2.05E-03	1.23E-04	2.25E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.93E-01	8.15E-02	3.61E-04	7.94E-03	2.05E-03	1.63E-05	3.14E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.61E-01	5.67E-02	3.72E-04	8.18E-03	2.05E-03	1.68E-05	2.70E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.54E-01	5.64E-02	4.17E-04	9.16E-03	2.05E-03	1.88E-05	2.89E-03
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	2.52E-01	7.30E-02	2.87E-04	6.32E-03	2.05E-03	1.30E-05	3.26E-03
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.40E-03	3.95E-02	6.59E-03	1.27E-01	2.05E-03	2.61E-04	8.87E-04
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.30E-03	3.05E-02	1.07E-02	1.92E-01	2.05E-03	3.93E-04	5.12E-04
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	5.55E-05	5.10E-02	7.14E-02	6.13E-01	2.05E-03	1.26E-03	
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	1.49E-05	5.23E-02	1.40E-01	7.56E-01	2.05E-03	1.55E-03	
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	1.66E-03	2.12E-02	6.62E-03	1.28E-01	2.05E-03	2.62E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	1.10E-05	2.99E-02	9.63E-02	6.81E-01	2.05E-03	1.40E-03	
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.16E-05	3.08E-02	9.78E-02	6.84E-01	2.05E-03	1.40E-03	
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.48E-03	2.33E-02	7.83E-03	1.48E-01	2.05E-03	3.03E-04	
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	9.57E-08	1.10E+00	7.36E+00	9.94E-01	2.05E-03	2.04E-03	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	6.91E-01	6.91E-05	1.03E-06	2.30E-01	1.18E+00	9.63E-01	2.05E-03	1.97E-03	
SVOC	Ethanol	64-17-5	1.06E+00	1.12E-04	1.96E-04	1.16E-01	7.21E-02	6.15E-01	2.05E-03	1.26E-03	
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.39E-03	3.41E-02	1.10E-02	1.95E-01	2.05E-03	4.00E-04	5.56E-04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	2.03E-05	2.34E-02	6.38E-02	5.86E-01	2.05E-03	1.20E-03	
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	1.20E-02	5.53E-02	2.91E-03	6.05E-02	2.05E-03	1.24E-04	1.49E-03
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	1.41E-03	3.52E-02	1.07E-02	1.92E-01	2.05E-03	3.93E-04	5.52E-04
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.00E-04	2.62E-02	2.48E-02	3.55E-01	2.05E-03	7.27E-04	
SVOC	Tetraethylene Glycol	112-60-7	4.39E-01	6.96E-05	1.62E-11	9.95E+03	6.72E+04	1.00E+00	5.32E-01	5.32E-01	
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	6.64E-02	1.89E-02	4.40E-04	9.65E-03	2.05E-03	1.98E-05	
INORG	Antimony	7440-36-0									
INORG	Arsenic	7440-38-2									
INORG	Chromium III	16065-83-1									
INORG	Chromium VI	18540-29-9									
INORG	Cyanide (total)	57-12-5	1.35E+00	1.53E-04	1.97E-03	1.46E-01	2.55E-02	3.61E-01	2.05E-03	7.40E-04	1.46E-03
INORG	Lead	7439-92-1									
INORG	Nickel	7440-02-0									
INORG	Vanadium	7440-62-2									

Attachment 2

Table 10:

Normalized Indoor Air Concentration in a Default PADEP Nonresidential Building (Slab-On-Grade) Due to Vapor Intrusion from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Subsurface and Building Characteristics			Crack Soil
SCS Soil texture class			Sand
Bulk density	kg/L	ρ_b	1.66
Total porosity	L/L-soil	θ_T	0.375
Water-filled porosity	L/L-soil	θ_w	0.090
Air-filled porosity	L/L-soil	θ_a	0.285
Residual saturation	L/L-soil	θ_r	0.053
Hydraulic conductivity	cm/s	K	7.4E-03
Dynamic viscosity of water	g/cm-s	μ_w	0.01307
Density of water	g/cm ³	ρ_w	1.0
Gravitational acceleration	cm/s ²	g	980.7
Intrinsic permeability	cm ²	k	9.9E-08
Relative saturation	unitless	S_e	0.115
van Genuchten N	unitless	N	3.177
van Genuchten M	unitless	M	0.685
Relative air permeability	unitless	k_{rg}	0.887
Permeability to vapor	cm ²	k_v	8.79E-08
Distance from foundation to source	m	L_{T-gw}	0.66
Bldg foundation thickness	m	L_{crack}	0.1
Bldg foundation length	m		10.00
Bldg foundation width	m		10.00
Bldg occupied height	m		2.44
Bldg occupied volume	m ³		244.00
Occupied depth below ground	m		0.2
Bldg area for vapor intrusion	m ²	A_B	106.0
Ratio of A_{crack} to A_B		η	4E-04
Area of cracks	m ²	A_{crack}	4E-02
Air exchange rate	hour ⁻¹	ach	0.60
Building ventilation rate	m ³ /day	Q_{bldg}	3.5E+03
Pressure diff. outdoors-indoors	kg/m-s ²	ΔP	1.0
Viscosity of air	kg/m-s	μ_a	1.8E-05
Crack length (bldg perimeter)	m	X_{crack}	40
Crack depth below ground	m	Z_{crack}	0.25
Crack radius	m	r_{crack}	1E-03
Soil gas flow rate into bldg	m ³ /day	Q_{soil}	7.20

Attachment 2

Table 11:

Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Routine Worker

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{gw} (mg/L)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	RfC (mg/m ³)	HQ	RBSL (mg/L)
VOC	Benzene	71-43-2	A	1.00E+00	3.44E-03	7.8E-03	2.2E-06	4.6E+00	3.0E-02	2.6E-02	3.8E+00
VOC	Cumene	98-82-8	D	1.00E+00	2.76E-03				4.0E-01	1.6E-03	6.3E+01
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	1.82E-03	6.0E-01	8.9E-05	1.1E-01	9.0E-03	4.6E-02	2.2E+00
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	2.58E-03	2.6E-02	5.5E-06	1.8E+00	7.0E-03	8.4E-02	1.2E+00
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	2.88E-03				1.0E+00	6.6E-04	1.5E+02
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	2.25E-03	2.6E-04	4.8E-08	2.1E+02	3.0E+00	1.7E-04	5.8E+02
VOC	Toluene	108-88-3	ID	1.00E+00	3.14E-03				5.0E+00	1.4E-04	7.0E+02
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	2.70E-03				6.0E-02	1.0E-02	9.7E+00
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	2.89E-03				6.0E-02	1.1E-02	9.1E+00
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	3.26E-03				1.0E-01	7.4E-03	1.3E+01
SVOC	Acenaphthene	83-32-9	ID	1.00E+00	8.87E-04						
SVOC	Anthracene	120-12-7	ID	1.00E+00	5.12E-04						
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02					
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01			2.0E-06		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02					
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00							
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		6.0E-03					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04					
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		6.0E-01					
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		7.1E+01					
SVOC	Ethanol	64-17-5		1.00E+00					1.9E+01		
SVOC	Fluorene	86-73-7	D	1.00E+00	5.56E-04						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02					
SVOC	Naphthalene	91-20-3	C	1.00E+00	1.49E-03	3.4E-02	4.1E-06	2.4E+00	3.0E-03	1.1E-01	8.8E-01
SVOC	Phenanthrene	85-01-8	D	1.00E+00	5.52E-04						
SVOC	Pyrene	129-00-0	NC	1.00E+00							
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00							
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		5.7E-01					
INORG	Antimony	7440-36-0	ID	1.00E+00							
INORG	Arsenic	7440-38-2	A	1.00E+00		4.3E+00			1.5E-05		
INORG	Chromium III	16065-83-1	D	1.00E+00					5.0E-03		
INORG	Chromium VI	18540-29-9	A	1.00E+00		1.2E+01			1.0E-04		
INORG	Cyanide (total)	57-12-5		1.00E+00	1.46E-03				8.0E-04	4.2E-01	2.4E-01
INORG	Lead	7439-92-1	B2	1.00E+00							

Attachment 2

Table 11:

Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Nonresidential Building (Slab-On-Grade)

Routine Worker

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{gw} (mg/L)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	RfC (mg/m ³)	HQ	RBSL (mg/L)
INORG	Nickel	7440-02-0	A	1.00E+00		2.4E-01			9.0E-05		
INORG	Vanadium	7440-62-2	ID	1.00E+00					1.0E-04		

Notes:

Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 2

Table 12:

Blood Lead Model for Adult Exposure to Lead in Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Soil Ingestion

Soil Pb concentration		mg-Pb/kg-soil	2,518
Gastrointestinal absorption	AF	unitless	0.12
Ingestion rate	IR	mg-soil/day	50
Conversion factor		kg/mg	1E-06
Exposure frequency	EF	days/year	219
Averaging time	AT	days	365

Baseline blood lead	PbB_{baseline}	ug-Pb/dL	0.6
Biokinetic slope factor	BSF	ug-Pb/dL per ug-Pb/day	0.4
Geometric std deviation	GSD		1.8

Blood lead goal	PbB_{goal}	ug-Pb/dL	10
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Soil Pb to meet PbB_{goal} at specific percentiles	z	Percentile	Soil Pb (mg/kg)
	0.000	50	7,299
	0.674	75	4,774
	1.036	85	3,779
	1.282	90	3,216
	1.645	95	2,518
	2.054	98	1,891
	2.326	99	1,549

Notes:

The model is adapted from the methodology provided in *Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks associated with Adult Exposure to Lead in Soil* (USEPA 2003), including *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters* (USEPA 2017).

The shaded value represents the screening level.

Attachment 3

Construction Worker Risk Based Screening Level Calculations

Table 1 – Normalized Average Vapor Flux from Soil to Outdoor Air

Table 2 – Dispersion Factor to Outdoor Air

Table 3 – Concentrations in Outdoor Air from Soil

Table 4a – Unit Risk and Cancer-Based RBSLs for Exposure of Construction Workers to Soil

Table 4b – Unit HQ and Noncancer-Based RBSLs for Exposure of Construction Workers to Soil

Table 5 – Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Table 6 – Dermal Absorbed Dose for Groundwater

Table 7a – Unit Risk and Cancer-Based RBSLs for Exposure of Construction Workers to Groundwater in Excavations

Table 7b – Unit HQ and Noncancer-Based RBSLs for Exposure of Construction Workers to Groundwater in Excavations



Attachment 3

Table 1:

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	D _G (m ² /d)	D _L (m ² /d)	D _E (m ² /d)	J _v (kg/m ² -s)
VOC	Benzene	71-43-2	5.82E+01		1.68E-01	7.60E-01	8.47E-05	1.23E-01	3.46E-08	3.51E-02	1.79E-04
VOC	Cumene	98-82-8	7.05E+02		3.28E-01	5.62E-01	6.13E-05	9.10E-02	2.51E-08	4.96E-03	7.98E-05
VOC	1,2-Dibromoethane	106-93-4	2.22E+01		2.37E-02	3.72E-01	7.29E-05	6.02E-02	2.98E-08	5.83E-03	8.65E-05
VOC	1,2-Dichloroethane	107-06-2	1.75E+01		2.92E-02	8.99E-01	8.55E-05	1.46E-01	3.50E-08	2.04E-02	1.50E-04
VOC	Ethyl Benzene	100-41-4	3.67E+02		2.20E-01	6.48E-01	6.74E-05	1.05E-01	2.76E-08	7.27E-03	9.63E-05
VOC	Methyl tert-butyl ether	1634-04-4	1.15E+01		1.83E-02	7.42E-01	8.73E-05	1.20E-01	3.57E-08	1.43E-02	1.31E-04
VOC	Toluene	108-88-3	1.80E+02		1.93E-01	7.52E-01	7.43E-05	1.22E-01	3.04E-08	1.46E-02	1.32E-04
VOC	1,2,4-Trimethylbenzene	95-63-6	8.97E+02		1.61E-01	5.24E-01	6.84E-05	8.48E-02	2.80E-08	1.81E-03	4.83E-05
VOC	1,3,5-Trimethylbenzene	108-67-8	1.76E+03		1.54E-01	5.20E-01	7.49E-05	8.42E-02	3.06E-08	8.81E-04	3.37E-05
VOC	Xylenes (total)	1330-20-7	3.86E+02		2.52E-01	6.74E-01	7.56E-05	1.09E-01	3.09E-08	8.23E-03	1.02E-04
SVOC	Acenaphthene	83-32-9	7.14E+03		3.40E-03	3.64E-01	6.64E-05	5.89E-02	2.72E-08	3.38E-06	2.09E-06
SVOC	Anthracene	120-12-7	2.97E+04		1.30E-03	2.80E-01	6.69E-05	4.53E-02	2.74E-08	2.40E-07	5.56E-07
SVOC	Benzo(a)anthracene	56-55-3	4.01E+05		5.55E-05	4.41E-01	7.78E-05	7.14E-02	3.18E-08	1.20E-09	
SVOC	Benzo(a)pyrene	50-32-8	1.01E+06		1.49E-05	3.72E-01	7.78E-05	6.02E-02	3.18E-08	1.11E-10	
SVOC	Benzo(b)fluoranthene	205-99-2	1.24E+06		1.66E-03	1.95E-01	4.80E-05	3.16E-02	1.97E-08	5.08E-09	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.28E+07		1.10E-05	1.88E-01	4.54E-05	3.04E-02	1.86E-08	3.32E-12	
SVOC	Benzo(k)fluoranthene	207-08-9	1.24E+06		1.16E-05	1.95E-01	4.80E-05	3.16E-02	1.97E-08	3.73E-11	
SVOC	Chrysene	218-01-9	4.01E+05		1.48E-03	2.14E-01	5.37E-05	3.47E-02	2.20E-08	1.54E-08	
SVOC	Dibenz(a,h)anthracene	53-70-3	3.77E+06		9.57E-08	1.75E-01	4.48E-05	2.83E-02	1.83E-08	6.71E-13	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	5.03E+05		1.03E-06	6.91E-01	6.91E-05	1.12E-01	2.83E-08	3.45E-11	
SVOC	Ethanol	64-17-5	6.81E-01		1.96E-04	1.06E+00	1.12E-04	1.72E-01	4.60E-08	5.71E-04	
SVOC	Fluorene	86-73-7	1.38E+04		1.39E-03	3.14E-01	6.81E-05	5.08E-02	2.79E-08	6.17E-07	8.91E-07
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	3.45E+06		2.03E-05	1.64E-01	4.89E-05	2.66E-02	2.00E-08	1.96E-11	
SVOC	Naphthalene	91-20-3	2.01E+03		1.20E-02	5.10E-01	6.48E-05	8.26E-02	2.65E-08	5.94E-05	8.75E-06
SVOC	Phenanthrene	85-01-8	2.42E+04		1.41E-03	3.24E-01	6.45E-05	5.25E-02	2.64E-08	3.67E-07	6.87E-07
SVOC	Pyrene	129-00-0	1.06E+05		2.00E-04	2.35E-01	6.26E-05	3.81E-02	2.56E-08	8.73E-09	
SVOC	Tetraethylene Glycol	112-60-7	3.00E-02		1.62E-11	4.39E-01	6.96E-05	7.11E-02	2.85E-08	5.30E-07	
PCB	PCBs (total)	1336-36-3	2.45E+06		6.64E-02	1.75E-01	4.32E-05	2.83E-02	1.77E-08	9.22E-08	
INORG	Antimony	7440-36-0		4.50E+01							
INORG	Arsenic	7440-38-2		2.90E+01							
INORG	Chromium III	16065-83-1		1.80E+06							
INORG	Chromium VI	18540-29-9		1.90E+01							
INORG	Cyanide (total)	57-12-5		9.90E+00	1.97E-03	1.35E+00	1.53E-04	2.18E-01	6.26E-08	2.61E-05	5.80E-06
INORG	Lead	7439-92-1		9.00E+02							
INORG	Nickel	7440-02-0		6.50E+01							
INORG	Vanadium	7440-62-2		1.00E+03							

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Table 1:

Normalized Average Vapor Flux from Soil to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Soil bulk density	kg/L	ρ_b	1.66
Soil porosity	L/L-soil	θ	0.38
Soil water content	L/L-soil	θ_w	0.05
Soil air-filled porosity	L/L-soil	θ_a	0.32
Soil organic carbon fraction	unitless	f_{oc}	0.005
Averaging period (Exposure Duration)	years	T	1
	days	T	365
Temperature	$^{\circ}\text{C}$	Temp	18
Clean soil above source	m	Z_1	
Bottom of source depth	m	Z_2	5.79

Based on the volatilization model developed by Jury et. al. (1983) for finite sources as described in USEPA's (1996) Soil Screening Guidance: Technical Background Document. The K_d for organic compounds is the K_{oc} times the f_{oc} .

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Table 2:

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Soil source area	acres	70.6
Soil C/Q averaging time		Annual Max
Conversion factor from 1-Hr Max for soil		0.19
C/Q for soil	(kg/m³)/(kg/m²-s)	25.06

Groundwater source area	acres	0.0052
Groundwater averaging time for C/Q		24-Hour Max
Conversion factor from 1-Hr Max for groundwater		0.40
C/Q for Groundwater	(L/m³)/(L/m²-s)	9.63

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

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Table 3:

Concentrations in Outdoor Air from Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Chem	Chemical	CASRN	Vapor		PM ₁₀	
			C _{soil} (mg/kg)	C _{air} (mg/m ³)	C _{soil} (mg/kg)	C _{air} (mg/m ³)
			C/Q (kg/m ³ per kg/m ² -s): 2.5E+01			
VOC	Benzene	71-43-2	1.00E+00	4.49E-03	1.00E+00	5.00E-08
VOC	Cumene	98-82-8	1.00E+00	2.00E-03	1.00E+00	5.00E-08
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	2.17E-03	1.00E+00	5.00E-08
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	3.76E-03	1.00E+00	5.00E-08
VOC	Ethyl Benzene	100-41-4	1.00E+00	2.41E-03	1.00E+00	5.00E-08
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	3.27E-03	1.00E+00	5.00E-08
VOC	Toluene	108-88-3	1.00E+00	3.30E-03	1.00E+00	5.00E-08
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	1.21E-03	1.00E+00	5.00E-08
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	8.44E-04	1.00E+00	5.00E-08
VOC	Xylenes (total)	1330-20-7	1.00E+00	2.56E-03	1.00E+00	5.00E-08
SVOC	Acenaphthene	83-32-9	1.00E+00	5.22E-05	1.00E+00	5.00E-08
SVOC	Anthracene	120-12-7	1.00E+00	1.39E-05	1.00E+00	5.00E-08
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.00E+00	5.00E-08
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00		1.00E+00	5.00E-08
SVOC	Chrysene	218-01-9	1.00E+00		1.00E+00	5.00E-08
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00		1.00E+00	5.00E-08
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00		1.00E+00	5.00E-08
SVOC	Ethanol	64-17-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Fluorene	86-73-7	1.00E+00	2.23E-05	1.00E+00	5.00E-08
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.00E+00	5.00E-08
SVOC	Naphthalene	91-20-3	1.00E+00	2.19E-04	1.00E+00	5.00E-08
SVOC	Phenanthrene	85-01-8	1.00E+00	1.72E-05	1.00E+00	5.00E-08
SVOC	Pyrene	129-00-0	1.00E+00		1.00E+00	5.00E-08
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.00E+00	5.00E-08
PCB	PCBs (total)	1336-36-3	1.00E+00		1.00E+00	5.00E-08
INORG	Antimony	7440-36-0	1.00E+00		1.00E+00	5.00E-08
INORG	Arsenic	7440-38-2	1.00E+00		1.00E+00	5.00E-08
INORG	Chromium III	16065-83-1	1.00E+00		1.00E+00	5.00E-08
INORG	Chromium VI	18540-29-9	1.00E+00		1.00E+00	5.00E-08
INORG	Cyanide (total)	57-12-5	1.00E+00	1.45E-04	1.00E+00	5.00E-08
INORG	Lead	7439-92-1	1.00E+00		1.00E+00	5.00E-08
INORG	Nickel	7440-02-0	1.00E+00		1.00E+00	5.00E-08
INORG	Vanadium	7440-62-2	1.00E+00		1.00E+00	5.00E-08

Attachment 3

Table 4a:

Unit Risk and Cancer-Based RBSLs for Exposure of Construction Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{soil} (mg/kg)	Soil Ingestion					Soil Dermal Contact					Soil Vapor Inhalation				Soil Particulate Inhalation				All Routes		
					RBA	LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	RBSL (mg/kg)	ABS _{derm}	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	RBSL (mg/kg)	C _{air} (mg/m ³)	URF (m ³ /mg)	Risk	RBSL (mg/kg)	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	RBSL (mg/kg)	Risk	RBSL (mg/kg)	
VOC	Benzene	71-43-2	A	1.00E+00		2.45E-08	5.5E-02	1.3E-09	7.4E+03			5.5E-02			4.49E-03	7.8E-03	1.1E-07	8.8E+01	5.00E-08	7.8E-03	1.3E-12	7.9E+06	1.2E-07	8.7E+01	
VOC	Cumene	98-82-8	D	1.00E+00		2.45E-08									2.00E-03				5.00E-08						
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00		2.45E-08	2.0E+00	4.9E-08	2.0E+02			2.0E+00			2.17E-03	6.0E-01	4.2E-06	2.4E+00	5.00E-08	6.0E-01	9.8E-11	1.0E+05	4.3E-06	2.3E+00	
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00		2.45E-08	9.1E-02	2.2E-09	4.5E+03			9.1E-02			3.76E-03	2.6E-02	3.2E-07	3.1E+01	5.00E-08	2.6E-02	4.2E-12	2.4E+06	3.2E-07	3.1E+01	
VOC	Ethyl Benzene	100-41-4	D	1.00E+00		2.45E-08									2.41E-03				5.00E-08						
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00		2.45E-08	1.8E-03	4.4E-11	2.3E+05			1.8E-03			3.27E-03	2.6E-04	2.8E-09	3.6E+03	5.00E-08	2.6E-04	4.2E-14	2.4E+08	2.8E-09	3.5E+03	
VOC	Toluene	108-88-3	ID	1.00E+00		2.45E-08									3.30E-03				5.00E-08						
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00		2.45E-08									1.21E-03				5.00E-08						
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00		2.45E-08									8.44E-04				5.00E-08						
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00		2.45E-08									2.56E-03				5.00E-08						
SVOC	Acenaphthene	83-32-9	ID	1.00E+00		2.45E-08				1.30E-01	6.73E-09							5.22E-05							
SVOC	Anthracene	120-12-7	ID	1.00E+00		2.45E-08				1.30E-01	6.73E-09							1.39E-05							
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	4.1E+03	1.30E-01	6.73E-09	1.0E-01	6.7E-10	1.5E+04		6.0E-02			5.00E-08	6.0E-02	9.8E-12	1.0E+06	3.1E-09	3.2E+03	
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		2.45E-08	1.0E+00	2.4E-08	4.1E+02	1.30E-01	6.73E-09	1.0E+00	6.7E-09	1.5E+03		6.0E-01			5.00E-08	6.0E-01	9.8E-11	1.0E+05	3.1E-08	3.2E+02	
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	4.1E+03	1.30E-01	6.73E-09	1.0E-01	6.7E-10	1.5E+04		6.0E-02			5.00E-08	6.0E-02	9.8E-12	1.0E+06	3.1E-09	3.2E+03	
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00		2.45E-08				1.30E-01	6.73E-09								5.00E-08						
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		2.45E-08	1.0E-02	2.4E-10	4.1E+04	1.30E-01	6.73E-09	1.0E-02	6.7E-11	1.5E+05		6.0E-03			5.00E-08	6.0E-03	9.8E-13	1.0E+07	3.1E-10	3.2E+04	
SVOC	Chrysene	218-01-9	B2	1.00E+00		2.45E-08	1.0E-03	2.4E-11	4.1E+05	1.30E-01	6.73E-09	1.0E-03	6.7E-12	1.5E+06		6.0E-04			5.00E-08	6.0E-04	9.8E-14	1.0E+08	3.1E-11	3.2E+05	
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		2.45E-08	1.0E+00	2.4E-08	4.1E+02	1.30E-01	6.73E-09	1.0E+00	6.7E-09	1.5E+03		6.0E-01			5.00E-08	6.0E-01	9.8E-11	1.0E+05	3.1E-08	3.2E+02	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		2.45E-08	2.5E+02	6.1E-06	1.6E+00	1.00E-01	5.18E-09	2.5E+02	1.3E-06	7.7E+00		7.1E+01			5.00E-08	7.1E+01	1.2E-08	8.6E+02	7.4E-06	1.3E+00	
SVOC	Ethanol	64-17-5		1.00E+00		2.45E-08													5.00E-08						
SVOC	Fluorene	86-73-7	D	1.00E+00		2.45E-08				1.30E-01	6.73E-09				2.23E-05				5.00E-08						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		2.45E-08	1.0E-01	2.4E-09	4.1E+03	1.30E-01	6.73E-09	1.0E-01	6.7E-10	1.5E+04		6.0E-02			5.00E-08	6.0E-02	9.8E-12	1.0E+06	3.1E-09	3.2E+03	
SVOC	Naphthalene	91-20-3	C	1.00E+00		2.45E-08	1.2E-01	2.9E-09	3.4E+03	1.30E-01	6.73E-09	1.2E-01	8.1E-10	1.2E+04		2.19E-04	3.4E-02	2.4E-08	4.1E+02	5.00E-08	3.4E-02	5.5E-12	1.8E+06	2.8E-08	3.6E+02
SVOC	Phenanthrene	85-01-8	D	1.00E+00		2.45E-08				1.30E-01	6.73E-09				1.72E-05				5.00E-08						
SVOC	Pyrene	129-00-0	NC	1.00E+00		2.45E-08				1.30E-01	6.73E-09								5.00E-08						
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00		2.45E-08				1.00E-01	5.18E-09								5.00E-08						
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		2.45E-08	2.0E+00	4.9E-08	2.0E+02	1.40E-01	7.25E-09	2.0E+00	1.4E-08	6.9E+02		5.7E-01			5.00E-08	5.7E-01	9.3E-11	1.1E+05	6.4E-08	1.6E+02	
INORG	Antimony	7440-36-0	ID	1.00E+00		2.45E-08													5.00E-08						
INORG	Arsenic	7440-38-2	A	1.00E+00	0.6	2.45E-08	1.5E+00	2.2E-08	4.5E+02	3.00E-02	1.55E-09	1.5E+00	2.3E-09	4.3E+03		4.3E+00			5.00E-08	4.3E+00	7.0E-10	1.4E+04	2.5E-08	4.0E+02	
INORG	Chromium III	16065-83-1	D	1.00E+00		2.45E-08													5.00E-08						
INORG	Chromium VI	18540-29-9	A	1.00E+00		2.45E-08	5.0E-01	1.2E-08	8.2E+02			2.0E+01				1.2E+01			5.00E-08	1.2E+01	2.0E-09	5.1E+03	1.4E-08	7.0E+02	
INORG	Cyanide (total)	57-12-5		1.00E+00		2.45E-08									1.45E-04				5.00E-08						
INORG	Lead	7439-92-1	B2	1.00E+00		2.45E-08													5.00E-08						
INORG	Nickel	7440-02-0	A	1.00E+00		2.45E-08										2.4E-01			5.00E-08	2.4E-01	3.9E-11	2.6E+05	3.9E-11	2.6E+05	
INORG	Vanadium	7440-62-2	ID	1.00E+00		2.45E-08													5.00E-08						

Notes:

The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³.
 Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Attachment 3

Table 4b:

Unit HQ and Noncancer-Based RBSLs for Exposure of Construction Worker to Soil

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{soil} (mg/kg)	Soil Ingestion					Soil Dermal Contact					Soil Vapor Inhalation				Soil Particulate Inhalation				All Routes		
				RBA	ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	RBSL (mg/kg)	ABS _{derm}	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	RBSL (mg/kg)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/kg)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/kg)	HQ	RBSL (mg/kg)	
VOC	Benzene	71-43-2	1.00E+00		1.71E-06	1.0E-02	1.7E-04	5.8E+02							4.49E-03	9.0E-02	1.1E-02	8.8E+00	5.00E-08	9.0E-02	1.3E-07	7.9E+05	1.2E-02	8.7E+00
VOC	Cumene	98-82-8	1.00E+00		1.71E-06	4.0E-01	4.3E-06	2.3E+04							2.00E-03	4.0E-01	1.1E-03	8.8E+01	5.00E-08	4.0E-01	2.9E-08	3.5E+06	1.1E-03	8.7E+01
VOC	1,2-Dibromoethane	106-93-4	1.00E+00		1.71E-06	9.0E-03	1.9E-04	5.3E+02							2.17E-03	9.0E-03	5.5E-02	1.8E+00	5.00E-08	9.0E-03	1.3E-06	7.9E+04	5.5E-02	1.8E+00
VOC	1,2-Dichloroethane	107-06-2	1.00E+00		1.71E-06	2.0E-02	8.6E-05	1.2E+03							3.76E-03	7.0E-02	1.2E-02	8.1E+00	5.00E-08	7.0E-02	1.6E-07	6.1E+05	1.2E-02	8.1E+00
VOC	Ethyl Benzene	100-41-4	1.00E+00		1.71E-06	1.0E-01	1.7E-05	5.8E+03							2.41E-03	9.0E+00	6.1E-05	1.6E+03	5.00E-08	9.0E+00	1.3E-09	7.9E+07	7.8E-05	1.3E+03
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.8E+04							3.27E-03	3.0E+00	2.5E-04	4.0E+02	5.00E-08	3.0E+00	3.8E-09	2.6E+07	2.5E-04	3.9E+02
VOC	Toluene	108-88-3	1.00E+00		1.71E-06	8.0E-01	2.1E-06	4.7E+04							3.30E-03	5.0E+00	1.5E-04	6.6E+02	5.00E-08	5.0E+00	2.3E-09	4.4E+07	1.5E-04	6.5E+02
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00		1.71E-06	4.0E-02	4.3E-05	2.3E+03							1.21E-03	2.0E-01	1.4E-03	7.2E+01	5.00E-08	2.0E-01	5.7E-08	1.8E+06	1.4E-03	7.0E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00		1.71E-06	4.0E-02	4.3E-05	2.3E+03							8.44E-04	2.0E-01	9.6E-04	1.0E+02	5.00E-08	2.0E-01	5.7E-08	1.8E+06	1.0E-03	9.9E+01
VOC	Xylenes (total)	1330-20-7	1.00E+00		1.71E-06	2.0E-01	8.6E-06	1.2E+04							2.56E-03	3.0E-01	1.9E-03	5.1E+01	5.00E-08	3.0E-01	3.8E-08	2.6E+06	2.0E-03	5.1E+01
SVOC	Acenaphthene	83-32-9	1.00E+00		1.71E-06	2.0E-01	8.6E-06	1.2E+04	1.30E-01	4.71E-07	2.0E-01	2.4E-06	4.2E+04	5.22E-05				5.00E-08					1.1E-05	9.2E+03
SVOC	Anthracene	120-12-7	1.00E+00		1.71E-06	1.0E+00	1.7E-06	5.8E+04	1.30E-01	4.71E-07	1.0E+00	4.7E-07	2.1E+05	1.39E-05				5.00E-08					2.2E-06	4.6E+04
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00		1.71E-06	3.0E-04	5.7E-03	1.8E+01	1.30E-01	4.71E-07	3.0E-04	1.6E-03	6.4E+01			2.0E-06		5.00E-08	2.0E-06	5.7E-03	1.8E+01	1.3E-02	7.7E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.8E+04	1.30E-01	4.71E-07	3.0E-01	1.6E-06	6.4E+04					5.00E-08					7.3E-06	1.4E+04
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	Chrysene	218-01-9	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00		1.71E-06				1.00E-01	3.62E-07								5.00E-08						
SVOC	Ethanol	64-17-5	1.00E+00		1.71E-06	6.2E+01	2.8E-08	3.6E+06									1.9E+01		5.00E-08	1.9E+01	6.0E-10	1.7E+08	2.8E-08	3.5E+06
SVOC	Fluorene	86-73-7	1.00E+00		1.71E-06	4.0E-01	4.3E-06	2.3E+04	1.30E-01	4.71E-07	4.0E-01	1.2E-06	8.5E+04	2.23E-05				5.00E-08					5.5E-06	1.8E+04
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00		1.71E-06				1.30E-01	4.71E-07								5.00E-08						
SVOC	Naphthalene	91-20-3	1.00E+00		1.71E-06	2.0E-01	8.6E-06	1.2E+04	1.30E-01	4.71E-07	2.0E-01	2.4E-06	4.2E+04	2.19E-04	3.0E-03	1.7E-02	6.0E+00	5.00E-08	3.0E-03	3.8E-06	2.6E+04	1.7E-02	6.0E+00	
SVOC	Phenanthrene	85-01-8	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.8E+04	1.30E-01	4.71E-07	3.0E-01	1.6E-06	6.4E+04	1.72E-05				5.00E-08					7.3E-06	1.4E+04
SVOC	Pyrene	129-00-0	1.00E+00		1.71E-06	3.0E-01	5.7E-06	1.8E+04	1.30E-01	4.71E-07	3.0E-01	1.6E-06	6.4E+04					5.00E-08					7.3E-06	1.4E+04
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00		1.71E-06	2.0E+00	8.6E-07	1.2E+05	1.00E-01	3.62E-07	2.0E+00	1.8E-07	5.5E+05					5.00E-08					1.0E-06	9.6E+04
PCB	PCBs (total)	1336-36-3	1.00E+00		1.71E-06	5.0E-05	3.4E-02	2.9E+00	1.40E-01	5.07E-07	5.0E-05	1.0E-02	9.9E+00					5.00E-08					4.4E-02	2.3E+00
INORG	Antimony	7440-36-0	1.00E+00		1.71E-06	4.0E-04	4.3E-03	2.3E+01			6.0E-05							5.00E-08					4.3E-03	2.3E+01
INORG	Arsenic	7440-38-2	1.00E+00	0.6	1.71E-06	5.0E-03	2.1E-04	4.9E+02	3.00E-02	1.09E-07	5.0E-03	2.2E-05	4.6E+03			1.5E-05		5.00E-08	1.5E-05	7.6E-04	1.3E+02	9.9E-04	1.0E+02	
INORG	Chromium III	16065-83-1	1.00E+00		1.71E-06	1.5E+00	1.1E-06	8.8E+04			2.0E-02							5.00E-08	5.0E-03	2.3E-06	4.4E+04	3.4E-06	2.9E+04	
INORG	Chromium VI	18540-29-9	1.00E+00		1.71E-06	5.0E-03	3.4E-04	2.9E+02			1.3E-04							5.00E-08	1.0E-03	1.1E-05	8.8E+03	3.5E-04	2.8E+02	
INORG	Cyanide (total)	57-12-5	1.00E+00		1.71E-06	6.0E-03	2.9E-04	3.5E+02			6.0E-03			1.45E-04	3.0E-03	1.1E-02	9.0E+00	5.00E-08	3.0E-03	3.8E-06	2.6E+04	1.1E-02	8.8E+00	
INORG	Lead	7439-92-1	1.00E+00		1.71E-06													5.00E-08						
INORG	Nickel	7440-02-0	1.00E+00		1.71E-06	2.0E-02	8.6E-05	1.2E+03			8.0E-04							5.00E-08	2.0E-04	5.7E-05	1.8E+03	1.4E-04	7.0E+02	
INORG	Vanadium	7440-62-2	1.00E+00		1.71E-06	1.0E-02	1.7E-04	5.8E+02			2.6E-04							5.00E-08	1.0E-04	1.1E-04	8.8E+02	2.9E-04	3.5E+02	

Notes:

The concentration of particulates in the air is assumed to be no more than the former annual National Ambient Air Quality Standards (NAAQS) for PM₁₀ of 50 ug/m³. Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 3

Table 5:

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	MW (g/mol)	k_G (cm/s)	k_L (cm/s)	$1/K_L$ (s/cm)	K_L (cm/s)	J_L (L/m ² -s)
VOC	Benzene	71-43-2	1.7E-01	7.8E+01	4.97E-01	1.25E-03	8.12E+02	1.23E-03	1.23E-02
VOC	Cumene	98-82-8	3.3E-01	1.2E+02	4.31E-01	1.01E-03	9.99E+02	1.00E-03	1.00E-02
VOC	1,2-Dibromoethane	106-93-4	2.4E-02	1.9E+02	3.71E-01	8.06E-04	1.35E+03	7.38E-04	7.38E-03
VOC	1,2-Dichloroethane	107-06-2	2.9E-02	9.9E+01	4.60E-01	1.11E-03	9.75E+02	1.03E-03	1.03E-02
VOC	Ethyl Benzene	100-41-4	2.2E-01	1.1E+02	4.49E-01	1.07E-03	9.43E+02	1.06E-03	1.06E-02
VOC	Methyl tert-butyl ether	1634-04-4	1.8E-02	8.8E+01	4.78E-01	1.18E-03	9.64E+02	1.04E-03	1.04E-02
VOC	Toluene	108-88-3	1.9E-01	9.2E+01	4.71E-01	1.15E-03	8.80E+02	1.14E-03	1.14E-02
VOC	1,2,4-Trimethylbenzene	95-63-6	1.6E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E-01	1.2E+02	4.31E-01	1.01E-03	1.01E+03	9.93E-04	9.93E-03
VOC	Xylenes (total)	1330-20-7	2.5E-01	1.1E+02	4.49E-01	1.07E-03	9.42E+02	1.06E-03	1.06E-02
SVOC	Acenaphthene	83-32-9	3.4E-03	1.5E+02	3.96E-01	8.90E-04	1.87E+03	5.36E-04	5.36E-03
SVOC	Anthracene	120-12-7	1.3E-03	1.8E+02	3.77E-01	8.28E-04	3.24E+03	3.09E-04	3.09E-03
SVOC	Benzo(a)anthracene	56-55-3	5.6E-05	2.3E+02	3.47E-01	7.31E-04	5.32E+04	1.88E-05	
SVOC	Benzo(a)pyrene	50-32-8	1.5E-05	2.5E+02	3.36E-01	6.96E-04	2.01E+05	4.98E-06	
SVOC	Benzo(b)fluoranthene	205-99-2	1.7E-03	2.5E+02	3.36E-01	6.96E-04	3.23E+03	3.09E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.1E-05	2.8E+02	3.26E-01	6.65E-04	2.81E+05	3.56E-06	
SVOC	Benzo(k)fluoranthene	207-08-9	1.2E-05	2.5E+02	3.36E-01	6.96E-04	2.59E+05	3.86E-06	
SVOC	Chrysene	218-01-9	1.5E-03	2.3E+02	3.47E-01	7.31E-04	3.31E+03	3.02E-04	
SVOC	Dibenz(a,h)anthracene	53-70-3	9.6E-08	2.8E+02	3.25E-01	6.62E-04	3.22E+07	3.11E-08	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.0E-06	2.6E+02	3.34E-01	6.90E-04	2.90E+06	3.45E-07	
SVOC	Ethanol	64-17-5	2.0E-04	4.6E+01	5.94E-01	1.63E-03	9.21E+03	1.09E-04	
SVOC	Fluorene	86-73-7	1.4E-03	1.7E+02	3.86E-01	8.57E-04	3.03E+03	3.30E-04	3.30E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.0E-05	2.8E+02	3.26E-01	6.65E-04	1.53E+05	6.54E-06	
SVOC	Naphthalene	91-20-3	1.2E-02	1.3E+02	4.21E-01	9.76E-04	1.22E+03	8.18E-04	8.18E-03
SVOC	Phenanthrene	85-01-8	1.4E-03	1.8E+02	3.77E-01	8.28E-04	3.09E+03	3.23E-04	3.23E-03
SVOC	Pyrene	129-00-0	2.0E-04	2.0E+02	3.62E-01	7.77E-04	1.51E+04	6.62E-05	
SVOC	Tetraethylene Glycol	112-60-7	1.6E-11	1.9E+02	3.67E-01	7.93E-04	1.68E+11	5.95E-12	
PCB	PCBs (total)	1336-36-3	6.6E-02	3.3E+02	3.08E-01	6.10E-04	1.69E+03	5.92E-04	
INORG	Antimony	7440-36-0		1.2E+02	4.29E-01	1.00E-03			
INORG	Arsenic	7440-38-2		7.5E+01	5.04E-01	1.28E-03			
INORG	Chromium III	16065-83-1		5.2E+01	5.70E-01	1.53E-03			
INORG	Chromium VI	18540-29-9		5.2E+01	5.70E-01	1.53E-03			
INORG	Cyanide (total)	57-12-5	2.0E-03	2.6E+01	7.19E-01	2.17E-03	1.17E+03	8.57E-04	8.57E-03
INORG	Lead	7439-92-1		2.1E+02	3.59E-01	7.68E-04			
INORG	Nickel	7440-02-0		5.9E+01	5.47E-01	1.44E-03			
INORG	Vanadium	7440-62-2		5.1E+01	5.74E-01	1.55E-03			

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Table 5:

Normalized Vapor Flux to Outdoor Air from Exposed Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Molecular Weight of Oxygen	g/mol	MW_{O2}	32
Molecular Weight of Water	g/mol	MW_{H2O}	18
Temperature	K	Temp	291
Liquid-phase Mass Transfer Coefficient for Oxygen	cm/s	k_{L,O2}	0.002
Gas-Phase Mass Transfer Coefficient for Water Vapor at 25 °C	cm/s	K_{G,H2O}	0.833
	(L/m ³) /		
Dispersion coefficient	(L/m ² /s)	C/Q	9.6

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Table 6:

Dermal Absorbed Dose for Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	MW (g/mole)	FA (unitless)	K _p (cm/hr)	B (unitless)	t (hr)	c	b	ts (hr)	DA (L/cm ² -event)
VOC	Benzene	71-43-2	7.8E+01	1.0E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	3.70E-05
VOC	Cumene	98-82-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,2-Dibromoethane	106-93-4	1.9E+02	1.0E+00	1.6E-03	8.4E-03	1.2E+00	3.4E-01	3.1E-01	2.8E+00	6.81E-06
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.0E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.13E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	1.0E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.27E-04
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.0E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	8.84E-06
VOC	Toluene	108-88-3	9.2E+01	1.0E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	8.08E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	Xylenes (total)	1330-20-7	1.1E+02	1.0E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.32E-04
SVOC	Acenaphthene	83-32-9	1.5E+02	1.0E+00			7.7E-01	3.3E-01	3.0E-01	1.8E+00	
SVOC	Anthracene	120-12-7	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Chrysene	218-01-9	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Dibenz(a,h)anthracene	53-70-3	2.8E+02	7.0E-01			3.8E+00	3.3E-01	3.0E-01	9.1E+00	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	2.6E+02	1.0E+00			2.9E+00	3.3E-01	3.0E-01	6.9E+00	
SVOC	Ethanol	64-17-5	4.6E+01	1.0E+00	5.5E-04	1.4E-03	1.9E-01	3.3E-01	3.0E-01	4.6E-01	1.30E-06
SVOC	Fluorene	86-73-7	1.7E+02	1.0E+00			9.0E-01	3.3E-01	3.0E-01	2.2E+00	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Naphthalene	91-20-3	1.3E+02	1.0E+00			5.5E-01	3.3E-01	3.0E-01	1.3E+00	
SVOC	Phenanthrene	85-01-8	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Pyrene	129-00-0	2.0E+02	1.0E+00			1.4E+00	3.3E-01	3.0E-01	3.4E+00	
SVOC	Tetraethylene Glycol	112-60-7	1.9E+02	1.0E+00			1.3E+00	3.3E-01	3.0E-01	3.1E+00	
PCB	PCBs (total)	1336-36-3	3.3E+02	7.0E-01			7.2E+00	3.3E-01	3.0E-01	1.7E+01	
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03		5.1E-01	3.3E-01	3.0E-01	1.2E+00	2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03		2.8E-01	3.3E-01	3.0E-01	6.6E-01	2.00E-06
INORG	Chromium III	16065-83-1	5.2E+01		1.0E-03		2.1E-01	3.3E-01	3.0E-01	4.9E-01	2.00E-06
INORG	Chromium VI	18540-29-9	5.2E+01		2.0E-03		2.1E-01	3.3E-01	3.0E-01	4.9E-01	4.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03		1.5E-01	3.3E-01	3.0E-01	3.5E-01	2.00E-06
INORG	Lead	7439-92-1	2.1E+02		1.0E-04		1.5E+00	3.3E-01	3.0E-01	3.7E+00	2.00E-07
INORG	Nickel	7440-02-0	5.9E+01		2.0E-04		2.2E-01	3.3E-01	3.0E-01	5.4E-01	4.00E-07
INORG	Vanadium	7440-62-2	5.1E+01		1.0E-03		2.0E-01	3.3E-01	3.0E-01	4.9E-01	2.00E-06

Notes:
 Event Time hours t 2
 K_p capped at 1 cm/hr (USEPA 1992).
 The dermal absorbed dose for inorganic chemicals is estimated using a steady-state approach (USEPA 2004, Equation 3.4) and for organic chemicals is estimated using a nonsteady-state approach (USEPA 2004, Equations 3.2 and 3.3).

Attachment 3

Table 7a:

Unit Risk and Cancer-Based RBSLs for Exposure of Construction Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	C _{gw} (mg/l)	Incidental Ingestion				Dermal Contact					Vapor Inhalation				All Routes	
					LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	Risk	RBSL (mg/L)	DA (L/cm ² -event)	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	Risk	RBSL (mg/L)	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	Risk	RBSL (mg/L)
VOC	Benzene	71-43-2	A	1.00E+00	7.34E-08	5.5E-02	4.0E-09	2.5E+03	3.70E-05	9.57E-07	5.5E-02	5.3E-08	1.9E+02	1.19E-01	7.8E-03	1.8E-07	5.5E+01	2.4E-07	4.2E+01
VOC	Cumene	98-82-8	D	1.00E+00	7.34E-08									9.64E-02					
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	7.34E-08	2.0E+00	1.5E-07	6.8E+01	6.81E-06	1.76E-07	2.0E+00	3.5E-07	2.8E+01	7.11E-02	6.0E-01	8.4E-06	1.2E+00	8.9E-06	1.1E+00
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	7.34E-08	9.1E-02	6.7E-09	1.5E+03	1.13E-05	2.92E-07	9.1E-02	2.7E-08	3.8E+02	9.88E-02	2.6E-02	5.0E-07	2.0E+01	5.4E-07	1.9E+01
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	7.34E-08				1.27E-04	3.28E-06				1.02E-01					
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	7.34E-08	1.8E-03	1.3E-10	7.6E+04	8.84E-06	2.29E-07	1.8E-03	4.1E-10	2.4E+04	9.99E-02	2.6E-04	5.1E-09	2.0E+03	5.6E-09	1.8E+03
VOC	Toluene	108-88-3	ID	1.00E+00	7.34E-08				8.08E-05	2.09E-06				1.09E-01					
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	7.34E-08									9.57E-02					
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	7.34E-08									9.56E-02					
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	7.34E-08				1.32E-04	3.41E-06				1.02E-01					
SVOC	Acenaphthene	83-32-9	ID	1.00E+00	7.34E-08									5.16E-02					
SVOC	Anthracene	120-12-7	ID	1.00E+00	7.34E-08									2.97E-02					
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09	1.4E+03			1.0E-01				6.0E-02			7.3E-09	1.4E+03
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00	7.34E-08	1.0E+00	7.3E-08	1.4E+02			1.0E+00				6.0E-01			7.3E-08	1.4E+02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09	1.4E+03			1.0E-01				6.0E-02			7.3E-09	1.4E+03
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00	7.34E-08														
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00	7.34E-08	1.0E-02	7.3E-10	1.4E+04			1.0E-02				6.0E-03			7.3E-10	1.4E+04
SVOC	Chrysene	218-01-9	B2	1.00E+00	7.34E-08	1.0E-03	7.3E-11	1.4E+05			1.0E-03				6.0E-04			7.3E-11	1.4E+05
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00	7.34E-08	1.0E+00	7.3E-08	1.4E+02			1.0E+00				6.0E-01			7.3E-08	1.4E+02
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00	7.34E-08	2.5E+02	1.8E-05	5.5E-01			2.5E+02				7.1E+01			1.8E-05	5.5E-01
SVOC	Ethanol	64-17-5		1.00E+00	7.34E-08				1.30E-06	3.36E-08									
SVOC	Fluorene	86-73-7	D	1.00E+00	7.34E-08									3.18E-02					
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00	7.34E-08	1.0E-01	7.3E-09	1.4E+03			1.0E-01				6.0E-02			7.3E-09	1.4E+03
SVOC	Naphthalene	91-20-3	C	1.00E+00	7.34E-08	1.2E-01	8.8E-09	1.1E+03			1.2E-01			7.88E-02	3.4E-02	5.2E-07	1.9E+01	5.3E-07	1.9E+01
SVOC	Phenanthrene	85-01-8	D	1.00E+00	7.34E-08									3.11E-02					
SVOC	Pyrene	129-00-0	NC	1.00E+00	7.34E-08														
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00	7.34E-08														
PCB	PCBs (total)	1336-36-3	B2	1.00E+00	7.34E-08	2.0E+00	1.5E-07	6.8E+01			2.0E+00				5.7E-01			1.5E-07	6.8E+01
INORG	Antimony	7440-36-0	ID	1.00E+00	7.34E-08				2.00E-06	5.18E-08									
INORG	Arsenic	7440-38-2	A	1.00E+00	7.34E-08	1.5E+00	1.1E-07	9.1E+01	2.00E-06	5.18E-08	1.5E+00	7.8E-08	1.3E+02		4.3E+00			1.9E-07	5.3E+01
INORG	Chromium III	16065-83-1	D	1.00E+00	7.34E-08				2.00E-06	5.18E-08									
INORG	Chromium VI	18540-29-9	A	1.00E+00	7.34E-08	5.0E-01	3.7E-08	2.7E+02	4.00E-06	1.04E-07	2.0E+01	2.1E-06	4.8E+00		1.2E+01			2.1E-06	4.7E+00
INORG	Cyanide (total)	57-12-5		1.00E+00	7.34E-08				2.00E-06	5.18E-08				8.26E-02					
INORG	Lead	7439-92-1	B2	1.00E+00	7.34E-08				2.00E-07	5.18E-09									
INORG	Nickel	7440-02-0	A	1.00E+00	7.34E-08				4.00E-07	1.04E-08					2.4E-01				
INORG	Vanadium	7440-62-2	ID	1.00E+00	7.34E-08				2.00E-06	5.18E-08									

Notes:
Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Attachment 3

Table 7b:

Unit HQ and Noncancer-Based RBSLs for Exposure of Construction Workers to Groundwater in Excavations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{gw} (mg/L)	Incidental Ingestion				Dermal Contact					Vapor Inhalation				All Routes	
				ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	RBSL (mg/L)	DA (L/cm ² -event)	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	RBSL (mg/L)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/L)	HQ	RBSL (mg/L)
VOC	Benzene	71-43-2	1.00E+00	5.14E-06	1.0E-02	5.1E-04	1.9E+02	3.70E-05	6.70E-05	1.0E-02	6.7E-03	1.5E+01	1.19E-01	9.0E-02	1.8E-02	5.5E+00	2.5E-02	4.0E+00
VOC	Cumene	98-82-8	1.00E+00	5.14E-06	4.0E-01	1.3E-05	7.8E+03			4.0E-01			9.64E-02	4.0E-01	3.3E-03	3.0E+01	3.3E-03	3.0E+01
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	5.14E-06	9.0E-03	5.7E-04	1.8E+02	6.81E-06	1.23E-05	9.0E-03	1.4E-03	7.3E+01	7.11E-02	9.0E-03	1.1E-01	9.2E-01	1.1E-01	9.1E-01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	5.14E-06	2.0E-02	2.6E-04	3.9E+02	1.13E-05	2.05E-05	2.0E-02	1.0E-03	9.8E+01	9.88E-02	7.0E-02	1.9E-02	5.2E+00	2.1E-02	4.9E+00
VOC	Ethyl Benzene	100-41-4	1.00E+00	5.14E-06	1.0E-01	5.1E-05	1.9E+03	1.27E-04	2.30E-04	1.0E-01	2.3E-03	4.4E+01	1.02E-01	9.0E+00	1.6E-04	6.4E+02	2.5E-03	4.0E+01
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	5.14E-06	3.0E-01	1.7E-05	5.8E+03	8.84E-06	1.60E-05	3.0E-01	5.3E-05	1.9E+03	9.99E-02	3.0E+00	4.6E-04	2.2E+02	5.3E-04	1.9E+02
VOC	Toluene	108-88-3	1.00E+00	5.14E-06	8.0E-01	6.4E-06	1.6E+04	8.08E-05	1.46E-04	8.0E-01	1.8E-04	5.5E+02	1.09E-01	5.0E+00	3.0E-04	3.3E+02	4.9E-04	2.0E+02
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	5.14E-06	4.0E-02	1.3E-04	7.8E+02			4.0E-02			9.57E-02	2.0E-01	6.6E-03	1.5E+01	6.7E-03	1.5E+01
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	5.14E-06	4.0E-02	1.3E-04	7.8E+02			4.0E-02			9.56E-02	2.0E-01	6.5E-03	1.5E+01	6.7E-03	1.5E+01
VOC	Xylenes (total)	1330-20-7	1.00E+00	5.14E-06	2.0E-01	2.6E-05	3.9E+03	1.32E-04	2.39E-04	2.0E-01	1.2E-03	8.4E+01	1.02E-01	3.0E-01	4.7E-03	2.1E+01	5.9E-03	1.7E+01
SVOC	Acenaphthene	83-32-9	1.00E+00	5.14E-06	2.0E-01	2.6E-05	3.9E+03			2.0E-01			5.16E-02				2.6E-05	3.9E+03
SVOC	Anthracene	120-12-7	1.00E+00	5.14E-06	1.0E+00	5.1E-06	1.9E+04			1.0E+00			2.97E-02				5.1E-06	1.9E+04
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00	5.14E-06														
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00	5.14E-06	3.0E-04	1.7E-02	5.8E+00			3.0E-04				2.0E-06			1.7E-02	5.8E+00
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00	5.14E-06														
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00	5.14E-06	3.0E-01	1.7E-05	5.8E+03			3.0E-01							1.7E-05	5.8E+03
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00	5.14E-06														
SVOC	Chrysene	218-01-9	1.00E+00	5.14E-06														
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00	5.14E-06														
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00	5.14E-06														
SVOC	Ethanol	64-17-5	1.00E+00	5.14E-06	6.2E+01	8.3E-08	1.2E+06	1.30E-06	2.35E-06	6.2E+01	3.8E-08	2.6E+06		1.9E+01			1.2E-07	8.3E+05
SVOC	Fluorene	86-73-7	1.00E+00	5.14E-06	4.0E-01	1.3E-05	7.8E+03			4.0E-01			3.18E-02				1.3E-05	7.8E+03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00	5.14E-06														
SVOC	Naphthalene	91-20-3	1.00E+00	5.14E-06	2.0E-01	2.6E-05	3.9E+03			2.0E-01			7.88E-02	3.0E-03	3.6E-01	2.8E-01	3.6E-01	2.8E-01
SVOC	Phenanthrene	85-01-8	1.00E+00	5.14E-06	3.0E-01	1.7E-05	5.8E+03			3.0E-01			3.11E-02				1.7E-05	5.8E+03
SVOC	Pyrene	129-00-0	1.00E+00	5.14E-06	3.0E-01	1.7E-05	5.8E+03			3.0E-01							1.7E-05	5.8E+03
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00	5.14E-06	2.0E+00	2.6E-06	3.9E+04			2.0E+00							2.6E-06	3.9E+04
PCB	PCBs (total)	1336-36-3	1.00E+00	5.14E-06	5.0E-05	1.0E-01	9.7E-01			5.0E-05							1.0E-01	9.7E-01
INORG	Antimony	7440-36-0	1.00E+00	5.14E-06	4.0E-04	1.3E-02	7.8E+00	2.00E-06	3.62E-06	6.0E-05	6.0E-02	1.7E+00					7.3E-02	1.4E+00
INORG	Arsenic	7440-38-2	1.00E+00	5.14E-06	5.0E-03	1.0E-03	9.7E+01	2.00E-06	3.62E-06	5.0E-03	7.2E-04	1.4E+02		1.5E-05			1.8E-03	5.7E+01
INORG	Chromium III	16065-83-1	1.00E+00	5.14E-06	1.5E+00	3.4E-06	2.9E+04	2.00E-06	3.62E-06	2.0E-02	1.9E-04	5.4E+02		5.0E-03			1.9E-04	5.3E+02
INORG	Chromium VI	18540-29-9	1.00E+00	5.14E-06	5.0E-03	1.0E-03	9.7E+01	4.00E-06	7.25E-06	1.3E-04	5.8E-02	1.7E+00		1.0E-03			5.9E-02	1.7E+00
INORG	Cyanide (total)	57-12-5	1.00E+00	5.14E-06	6.0E-03	8.6E-04	1.2E+02	2.00E-06	3.62E-06	6.0E-03	6.0E-04	1.7E+02	8.26E-02	3.0E-03	3.8E-01	2.7E-01	3.8E-01	2.6E-01
INORG	Lead	7439-92-1	1.00E+00	5.14E-06				2.00E-07	3.62E-07									
INORG	Nickel	7440-02-0	1.00E+00	5.14E-06	2.0E-02	2.6E-04	3.9E+02	4.00E-07	7.25E-07	8.0E-04	9.1E-04	1.1E+02		2.0E-04			1.2E-03	8.6E+01
INORG	Vanadium	7440-62-2	1.00E+00	5.14E-06	1.0E-02	5.1E-04	1.9E+02	2.00E-06	3.62E-06	2.6E-04	1.4E-02	7.2E+00		1.0E-04			1.4E-02	6.9E+00

Notes:
Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 4

Soil Migration to Groundwater Screening Level Calculations

Table 1 – Groundwater Protection Concentrations

Table 2 – Soil Migration to Groundwater Criteria



Attachment 4

Table 1

Groundwater Protection Concentrations

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	Groundwater Protection Concentration (mg/L)	GWP Basis
VOC	Benzene	71-43-2	A	2.5E-01	Min
VOC	Cumene	98-82-8	D	2.6E+00	Min
VOC	1,2-Dibromoethane	106-93-4	LC	7.9E-03	Min
VOC	1,2-Dichloroethane	107-06-2	B2	8.2E-02	Min
VOC	Ethyl Benzene	100-41-4	D	2.0E+00	Min
VOC	Methyl tert-butyl ether	1634-04-4	C	1.5E+01	Min
VOC	Toluene	108-88-3	ID	2.5E+01	Min
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	6.3E-01	Min
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	5.9E-01	Min
VOC	Xylenes (total)	1330-20-7	ID	8.6E-01	Min
SVOC	Acenaphthene	83-32-9	ID	9.0E+00	Min
SVOC	Anthracene	120-12-7	ID	4.0E+01	Min
SVOC	Benzo(a)anthracene	56-55-3	B2	1.3E-02	Min
SVOC	Benzo(a)pyrene	50-32-8	HC	1.3E-03	Min
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.3E-02	Min
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.2E-02	Min
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.3E-01	Min
SVOC	Chrysene	218-01-9	B2	1.3E+00	Min
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.3E-03	Min
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	3.9E-05	Min
SVOC	Ethanol	64-17-5		1.0E+04	Min
SVOC	Fluorene	86-73-7	D	7.0E+00	Min
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.3E-02	Min
SVOC	Naphthalene	91-20-3	C	6.7E-02	Min
SVOC	Phenanthrene	85-01-8	D	1.0E+00	Min
SVOC	Pyrene	129-00-0	NC	3.0E+00	Min
SVOC	Tetraethylene Glycol	112-60-7		2.9E+02	Min
PCB	PCBs (total)	1336-36-3	B2	6.4E-04	Min
INORG	Antimony	7440-36-0	ID	2.2E-02	Min
INORG	Arsenic	7440-38-2	A	2.1E-02	Min
INORG	Chromium III	16065-83-1	D	1.1E+01	Min
INORG	Chromium VI	18540-29-9	A	3.9E-03	Min
INORG	Cyanide (total)	57-12-5		2.5E-02	Min
INORG	Lead	7439-92-1	B2	2.5E+00	Min
INORG	Nickel	7440-02-0	A	1.3E+00	Min
INORG	Vanadium	7440-62-2	ID	1.4E-01	Min

Notes:

The target groundwater protection concentration is based on the minimum of the groundwater RBSLs.

Attachment 4

Table 2

Soil Migration to Groundwater Criteria

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Target Concentration in Groundwater (mg/L)		Solubility (mg/L)	K _{oc} (L/kg)	K _d (L/kg)	H (unitless)	C _{soil-MtGW-Eq} (mg/kg)	C _{soil-MtGW-Lt} (mg/kg)	Soil MtGW Screening Level (mg/kg)	
				Min								
VOC	Benzene	71-43-2	2.5E-01	Min	1.8E+03	5.8E+01		1.7E-01	1.8E+00	9.8E+01	9.8E+01	LT
VOC	Cumene	98-82-8	2.6E+00	Min	6.1E+01	7.1E+02		3.3E-01	1.9E+02	1.0E+03	1.0E+03	LT
VOC	1,2-Dibromoethane	106-93-4	7.9E-03	Min	3.9E+03	2.2E+01		2.4E-02	2.3E-02	3.2E+00	3.2E+00	LT
VOC	1,2-Dichloroethane	107-06-2	8.2E-02	Min	8.5E+03	1.7E+01		2.9E-02	2.1E-01	3.3E+01	3.3E+01	LT
VOC	Ethyl Benzene	100-41-4	2.0E+00	Min	1.7E+02	3.7E+02		2.2E-01	7.8E+01	8.2E+02	8.2E+02	LT
VOC	Methyl tert-butyl ether	1634-04-4	1.5E+01	Min	5.1E+04	1.1E+01		1.8E-02	2.7E+01	5.9E+03	5.9E+03	LT
VOC	Toluene	108-88-3	2.5E+01	Min	5.3E+02	1.8E+02		1.9E-01	4.8E+02	9.8E+03	9.8E+03	LT
VOC	1,2,4-Trimethylbenzene	95-63-6	6.3E-01	Min	5.7E+01	9.0E+02		1.6E-01	5.7E+01	2.5E+02	2.5E+02	LT
VOC	1,3,5-Trimethylbenzene	108-67-8	5.9E-01	Min	4.8E+01	1.8E+03		1.5E-01	1.0E+02	2.4E+02	2.4E+02	LT
VOC	Xylenes (total)	1330-20-7	8.6E-01	Min	1.7E+02	3.9E+02		2.5E-01	3.4E+01	3.4E+02	3.4E+02	LT
SVOC	Acenaphthene	83-32-9	9.0E+00	Min	4.2E+00	7.1E+03		3.4E-03	6.4E+03	3.6E+03		NA
SVOC	Anthracene	120-12-7	4.0E+01	Min	4.3E-02	3.0E+04		1.3E-03	1.2E+05	1.6E+04		NA
SVOC	Benzo(a)anthracene	56-55-3	1.3E-02	Min	9.4E-03	4.0E+05		5.6E-05	5.2E+02	5.2E+00		NA
SVOC	Benzo(a)pyrene	50-32-8	1.3E-03	Min	1.6E-03	1.0E+06		1.5E-05	1.3E+02	5.2E-01		NA
SVOC	Benzo(b)fluoranthene	205-99-2	1.3E-02	Min	1.5E-03	1.2E+06		1.7E-03	1.6E+03	5.2E+00		NA
SVOC	Benzo(g,h,i)perylene	191-24-2	1.2E-02	Min	2.6E-04	1.3E+07		1.1E-05	1.5E+04	4.8E+00		NA
SVOC	Benzo(k)fluoranthene	207-08-9	1.3E-01	Min	8.0E-04	1.2E+06		1.2E-05	1.6E+04	5.2E+01		NA
SVOC	Chrysene	218-01-9	1.3E+00	Min	1.6E-03	4.0E+05		1.5E-03	5.2E+04	5.2E+02		NA
SVOC	Dibenz(a,h)anthracene	53-70-3	1.3E-03	Min	2.5E-03	3.8E+06		9.6E-08	4.9E+02	5.2E-01		NA
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	3.9E-05	Min	2.5E-02	5.0E+05		1.0E-06	2.0E+00	1.6E-02	2.0E+00	EQ
SVOC	Ethanol	64-17-5	1.0E+04	Min		6.8E-01		2.0E-04	7.5E+03	4.2E+06	4.2E+06	LT
SVOC	Fluorene	86-73-7	7.0E+00	Min	2.0E+00	1.4E+04		1.4E-03	9.6E+03	2.8E+03		NA
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.3E-02	Min	2.2E-05	3.4E+06		2.0E-05	4.5E+03	5.2E+00		NA
SVOC	Naphthalene	91-20-3	6.7E-02	Min	3.1E+01	2.0E+03		1.2E-02	1.4E+01	2.7E+01	2.7E+01	LT
SVOC	Phenanthrene	85-01-8	1.0E+00	Min	1.2E+00	2.4E+04		1.4E-03	2.4E+03	4.0E+02		NA
SVOC	Pyrene	129-00-0	3.0E+00	Min	1.4E-01	1.1E+05		2.0E-04	3.2E+04	1.2E+03		NA
SVOC	Tetraethylene Glycol	112-60-7	2.9E+02	Min	1.0E+06	3.0E-02		1.6E-11	1.9E+02	1.2E+05	1.2E+05	LT
PCB	PCBs (total)	1336-36-3	6.4E-04	Min	1.2E-02	2.5E+06		6.6E-02	1.6E+02	2.6E-01		NA
INORG	Antimony	7440-36-0	2.2E-02	Min			4.5E+01		2.0E+01	8.9E+00	2.0E+01	EQ
INORG	Arsenic	7440-38-2	2.1E-02	Min			2.9E+01		1.2E+01	8.4E+00	1.2E+01	EQ
INORG	Chromium III	16065-83-1	1.1E+01	Min			1.8E+06		4.0E+08	4.5E+03	4.0E+08	EQ
INORG	Chromium VI	18540-29-9	3.9E-03	Min			1.9E+01		1.5E+00	1.5E+00	1.5E+00	LT
INORG	Cyanide (total)	57-12-5	2.5E-02	Min	9.5E+04		9.9E+00	2.0E-03	4.9E+00	9.9E+00	9.9E+00	LT
INORG	Lead	7439-92-1	2.5E+00	Min			9.0E+02		4.5E+04	1.0E+03	4.5E+04	EQ
INORG	Nickel	7440-02-0	1.3E+00	Min			6.5E+01		1.7E+03	5.3E+02	1.7E+03	EQ
INORG	Vanadium	7440-62-2	1.4E-01	Min			1.0E+03		2.8E+03	5.7E+01	2.8E+03	EQ

Attachment 4

Table 2

Soil Migration to Groundwater Criteria

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

f_{oc}	Fraction organic carbon	0.005
ρ_b	Soil bulk density	1.66
n	Total porosity	0.38
θ_w	Water-filled soil porosity	0.05
θ_a	Air-filled soil porosity	0.32
DAF	Dilution attenuation factor	20

Only chemicals detected in soil are shown.

$C_{soil-MtGW-Eq}$: Soil screening level based on equilibrium partitioning (EQ)

$C_{soil-MtGW-Lt}$: Soil screening level based on simulated worst-case leach test (LT)

NA: Not applicable - target groundwater concentration times DAF is greater than constituent's solubility.

The K_d for organic compounds is the K_{oc} times the f_{oc} .

Attachment 5

Off-Site Resident Risk Based Screening Level Calculations

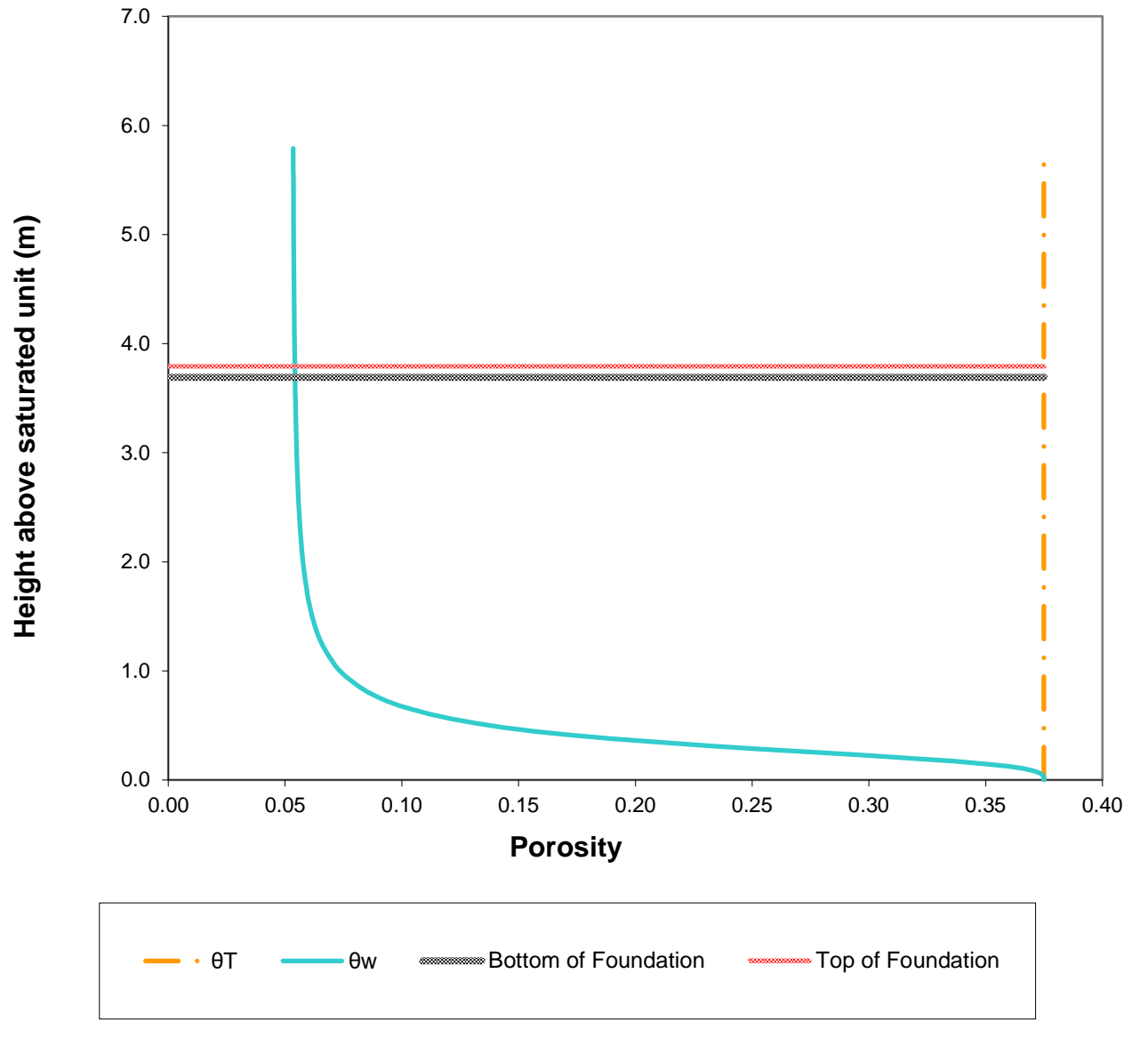
Figure 1 – Soil Moisture Profile for Default PADEP Residential Building (w/ Basement)

Table 1 – Normalized Indoor Air Concentrations in a Default PADEP Residential Building (with Basement) Due to Vapor Intrusion from Groundwater

Table 2 – Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Residential Building (with Basement)



Attachment 5
Figure 1: Soil Moisture Profile for Default PADEP Residential Building (w/ Basement)
PESRM Philadelphia Refining Complex, Philadelphia, Pennsylvania



Attachment 5

Table 1:

Normalized Indoor Air Concentration in a Default PADEP Residential Building (w/ Basement) Due to Vapor Intrusion from Groundwater

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	D _{air} (m ² /day)	D _{water} (m ² /day)	H (unitless)	D _{crack} (m ² /day)	D _{eff} ^T (m ² /day)	α _{soil}	α _{slab}	α _∞	C _{b, norm} (L-water/m ³)
VOC	Benzene	71-43-2	7.60E-01	8.47E-05	1.68E-01	1.23E-01	2.49E-03	1.66E-02	4.55E-03	7.55E-05	1.27E-02
VOC	Cumene	98-82-8	5.62E-01	6.13E-05	3.28E-01	9.06E-02	1.03E-03	6.94E-03	4.55E-03	3.16E-05	1.04E-02
VOC	1,2-Dibromoethane	106-93-4	3.72E-01	7.29E-05	2.37E-02	5.99E-02	8.50E-03	5.45E-02	4.55E-03	2.48E-04	5.89E-03
VOC	1,2-Dichloroethane	107-06-2	8.99E-01	8.55E-05	2.92E-02	1.45E-01	1.06E-02	6.68E-02	4.55E-03	3.04E-04	8.87E-03
VOC	Ethyl Benzene	100-41-4	6.48E-01	6.74E-05	2.20E-01	1.05E-01	1.60E-03	1.07E-02	4.55E-03	4.89E-05	1.07E-02
VOC	Methyl tert-butyl ether	1634-04-4	7.42E-01	8.73E-05	1.83E-02	1.20E-01	1.43E-02	8.81E-02	4.55E-03	4.01E-04	7.36E-03
VOC	Toluene	108-88-3	7.52E-01	7.43E-05	1.93E-01	1.21E-01	1.99E-03	1.33E-02	4.55E-03	6.05E-05	1.17E-02
VOC	1,2,4-Trimethylbenzene	95-63-6	5.24E-01	6.84E-05	1.61E-01	8.45E-02	2.03E-03	1.36E-02	4.55E-03	6.19E-05	9.96E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	5.20E-01	7.49E-05	1.54E-01	8.39E-02	2.27E-03	1.52E-02	4.55E-03	6.90E-05	1.06E-02
VOC	Xylenes (total)	1330-20-7	6.74E-01	7.56E-05	2.52E-01	1.09E-01	1.58E-03	1.06E-02	4.55E-03	4.84E-05	1.22E-02
SVOC	Acenaphthene	83-32-9	3.64E-01	6.64E-05	3.40E-03	5.87E-02	2.34E-02	1.37E-01	4.55E-03	6.24E-04	2.12E-03
SVOC	Anthracene	120-12-7	2.80E-01	6.69E-05	1.30E-03	4.52E-02	2.73E-02	1.56E-01	4.55E-03	7.10E-04	9.26E-04
SVOC	Benzo(a)anthracene	56-55-3	4.41E-01	7.78E-05	5.55E-05	7.17E-02	6.73E-02	3.13E-01	4.55E-03	1.43E-03	
SVOC	Benzo(a)pyrene	50-32-8	3.72E-01	7.78E-05	1.49E-05	6.21E-02	6.63E-02	3.10E-01	4.55E-03	1.41E-03	
SVOC	Benzo(b)fluoranthene	205-99-2	1.95E-01	4.80E-05	1.66E-03	3.15E-02	1.80E-02	1.08E-01	4.55E-03	4.94E-04	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.88E-01	4.54E-05	1.10E-05	3.20E-02	3.54E-02	1.94E-01	4.55E-03	8.82E-04	
SVOC	Benzo(k)fluoranthene	207-08-9	1.95E-01	4.80E-05	1.16E-05	3.32E-02	3.67E-02	1.99E-01	4.55E-03	9.07E-04	
SVOC	Chrysene	218-01-9	2.14E-01	5.37E-05	1.48E-03	3.46E-02	2.04E-02	1.22E-01	4.55E-03	5.54E-04	
SVOC	Dibenz(a,h)anthracene	53-70-3	1.75E-01	4.48E-05	9.57E-08	2.24E-01	3.60E-01	7.09E-01	4.55E-03	3.23E-03	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	6.91E-01	6.91E-05	1.03E-06	1.40E-01	1.77E-01	5.45E-01	4.55E-03	2.48E-03	
SVOC	Ethanol	64-17-5	1.06E+00	1.12E-04	1.96E-04	1.72E-01	1.30E-01	4.68E-01	4.55E-03	2.13E-03	
SVOC	Fluorene	86-73-7	3.14E-01	6.81E-05	1.39E-03	5.06E-02	2.93E-02	1.65E-01	4.55E-03	7.54E-04	1.05E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.64E-01	4.89E-05	2.03E-05	2.75E-02	2.94E-02	1.66E-01	4.55E-03	7.57E-04	
SVOC	Naphthalene	91-20-3	5.10E-01	6.48E-05	1.20E-02	8.22E-02	1.37E-02	8.49E-02	4.55E-03	3.87E-04	4.66E-03
SVOC	Phenanthrene	85-01-8	3.24E-01	6.45E-05	1.41E-03	5.23E-02	2.94E-02	1.66E-01	4.55E-03	7.56E-04	1.06E-03
SVOC	Pyrene	129-00-0	2.35E-01	6.26E-05	2.00E-04	3.80E-02	3.26E-02	1.81E-01	4.55E-03	8.24E-04	
SVOC	Tetraethylene Glycol	112-60-7	4.39E-01	6.96E-05	1.62E-11	1.80E+03	2.97E+03	9.97E-01	3.14E-01	3.13E-01	
PCB	PCBs (total)	1336-36-3	1.75E-01	4.32E-05	6.64E-02	2.82E-02	2.27E-03	1.51E-02	4.55E-03	6.89E-05	
INORG	Antimony	7440-36-0									
INORG	Arsenic	7440-38-2									
INORG	Chromium III	16065-83-1									
INORG	Chromium VI	18540-29-9									
INORG	Cyanide (total)	57-12-5	1.35E+00	1.53E-04	1.97E-03	2.17E-01	8.92E-02	3.77E-01	4.55E-03	1.72E-03	3.38E-03
INORG	Lead	7439-92-1									
INORG	Nickel	7440-02-0									
INORG	Vanadium	7440-62-2									

Attachment 5

Table 1:

Normalized Indoor Air Concentration in a Default PADEP Residential Building (w/ Basement) Due to Vapor Intrusion from Groundwater
Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes:

Subsurface and Building Characteristics			Crack Soil
SCS Soil texture class			Sand
Bulk density	kg/L	ρ_b	1.66
Total porosity	L/L-soil	θ_T	0.375
Water-filled porosity	L/L-soil	θ_w	0.054
Air-filled porosity	L/L-soil	θ_a	0.321
Residual saturation	L/L-soil	θ_r	0.053
Hydraulic conductivity	cm/s	K	7.4E-03
Dynamic viscosity of water	g/cm-s	μ_w	0.01307
Density of water	g/cm ³	ρ_w	1.0
Gravitational acceleration	cm/s ²	g	980.7
Intrinsic permeability	cm ²	k	9.9E-08
Relative saturation	unitless	S_e	0.003
van Genuchten N	unitless	N	3.177
van Genuchten M	unitless	M	0.685
Relative air permeability	unitless	k_{rg}	0.998
Permeability to vapor	cm ²	k_v	9.90E-08
Distance from foundation to source	m	L_{T-gw}	3.69
Bldg foundation thickness	m	L_{crack}	0.1
Bldg foundation length	m		10.00
Bldg foundation width	m		10.00
Bldg occupied height	m		3.66
Bldg occupied volume	m ³		366.00
Occupied depth below ground	m		2.0
Bldg area for vapor intrusion	m ²	A_B	180.0
Ratio of A_{crack} to A_B		η	2E-04
Area of cracks	m ²	A_{crack}	4E-02
Air exchange rate	hour ⁻¹	ach	0.18
Building ventilation rate	m ³ /day	Q_{bldg}	1.6E+03
Pressure diff. outdoors-indoors	kg/m-s ²	ΔP	4.0
Viscosity of air	kg/m-s	μ_a	1.8E-05
Crack length (bldg perimeter)	m	X_{crack}	40
Crack depth below ground	m	Z_{crack}	2.10
Crack radius	m	r_{crack}	1E-03
Soil gas flow rate into bldg	m ³ /day	Q_{soil}	7.20

Attachment 5

Table 2:

Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Residential Building (w/ Basement)

Resident

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{gw} (mg/L)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	RfC (mg/m ³)	HQ	RBSL (mg/L)
VOC	Benzene	71-43-2	A	1.00E+00	1.27E-02	7.8E-03	3.5E-05	2.8E-01	3.0E-02	4.1E-01	2.5E-01
VOC	Cumene	98-82-8	D	1.00E+00	1.04E-02				4.0E-01	2.5E-02	4.0E+00
VOC	1,2-Dibromoethane	106-93-4	LC	1.00E+00	5.89E-03	6.0E-01	1.3E-03	7.9E-03	9.0E-03	6.3E-01	1.6E-01
VOC	1,2-Dichloroethane	107-06-2	B2	1.00E+00	8.87E-03	2.6E-02	8.2E-05	1.2E-01	7.0E-03	1.2E+00	8.2E-02
VOC	Ethyl Benzene	100-41-4	D	1.00E+00	1.07E-02				1.0E+00	1.0E-02	9.7E+00
VOC	Methyl tert-butyl ether	1634-04-4	C	1.00E+00	7.36E-03	2.6E-04	6.8E-07	1.5E+01	3.0E+00	2.4E-03	4.2E+01
VOC	Toluene	108-88-3	ID	1.00E+00	1.17E-02				5.0E+00	2.2E-03	4.5E+01
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	1.00E+00	9.96E-03				6.0E-02	1.6E-01	6.3E-01
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	1.00E+00	1.06E-02				6.0E-02	1.7E-01	5.9E-01
VOC	Xylenes (total)	1330-20-7	ID	1.00E+00	1.22E-02				1.0E-01	1.2E-01	8.6E-01
SVOC	Acenaphthene	83-32-9	ID	1.00E+00	2.12E-03						
SVOC	Anthracene	120-12-7	ID	1.00E+00	9.26E-04						
SVOC	Benzo(a)anthracene	56-55-3	B2	1.00E+00		6.0E-02					
SVOC	Benzo(a)pyrene	50-32-8	HC	1.00E+00		6.0E-01			2.0E-06		
SVOC	Benzo(b)fluoranthene	205-99-2	B2	1.00E+00		6.0E-02					
SVOC	Benzo(g,h,i)perylene	191-24-2	D	1.00E+00							
SVOC	Benzo(k)fluoranthene	207-08-9	B2	1.00E+00		6.0E-03					
SVOC	Chrysene	218-01-9	B2	1.00E+00		6.0E-04					
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	1.00E+00		6.0E-01					
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	1.00E+00		7.1E+01					
SVOC	Ethanol	64-17-5		1.00E+00					1.9E+01		
SVOC	Fluorene	86-73-7	D	1.00E+00	1.05E-03						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	1.00E+00		6.0E-02					
SVOC	Naphthalene	91-20-3	C	1.00E+00	4.66E-03	3.4E-02	5.6E-05	1.8E-01	3.0E-03	1.5E+00	6.7E-02
SVOC	Phenanthrene	85-01-8	D	1.00E+00	1.06E-03						
SVOC	Pyrene	129-00-0	NC	1.00E+00							
SVOC	Tetraethylene Glycol	112-60-7		1.00E+00							
PCB	PCBs (total)	1336-36-3	B2	1.00E+00		5.7E-01					
INORG	Antimony	7440-36-0	ID	1.00E+00							
INORG	Arsenic	7440-38-2	A	1.00E+00		4.3E+00			1.5E-05		
INORG	Chromium III	16065-83-1	D	1.00E+00					5.0E-03		
INORG	Chromium VI	18540-29-9	A	1.00E+00		1.2E+01			1.0E-04		
INORG	Cyanide (total)	57-12-5		1.00E+00	3.38E-03				8.0E-04	4.1E+00	2.5E-02
INORG	Lead	7439-92-1	B2	1.00E+00							

Attachment 5

Table 2:

Unit Risk, Unit HQ, and RBSLs for Groundwater Vapor Intrusion into a Default PADEP Residential Building (w/ Basement)

Resident

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Carc Class	C _{gw} (mg/L)	C _{air} (mg/m ³)	Cancer			Noncancer		
						URF (mg/m ³) ⁻¹	Risk	RBSL (mg/L)	RfC (mg/m ³)	HQ	RBSL (mg/L)
INORG	Nickel	7440-02-0	A	1.00E+00		2.4E-01			9.0E-05		
INORG	Vanadium	7440-62-2	ID	1.00E+00					1.0E-04		

Notes:

Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Noncancer RBSLs are calculated at a target HQ of 0.1.

Attachment 6

Nonpotable Groundwater Use Risk Based Screening Level Calculation

Table 1 – Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Table 2 – Nonsteady State Dermal Absorption of Chemicals from Water in Residential Kiddie Pool

Table 3 – Dispersion Factor to Outdoor Air

Table 4a – Unit Risk and Cancer-Based RBSLs for Exposure of Resident to Groundwater in Kiddie Pools

Table 4b – Unit HQ and Noncancer-Based RBSLs for Exposure of Resident to Groundwater in Kiddie Pools



Attachment 6

Table 1:

Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	H (unitless)	D _{air} (m ² /d)	D _{water} (m ² /d)	Sc _L (unitless)	Sc _G (unitless)	k _L (m/s)	k _G (m/s)	K _L (cm/s)	C _{avg} /C ₀ (unitless)	J _L (L/m ² -s)
VOC	Benzene	71-43-2	1.7E-01	7.6E-01	8.5E-05	9.1E+02	1.7E+00	5.73E-06	9.43E-03	5.71E-06	4.10E-01	2.34E-03
VOC	Cumene	98-82-8	3.3E-01	5.6E-01	6.1E-05	1.3E+03	2.3E+00	5.02E-06	7.69E-03	5.01E-06	4.48E-01	2.25E-03
VOC	1,2-Dibromoethane	106-93-4	2.4E-02	3.7E-01	7.3E-05	1.1E+03	3.5E+00	5.39E-06	5.83E-03	5.18E-06	4.38E-01	2.27E-03
VOC	1,2-Dichloroethane	107-06-2	2.9E-02	9.0E-01	8.6E-05	9.0E+02	1.5E+00	5.75E-06	1.05E-02	5.64E-06	4.13E-01	2.33E-03
VOC	Ethyl Benzene	100-41-4	2.2E-01	6.5E-01	6.7E-05	1.1E+03	2.0E+00	5.22E-06	8.47E-03	5.20E-06	4.37E-01	2.28E-03
VOC	Methyl tert-butyl ether	1634-04-4	1.8E-02	7.4E-01	8.7E-05	8.8E+02	1.8E+00	5.80E-06	9.28E-03	5.61E-06	4.15E-01	2.33E-03
VOC	Toluene	108-88-3	1.9E-01	7.5E-01	7.4E-05	1.0E+03	1.7E+00	5.43E-06	9.35E-03	5.41E-06	4.26E-01	2.30E-03
VOC	1,2,4-Trimethylbenzene	95-63-6	1.6E-01	5.2E-01	6.8E-05	1.1E+03	2.5E+00	5.25E-06	7.34E-03	5.23E-06	4.36E-01	2.28E-03
VOC	1,3,5-Trimethylbenzene	108-67-8	1.5E-01	5.2E-01	7.5E-05	1.0E+03	2.5E+00	5.45E-06	7.31E-03	5.42E-06	4.25E-01	2.30E-03
VOC	Xylenes (total)	1330-20-7	2.5E-01	6.7E-01	7.6E-05	1.0E+03	1.9E+00	5.46E-06	8.69E-03	5.45E-06	4.24E-01	2.31E-03
SVOC	Acenaphthene	83-32-9	3.4E-03	3.6E-01	6.6E-05	1.2E+03	3.6E+00	5.19E-06	5.75E-03	4.10E-06	5.08E-01	2.08E-03
SVOC	Anthracene	120-12-7	1.3E-03	2.8E-01	6.7E-05	1.2E+03	4.7E+00	5.20E-06	4.83E-03	2.85E-06	6.12E-01	1.74E-03
SVOC	Benzo(a)anthracene	56-55-3	5.6E-05	4.4E-01	7.8E-05	9.9E+02	3.0E+00	5.53E-06	6.54E-03	3.41E-07	9.38E-01	
SVOC	Benzo(a)pyrene	50-32-8	1.5E-05	3.7E-01	7.8E-05	9.9E+02	3.5E+00	5.53E-06	5.83E-03	8.58E-08	9.84E-01	
SVOC	Benzo(b)fluoranthene	205-99-2	1.7E-03	2.0E-01	4.8E-05	1.6E+03	6.7E+00	4.56E-06	3.79E-03	2.64E-06	6.32E-01	
SVOC	Benzo(g,h,i)perylene	191-24-2	1.1E-05	1.9E-01	4.5E-05	1.7E+03	6.9E+00	4.46E-06	3.69E-03	4.02E-08	9.92E-01	
SVOC	Benzo(k)fluoranthene	207-08-9	1.2E-05	2.0E-01	4.8E-05	1.6E+03	6.7E+00	4.56E-06	3.79E-03	4.34E-08	9.92E-01	
SVOC	Chrysene	218-01-9	1.5E-03	2.1E-01	5.4E-05	1.4E+03	6.1E+00	4.76E-06	4.03E-03	2.65E-06	6.32E-01	
SVOC	Dibenz(a,h)anthracene	53-70-3	9.6E-08	1.7E-01	4.5E-05	1.7E+03	7.5E+00	4.44E-06	3.52E-03	3.37E-10	1.00E+00	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.0E-06	6.9E-01	6.9E-05	1.1E+03	1.9E+00	5.27E-06	8.84E-03	9.12E-09	9.98E-01	
SVOC	Ethanol	64-17-5	2.0E-04	1.1E+00	1.1E-04	6.9E+02	1.2E+00	6.44E-06	1.18E-02	1.70E-06	7.38E-01	
SVOC	Fluorene	86-73-7	1.4E-03	3.1E-01	6.8E-05	1.1E+03	4.2E+00	5.24E-06	5.21E-03	3.04E-06	5.95E-01	1.81E-03
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.0E-05	1.6E-01	4.9E-05	1.6E+03	7.9E+00	4.59E-06	3.38E-03	6.75E-08	9.87E-01	
SVOC	Naphthalene	91-20-3	1.2E-02	5.1E-01	6.5E-05	1.2E+03	2.6E+00	5.13E-06	7.21E-03	4.85E-06	4.58E-01	2.22E-03
SVOC	Phenanthrene	85-01-8	1.4E-03	3.2E-01	6.5E-05	1.2E+03	4.0E+00	5.13E-06	5.32E-03	3.04E-06	5.94E-01	1.81E-03
SVOC	Pyrene	129-00-0	2.0E-04	2.4E-01	6.3E-05	1.2E+03	5.5E+00	5.06E-06	4.29E-03	7.35E-07	8.73E-01	
SVOC	Tetraethylene Glycol	112-60-7	1.6E-11	4.4E-01	7.0E-05	1.1E+03	3.0E+00	5.28E-06	6.52E-03	1.06E-13	1.00E+00	
PCB	PCBs (total)	1336-36-3	6.6E-02	1.7E-01	4.3E-05	1.8E+03	7.5E+00	4.38E-06	3.52E-03	4.30E-06	4.94E-01	
INORG	Antimony	7440-36-0										
INORG	Arsenic	7440-38-2										
INORG	Chromium III	16065-83-1										
INORG	Chromium VI	18540-29-9										
INORG	Cyanide (total)	57-12-5	2.0E-03	1.3E+00	1.5E-04	5.0E+02	9.7E-01	7.35E-06	1.38E-02	5.79E-06	4.06E-01	2.35E-03
INORG	Lead	7439-92-1										
INORG	Nickel	7440-02-0										
INORG	Vanadium	7440-62-2										

Attachment 6

Table 1:

Normalized Vapor Flux to Outdoor Air from Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Notes: Water density (g/cm ³)	ρ_w	1.00E+00
Water viscosity (g/cm-s)	v_w	8.93E-03
Air density (g/cm ³)	ρ_a	1.20E-03
Air viscosity (g/cm-s)	v_a	1.81E-04
Wind speed (mph)	u_{10}	9.3
Wind speed (m/s)	u_{10}	4.2
Friction velocity (m/s)	u	0.123
Pool effective diameter (m)	d_e	2.1
Pool water surface area (m ²)	A	3.3
Pool water depth (m)	d	0.23
Pool water volume (m ³)	V	0.76
Fetch-to-depth ratio	F/D	9.0
Averaging period (days)	t	1.0

Attachment 6

Table 2:

Nonsteady State Dermal Absorption of Chemicals from Water in Residential Kiddie Pool

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	MW (g/mole)	FA (unitless)	K _p (cm/hr)	B (unitless)	t (hr)	c	b	ts (hr)	DA (L/cm ² -event)
VOC	Benzene	71-43-2	7.8E+01	1.0E+00	1.5E-02	5.0E-02	2.9E-01	3.7E-01	3.3E-01	6.9E-01	3.70E-05
VOC	Cumene	98-82-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,2-Dibromoethane	106-93-4	1.9E+02	1.0E+00	1.6E-03	8.4E-03	1.2E+00	3.4E-01	3.1E-01	2.8E+00	6.81E-06
VOC	1,2-Dichloroethane	107-06-2	9.9E+01	1.0E+00	4.1E-03	1.6E-02	3.8E-01	3.4E-01	3.1E-01	9.0E-01	1.13E-05
VOC	Ethyl Benzene	100-41-4	1.1E+02	1.0E+00	4.8E-02	1.9E-01	4.1E-01	4.7E-01	4.3E-01	9.9E-01	1.27E-04
VOC	Methyl tert-butyl ether	1634-04-4	8.8E+01	1.0E+00	3.3E-03	1.2E-02	3.3E-01	3.4E-01	3.1E-01	7.9E-01	8.84E-06
VOC	Toluene	108-88-3	9.2E+01	1.0E+00	3.2E-02	1.2E-01	3.5E-01	4.2E-01	3.8E-01	8.3E-01	8.08E-05
VOC	1,2,4-Trimethylbenzene	95-63-6	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	1,3,5-Trimethylbenzene	108-67-8	1.2E+02	1.0E+00			5.0E-01	3.3E-01	3.0E-01	1.2E+00	
VOC	Xylenes (total)	1330-20-7	1.1E+02	1.0E+00	5.0E-02	2.0E-01	4.1E-01	4.8E-01	4.4E-01	9.9E-01	1.32E-04
SVOC	Acenaphthene	83-32-9	1.5E+02	1.0E+00			7.7E-01	3.3E-01	3.0E-01	1.8E+00	
SVOC	Anthracene	120-12-7	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Benzo(a)anthracene	56-55-3	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Benzo(a)pyrene	50-32-8	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(b)fluoranthene	205-99-2	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Benzo(g,h,i)perylene	191-24-2	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Benzo(k)fluoranthene	207-08-9	2.5E+02	8.0E-01			2.7E+00	3.3E-01	3.0E-01	6.5E+00	
SVOC	Chrysene	218-01-9	2.3E+02	9.0E-01			2.0E+00	3.3E-01	3.0E-01	4.8E+00	
SVOC	Dibenz(a,h)anthracene	53-70-3	2.8E+02	7.0E-01			3.8E+00	3.3E-01	3.0E-01	9.1E+00	
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	2.6E+02	1.0E+00			2.9E+00	3.3E-01	3.0E-01	6.9E+00	
SVOC	Ethanol	64-17-5	4.6E+01	1.0E+00	5.5E-04	1.4E-03	1.9E-01	3.3E-01	3.0E-01	4.6E-01	1.30E-06
SVOC	Fluorene	86-73-7	1.7E+02	1.0E+00			9.0E-01	3.3E-01	3.0E-01	2.2E+00	
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	2.8E+02	7.0E-01			3.7E+00	3.3E-01	3.0E-01	8.9E+00	
SVOC	Naphthalene	91-20-3	1.3E+02	1.0E+00			5.5E-01	3.3E-01	3.0E-01	1.3E+00	
SVOC	Phenanthrene	85-01-8	1.8E+02	1.0E+00			1.0E+00	3.3E-01	3.0E-01	2.5E+00	
SVOC	Pyrene	129-00-0	2.0E+02	1.0E+00			1.4E+00	3.3E-01	3.0E-01	3.4E+00	
SVOC	Tetraethylene Glycol	112-60-7	1.9E+02	1.0E+00			1.3E+00	3.3E-01	3.0E-01	3.1E+00	
PCB	PCBs (total)	1336-36-3	3.3E+02	7.0E-01			7.2E+00	3.3E-01	3.0E-01	1.7E+01	
INORG	Antimony	7440-36-0	1.2E+02		1.0E-03		5.1E-01	3.3E-01	3.0E-01	1.2E+00	2.00E-06
INORG	Arsenic	7440-38-2	7.5E+01		1.0E-03		2.8E-01	3.3E-01	3.0E-01	6.6E-01	2.00E-06
INORG	Chromium III	16065-83-1	5.2E+01		1.0E-03		2.1E-01	3.3E-01	3.0E-01	4.9E-01	2.00E-06
INORG	Chromium VI	18540-29-9	5.2E+01		2.0E-03		2.1E-01	3.3E-01	3.0E-01	4.9E-01	4.00E-06
INORG	Cyanide (total)	57-12-5	2.6E+01		1.0E-03		1.5E-01	3.3E-01	3.0E-01	3.5E-01	2.00E-06
INORG	Lead	7439-92-1	2.1E+02		1.0E-04		1.5E+00	3.3E-01	3.0E-01	3.7E+00	2.00E-07
INORG	Nickel	7440-02-0	5.9E+01		2.0E-04		2.2E-01	3.3E-01	3.0E-01	5.4E-01	4.00E-07
INORG	Vanadium	7440-62-2	5.1E+01		1.0E-03		2.0E-01	3.3E-01	3.0E-01	4.9E-01	2.00E-06

Notes:

Event Time hours t 2

K_p capped at 1 cm/hr (USEPA 1992).

The dermal absorbed dose for inorganic chemicals is estimated using a steady-state approach (USEPA 2004, Equation 3.4) and for organic chemicals is estimated using a nonsteady-state approach (USEPA 2004, Equations 3.2 and 3.3).

Attachment 6

Table 3:

Dispersion Factor to Outdoor Air

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Parameter	Units	Value
Correlation coefficient city		Philadelphia
Correlation coefficient A		14.0111
Correlation coefficient B		19.6154
Correlation coefficient C		225.3397

Source area	acres	0.0008
Groundwater averaging time for C/Q		1-Hour Max
C/Q	$(L/m^3)/(L/m^2-s)$	15.83

Note:

C/Q is estimated using the empirical correlation in USEPA's (2002) Supplemental Soil Screening Guidance.

Attachment 6

Table 4a:

Unit Risk and Cancer-Based RBSLs for Exposure of Residents to Groundwater in Kiddie Pools

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	Cancer Class	ADAF	C _{gw} (mg/l)	Incidental Ingestion					Dermal Contact						Vapor Inhalation					All Routes	
						LADD (mg/kg/d)	SF _{oral} (mg/kg/d) ⁻¹	f _{oral}	Risk	RBSL (mg/L)	DA (L/cm ² -event)	LADD (mg/kg/d)	SF _{derm} (mg/kg/d) ⁻¹	f _{oral}	Risk	RBSL (mg/L)	C _{air} (mg/m ³)	URF (mg/m ³) ⁻¹	f _{inh}	Risk	RBSL (mg/L)	Risk	RBSL (mg/L)
VOC	Benzene	71-43-2	A	N	1.00E+00	1.06E-04	5.5E-02		5.8E-06	1.7E+00	3.70E-05	4.65E-04	5.5E-02		2.6E-05	3.9E-01	3.70E-02	7.8E-03		2.4E-06	4.3E+00	3.4E-05	3.0E-01
VOC	Cumene	98-82-8	D	N	1.00E+00	1.16E-04											3.56E-02						
VOC	1,2-Dibromoethane	106-93-4	LC	N	1.00E+00	1.13E-04	2.0E+00		2.3E-04	4.4E-02	6.81E-06	9.15E-05	2.0E+00		1.8E-04	5.5E-02	3.60E-02	6.0E-01		1.8E-04	5.7E-02	5.8E-04	1.7E-02
VOC	1,2-Dichloroethane	107-06-2	B2	N	1.00E+00	1.06E-04	9.1E-02		9.7E-06	1.0E+00	1.13E-05	1.43E-04	9.1E-02		1.3E-05	7.7E-01	3.69E-02	2.6E-02		7.8E-06	1.3E+00	3.1E-05	3.3E-01
VOC	Ethyl Benzene	100-41-4	D	N	1.00E+00	1.13E-04					1.27E-04	1.70E-03					3.60E-02						
VOC	Methyl tert-butyl ether	1634-04-4	C	N	1.00E+00	1.07E-04	1.8E-03		1.9E-07	5.2E+01	8.84E-06	1.12E-04	1.8E-03		2.0E-07	4.9E+01	3.68E-02	2.6E-04		7.8E-08	1.3E+02	4.7E-07	2.1E+01
VOC	Toluene	108-88-3	ID	N	1.00E+00	1.10E-04					8.08E-05	1.05E-03					3.65E-02						
VOC	1,2,4-Trimethylbenzene	95-63-6	ID	N	1.00E+00	1.12E-04												3.61E-02					
VOC	1,3,5-Trimethylbenzene	108-67-8	ID	N	1.00E+00	1.10E-04												3.65E-02					
VOC	Xylenes (total)	1330-20-7	ID	N	1.00E+00	1.09E-04					1.32E-04	1.71E-03					3.65E-02						
SVOC	Acenaphthene	83-32-9	ID	N	1.00E+00	1.31E-04											3.30E-02						
SVOC	Anthracene	120-12-7	ID	N	1.00E+00	1.58E-04											2.76E-02						
SVOC	Benzo(a)anthracene	56-55-3	B2	Y	1.00E+00	2.42E-04	1.0E-01	1	9.5E-05	1.0E-01			1.0E-01	1				6.0E-02	1			9.5E-05	1.0E-01
SVOC	Benzo(a)pyrene	50-32-8	HC	Y	1.00E+00	2.54E-04	1.0E+00	1	1.0E-03	1.0E-02			1.0E+00	1				6.0E-01	1			1.0E-03	1.0E-02
SVOC	Benzo(b)fluoranthene	205-99-2	B2	Y	1.00E+00	1.63E-04	1.0E-01	1	6.4E-05	1.6E-01			1.0E-01	1				6.0E-02	1			6.4E-05	1.6E-01
SVOC	Benzo(g,h,i)perylene	191-24-2	D	N	1.00E+00	2.56E-04																	
SVOC	Benzo(k)fluoranthene	207-08-9	B2	Y	1.00E+00	2.56E-04	1.0E-02	1	1.0E-05	9.9E-01			1.0E-02	1				6.0E-03	1			1.0E-05	9.9E-01
SVOC	Chrysene	218-01-9	B2	Y	1.00E+00	1.63E-04	1.0E-03	1	6.4E-07	1.6E+01			1.0E-03	1				6.0E-04	1			6.4E-07	1.6E+01
SVOC	Dibenz(a,h)anthracene	53-70-3	B2	Y	1.00E+00	2.58E-04	1.0E+00	1	1.0E-03	9.8E-03			1.0E+00	1				6.0E-01	1			1.0E-03	9.8E-03
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	C	Y	1.00E+00	2.57E-04	2.5E+02	1	2.5E-01	3.9E-05			2.5E+02	1				7.1E+01	1			2.5E-01	3.9E-05
SVOC	Ethanol	64-17-5		N	1.00E+00	1.90E-04					1.30E-06	2.94E-05											
SVOC	Fluorene	86-73-7	D	N	1.00E+00	1.53E-04											2.86E-02						
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	Y	1.00E+00	2.54E-04	1.0E-01	1	1.0E-04	1.0E-01			1.0E-01	1				6.0E-02	1			1.0E-04	1.0E-01
SVOC	Naphthalene	91-20-3	C	N	1.00E+00	1.18E-04	1.2E-01		1.4E-05	7.1E-01			1.2E-01				3.52E-02	3.4E-02		9.7E-06	1.0E+00	2.4E-05	4.2E-01
SVOC	Phenanthrene	85-01-8	D	N	1.00E+00	1.53E-04											2.86E-02						
SVOC	Pyrene	129-00-0	NC	N	1.00E+00	2.25E-04																	
SVOC	Tetraethylene Glycol	112-60-7		N	1.00E+00	2.58E-04																	
PCB	PCBs (total)	1336-36-3	B2	N	1.00E+00	1.27E-04	2.0E+00		2.5E-04	3.9E-02			2.0E+00					5.7E-01				2.5E-04	3.9E-02
INORG	Antimony	7440-36-0	ID	N	1.00E+00	2.58E-04					2.00E-06	6.13E-05											
INORG	Arsenic	7440-38-2	A	N	1.00E+00	2.58E-04	1.5E+00		3.9E-04	2.6E-02	2.00E-06	6.13E-05	1.5E+00		9.2E-05	1.1E-01		4.3E+00				4.8E-04	2.1E-02
INORG	Chromium III	16065-83-1	D	N	1.00E+00	2.58E-04					2.00E-06	6.13E-05											
INORG	Chromium VI	18540-29-9	A	N	1.00E+00	2.58E-04	5.0E-01		1.3E-04	7.8E-02	4.00E-06	1.23E-04	2.0E+01		2.5E-03	4.1E-03		1.2E+01				2.6E-03	3.9E-03
INORG	Cyanide (total)	57-12-5		N	1.00E+00	1.05E-04					2.00E-06	2.49E-05					3.72E-02						
INORG	Lead	7439-92-1	B2	N	1.00E+00	2.58E-04					2.00E-07	6.13E-06											
INORG	Nickel	7440-02-0	A	N	1.00E+00	2.58E-04					4.00E-07	1.23E-05						2.4E-01					
INORG	Vanadium	7440-62-2	ID	N	1.00E+00	2.58E-04					2.00E-06	6.13E-05											

Notes:

f_{oral} and f_{inh} are the fraction of the oral and inhalation toxicity values, respectively, that USEPA identified as having a mutagenic mode of action.

Cancer RBSLs are calculated at a target cancer risk of 1E-05.

Attachment 6

Table 4b:

Unit HQ and Noncancer-Based RBSLs for Exposure of Residents to Groundwater in Kiddie Pools

Philadelphia Energy Solutions Refining & Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Chem Group	Chemical	CASRN	C _{gw} (mg/L)	Incidental Ingestion				Dermal Contact					Vapor Inhalation				All Routes	
				ADD (mg/kg/d)	RfD _{oral} (mg/kg/d)	HQ	RBSL (mg/L)	DA (L/cm ² -event)	ADD (mg/kg/d)	RfD _{derm} (mg/kg/d)	HQ	RBSL (mg/L)	C _{air} (mg/m ³)	RfC (mg/m ³)	HQ	RBSL (mg/L)	HQ	RBSL (mg/L)
VOC	Benzene	71-43-2	1.00E+00	2.84E-04	1.0E-02	2.8E-02	3.5E+00	3.70E-05	1.25E-03	1.0E-02	1.3E-01	8.0E-01	3.70E-02	9.0E-02	9.0E-03	1.1E+01	1.6E-01	6.1E-01
VOC	Cumene	98-82-8	1.00E+00	3.11E-04	4.0E-01	7.8E-04	1.3E+02			4.0E-01			3.56E-02	4.0E-01	1.9E-03	5.1E+01	2.7E-03	3.7E+01
VOC	1,2-Dibromoethane	106-93-4	1.00E+00	3.04E-04	9.0E-03	3.4E-02	3.0E+00	6.81E-06	2.46E-04	9.0E-03	2.7E-02	3.7E+00	3.60E-02	9.0E-03	8.8E-02	1.1E+00	1.5E-01	6.7E-01
VOC	1,2-Dichloroethane	107-06-2	1.00E+00	2.87E-04	2.0E-02	1.4E-02	7.0E+00	1.13E-05	3.85E-04	2.0E-02	1.9E-02	5.2E+00	3.69E-02	7.0E-02	1.2E-02	8.7E+00	4.5E-02	2.2E+00
VOC	Ethyl Benzene	100-41-4	1.00E+00	3.03E-04	1.0E-01	3.0E-03	3.3E+01	1.27E-04	4.58E-03	1.0E-01	4.6E-02	2.2E+00	3.60E-02	9.0E+00	8.8E-05	1.1E+03	4.9E-02	2.0E+00
VOC	Methyl tert-butyl ether	1634-04-4	1.00E+00	2.88E-04	3.0E-01	9.6E-04	1.0E+02	8.84E-06	3.03E-04	3.0E-01	1.0E-03	9.9E+01	3.68E-02	3.0E+00	2.7E-04	3.7E+02	2.2E-03	4.5E+01
VOC	Toluene	108-88-3	1.00E+00	2.95E-04	8.0E-01	3.7E-04	2.7E+02	8.08E-05	2.84E-03	8.0E-01	3.5E-03	2.8E+01	3.65E-02	5.0E+00	1.6E-04	6.3E+02	4.1E-03	2.5E+01
VOC	1,2,4-Trimethylbenzene	95-63-6	1.00E+00	3.02E-04	4.0E-02	7.6E-03	1.3E+01			4.0E-02			3.61E-02	2.0E-01	4.0E-03	2.5E+01	1.2E-02	8.7E+00
VOC	1,3,5-Trimethylbenzene	108-67-8	1.00E+00	2.95E-04	4.0E-02	7.4E-03	1.4E+01			4.0E-02			3.65E-02	2.0E-01	4.0E-03	2.5E+01	1.1E-02	8.8E+00
VOC	Xylenes (total)	1330-20-7	1.00E+00	2.94E-04	2.0E-01	1.5E-03	6.8E+01	1.32E-04	4.61E-03	2.0E-01	2.3E-02	4.3E+00	3.65E-02	3.0E-01	2.7E-03	3.7E+01	2.7E-02	3.7E+00
SVOC	Acenaphthene	83-32-9	1.00E+00	3.53E-04	2.0E-01	1.8E-03	5.7E+01			2.0E-01			3.30E-02				1.8E-03	5.7E+01
SVOC	Anthracene	120-12-7	1.00E+00	4.25E-04	1.0E+00	4.2E-04	2.4E+02			1.0E+00			2.76E-02				4.2E-04	2.4E+02
SVOC	Benzo(a)anthracene	56-55-3	1.00E+00	6.51E-04														
SVOC	Benzo(a)pyrene	50-32-8	1.00E+00	6.83E-04	3.0E-04	2.3E+00	4.4E-02			3.0E-04				2.0E-06			2.3E+00	4.4E-02
SVOC	Benzo(b)fluoranthene	205-99-2	1.00E+00	4.39E-04														
SVOC	Benzo(g,h,i)perylene	191-24-2	1.00E+00	6.88E-04	3.0E-01	2.3E-03	4.4E+01			3.0E-01							2.3E-03	4.4E+01
SVOC	Benzo(k)fluoranthene	207-08-9	1.00E+00	6.88E-04														
SVOC	Chrysene	218-01-9	1.00E+00	4.38E-04														
SVOC	Dibenz(a,h)anthracene	53-70-3	1.00E+00	6.94E-04														
SVOC	7,12-Dimethylbenz(a)anthracene	57-97-6	1.00E+00	6.92E-04														
SVOC	Ethanol	64-17-5	1.00E+00	5.12E-04	6.2E+01	8.3E-06	1.2E+04	1.30E-06	7.91E-05	6.2E+01	1.3E-06	7.8E+04		1.9E+01			9.5E-06	1.0E+04
SVOC	Fluorene	86-73-7	1.00E+00	4.13E-04	4.0E-01	1.0E-03	9.7E+01			4.0E-01			2.86E-02				1.0E-03	9.7E+01
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	1.00E+00	6.85E-04														
SVOC	Naphthalene	91-20-3	1.00E+00	3.18E-04	2.0E-01	1.6E-03	6.3E+01			2.0E-01			3.52E-02	3.0E-03	2.6E-01	3.9E-01	2.6E-01	3.9E-01
SVOC	Phenanthrene	85-01-8	1.00E+00	4.12E-04	3.0E-01	1.4E-03	7.3E+01			3.0E-01			2.86E-02				1.4E-03	7.3E+01
SVOC	Pyrene	129-00-0	1.00E+00	6.06E-04	3.0E-01	2.0E-03	5.0E+01			3.0E-01							2.0E-03	5.0E+01
SVOC	Tetraethylene Glycol	112-60-7	1.00E+00	6.94E-04	2.0E+00	3.5E-04	2.9E+02			2.0E+00							3.5E-04	2.9E+02
PCB	PCBs (total)	1336-36-3	1.00E+00	3.43E-04	5.0E-05	6.9E+00	1.5E-02			5.0E-05							6.9E+00	1.5E-02
INORG	Antimony	7440-36-0	1.00E+00	6.94E-04	4.0E-04	1.7E+00	5.8E-02	2.00E-06	1.65E-04	6.0E-05	2.8E+00	3.6E-02					4.5E+00	2.2E-02
INORG	Arsenic	7440-38-2	1.00E+00	6.94E-04	5.0E-03	1.4E-01	7.2E-01	2.00E-06	1.65E-04	5.0E-03	3.3E-02	3.0E+00		1.5E-05			1.7E-01	5.8E-01
INORG	Chromium III	16065-83-1	1.00E+00	6.94E-04	1.5E+00	4.6E-04	2.2E+02	2.00E-06	1.65E-04	2.0E-02	8.5E-03	1.2E+01		5.0E-03			8.9E-03	1.1E+01
INORG	Chromium VI	18540-29-9	1.00E+00	6.94E-04	5.0E-03	1.4E-01	7.2E-01	4.00E-06	3.30E-04	1.3E-04	2.6E+00	3.8E-02		1.0E-03			2.8E+00	3.6E-02
INORG	Cyanide (total)	57-12-5	1.00E+00	2.81E-04	6.0E-03	4.7E-02	2.1E+00	2.00E-06	6.70E-05	6.0E-03	1.1E-02	9.0E+00	3.72E-02	3.0E-03	2.7E-01	3.7E-01	3.3E-01	3.0E-01
INORG	Lead	7439-92-1	1.00E+00	6.94E-04				2.00E-07	1.65E-05									
INORG	Nickel	7440-02-0	1.00E+00	6.94E-04	2.0E-02	3.5E-02	2.9E+00	4.00E-07	3.30E-05	8.0E-04	4.1E-02	2.4E+00		2.0E-04			7.6E-02	1.3E+00
INORG	Vanadium	7440-62-2	1.00E+00	6.94E-04	1.0E-02	6.9E-02	1.4E+00	2.00E-06	1.65E-04	2.6E-04	6.4E-01	1.6E-01		1.0E-04			7.0E-01	1.4E-01

Notes:

Noncancer RBSLs are calculated at a target HQ of 0.1.

Appendix C

Analytical Data



Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR1088-01	GPR1088-01	GPR1088-02	GPR1088-03	GPR1088-04	GPR1088-04	GPR1088-05	GPR1088-06
Field Sample ID					GPR1088-01-SS01	DUP-50	GPR1088-02-SS01	GPR1088-03-SS01	GPR1088-04-SS01	DUP-51	GPR1088-05-SS01	GPR1088-06-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/3/2022	8/3/2022	8/3/2022	8/3/2022	
Comments						Field Duplicate				Field Duplicate			
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	NA	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	NA	NA	NA	NA	
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	NA	NA	
Toluene	8000	76	650	9800	NA	NA	NA	NA	NA	NA	NA	NA	
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA	NA	
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA	NA	
m,p-xylene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
ortho-xylene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	NA	NA	NA	NA	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	NA	NA	NA	NA	NA	NA	NA	NA	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	8.5	8	8	8	6.2	6.1	8.9	6.7	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR1116-01	GPR1116-02	GPR1116-03	GPR1116-04	GPR1116-05	GPR1116-05	GPR1116-06	GPR1116-07
Field Sample ID					GPR1116-01-SS01	GPR1116-02-SS01	GPR1116-03-SS01	GPR1116-04-SS01	GPR1116-05-SS01	DUP-48	GPR1116-06-SS01	GPR1116-07-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.0 - 3.5	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	4.5 - 5.0	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date			Contact		7/18/2022	7/18/2022	7/18/2022	7/18/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022	
Comments	Field Duplicate												
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	ND (0.00073)	0.017 (0.00092)	0.0012 (0.00072)	0.00056 J (0.00059)	0.053 (0.047)	ND (0.00088)	ND (0.38)	0.037 J (0.046)	
Cumene	1000	6.1	87	1000	0.028 (0.0015)	0.0091 (0.0018)	0.015 (0.0014)	0.024 (0.0012)	0.8 (0.094)	0.004 (0.0018)	<u>18 (0.77)</u>	<u>8.4 (0.093)</u>	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00073)	ND (0.00092)	ND (0.00072)	ND (0.00059)	ND (0.047)	ND (0.00088)	ND (0.38)	ND (0.046)	
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0015)	ND (0.0018)	ND (0.0014)	ND (0.0012)	ND (0.094)	ND (0.0018)	ND (0.77)	ND (0.093)	
Ethyl Benzene	2300	15	1300	820	0.0012 J (0.0015)	0.0031 (0.0018)	0.0004 J (0.0014)	0.001 J (0.0012)	0.022 J (0.094)	ND (0.0018)	0.19 J (0.77)	0.087 J (0.093)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0029)	ND (0.0037)	ND (0.0029)	ND (0.0023)	ND (0.19)	ND (0.0035)	ND (1.5)	ND (0.18)	
Toluene	8000	76	650	9800	0.00081 J (0.0015)	0.02 (0.0018)	0.0008 J (0.0014)	0.0017 (0.0012)	0.078 J (0.094)	ND (0.0018)	ND (0.77)	0.17 (0.093)	
1,2,4-Trimethylbenzene	180	0.92	70	250	0.026 (0.0029)	0.029 (0.0037)	0.0095 (0.0029)	0.022 (0.0023)	0.78 (0.19)	0.0038 (0.0035)	<u>1.2 J (1.5)</u>	<u>2.7 (0.18)</u>	
1,3,5-Trimethylbenzene	220	0.92	99	240	0.016 (0.0029)	0.00097 J (0.0037)	0.00056 J (0.0029)	0.0089 (0.0023)	ND (0.19)	0.0012 J (0.0035)	0.15 J (1.5)	0.12 J (0.18)	
m,p-xylene	--	--	--	--	0.03 (0.0029)	0.016 (0.0037)	0.00085 J (0.0029)	0.0082 (0.0023)	0.063 J (0.19)	0.0011 J (0.0035)	0.92 J (1.5)	0.3 (0.18)	
ortho-xylene	--	--	--	--	0.012 (0.0015)	0.0055 (0.0018)	0.0031 (0.0014)	0.0068 (0.0012)	0.056 J (0.094)	0.0016 J (0.0018)	0.24 J (0.77)	0.13 (0.093)	
Xylenes (total)	240	1.5	51	340	0.042 (0.0015)	0.022 (0.0018)	0.004 J (0.0014)	0.015 (0.0012)	0.12 J (0.094)	0.0027 J (0.0018)	1.2 J (0.77)	0.43 (0.093)	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	0.14 J (0.15)	0.34 (0.18)	0.3 (0.14)	0.28 (0.12)	0.055 J (0.13)	ND (0.14)	0.18 (0.12)	ND (6.6)	
Benzo(a)anthracene	430	--	3200	--	0.38 (0.15)	0.81 (0.18)	0.39 (0.14)	0.49 (0.12)	0.24 (0.13)	0.04 J (0.14)	0.27 (0.12)	ND (6.6)	
Benzo(a)pyrene	43	--	7.7	--	0.58 (0.2)	1.2 (0.24)	0.42 (0.19)	0.66 (0.16)	0.4 (0.17)	ND (0.18)	0.41 (0.16)	ND (8.8)	
Benzo(b)fluoranthene	430	--	3200	--	0.57 (0.15)	1.1 (0.18)	0.49 (0.14)	0.67 (0.12)	0.42 (0.13)	0.042 J (0.14)	0.44 (0.12)	ND (6.6)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.33 (0.2)	0.54 (0.24)	0.22 (0.19)	0.52 (0.16)	0.26 (0.17)	0.028 J (0.18)	0.31 (0.16)	ND (8.8)	
Chrysene	43000	--	320000	--	0.42 (0.15)	0.92 (0.18)	0.77 (0.14)	0.52 (0.12)	0.27 (0.13)	0.044 J (0.14)	0.3 (0.12)	ND (6.6)	
Fluorene	6200	--	18000	--	0.11 J (0.24)	0.35 (0.3)	0.75 (0.24)	0.16 J (0.2)	0.056 J (0.22)	0.087 J (0.23)	0.22 (0.2)	1.4 J (11)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	<u>0.94 (0.24)</u>	<u>2 (0.3)</u>	0.52 (0.24)	<u>2.8 (0.2)</u>	0.35 (0.22)	0.16 J (0.23)	<u>1.1 (0.2)</u>	ND (11)	
Phenanthrene	4600	--	14000	--	0.32 (0.15)	0.94 (0.18)	1.5 (0.14)	0.52 (0.12)	0.15 (0.13)	0.19 (0.14)	0.67 (0.12)	2.8 J (6.6)	
Pyrene	4600	--	14000	--	0.49 (0.15)	1.2 (0.18)	0.68 (0.14)	0.54 (0.12)	0.21 (0.13)	0.1 J (0.14)	0.55 (0.12)	ND (6.6)	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	19.4 (2.87)	97.8 (3.52)	1360 (2.83)	20.2 (2.31)	67.9 (2.49)	206 (13.4)	104 (2.25)	119 (2.25)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR1116-08	GPR1116-08R	GPR1116-08R	GPR1116-09	GPR1116-10	GPR1116-11	GPR1116-12	GPR1116-13
Field Sample ID						GPR1116-08-SS01	TG07-MW-03-3.0-3.5	TG07-MW-03-3.0-3.5D	GPR1116-09-SS01	GPR1116-10-SS01	GPR1116-11-SS01	GPR1116-12-SS01	GPR1116-13-SS01
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		2.5 - 3.0	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	2.5 - 3.0	3.0 - 3.5
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date						8/1/2022	12/21/2022	12/21/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022
Comments						Field Duplicate							
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98		<u>28 (0.19)</u>	0.036 (0.00052)	ND (0.0005)	ND (0.00051)	0.0003 J (0.00051)	ND (0.041)	0.052 (0.033)	0.00064 J (0.00065)
Cumene	1000	6.1	87	1000		0.022 J (0.078)	0.0068 (0.001)	0.0074 (0.00099)	0.00064 J (0.001)	0.00054 J (0.001)	0.068 J (0.083)	3.8 (0.066)	0.0034 (0.0013)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2		ND (0.039)	NA	NA	ND (0.00051)	ND (0.00051)	ND (0.041)	ND (0.033)	ND (0.00065)
1,2-Dichloroethane	16	0.11	8.1	33		ND (0.078)	NA	NA	ND (0.001)	ND (0.001)	ND (0.083)	ND (0.066)	ND (0.0013)
Ethyl Benzene	2300	15	1300	820		0.34 (0.078)	ND (0.001)	ND (0.00099)	ND (0.001)	0.00022 J (0.001)	0.015 J (0.083)	0.12 (0.066)	0.0011 J (0.0013)
Methyl tert-butyl ether	2400	16	390	5900		ND (0.16)	ND (0.0021)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.16)	ND (0.13)	ND (0.0026)
Toluene	8000	76	650	9800		6.8 (0.078)	ND (0.001)	ND (0.00099)	ND (0.001)	0.00084 J (0.001)	ND (0.083)	0.29 (0.066)	0.0029 (0.0013)
1,2,4-Trimethylbenzene	180	0.92	70	250		0.1 J (0.16)	0.0026 (0.0021)	0.0018 J (0.002)	ND (0.002)	0.00072 J (0.002)	ND (0.16)	<u>16 (0.13)</u>	0.0048 (0.0026)
1,3,5-Trimethylbenzene	220	0.92	99	240		0.025 J (0.16)	ND (0.0021)	ND (0.002)	ND (0.002)	0.00025 J (0.002)	ND (0.16)	<u>3.8 (0.13)</u>	0.0018 J (0.0026)
m,p-xylene	--	--	--	--		1 (0.16)	0.001 J (0.0021)	0.00099 J (0.002)	ND (0.002)	0.001 J (0.002)	0.084 J (0.16)	1.1 (0.13)	0.0086 (0.0026)
ortho-xylene	--	--	--	--		0.075 J (0.078)	0.00084 J (0.001)	0.00087 J (0.00099)	ND (0.001)	0.00056 J (0.001)	0.026 J (0.083)	0.16 (0.066)	0.0056 (0.0013)
Xylenes (total)	240	1.5	51	340		1.1 J (0.078)	0.0018 J (0.001)	0.0019 J (0.00099)	ND (0.001)	0.0016 J (0.001)	0.11 J (0.083)	1.3 (0.066)	0.014 (0.0013)
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--		ND (0.12)	NA	NA	ND (0.12)	0.22 (0.13)	0.039 J (0.12)	0.45 (0.11)	0.48 (0.12)
Benzo(a)anthracene	430	--	3200	--		0.029 J (0.12)	NA	NA	ND (0.12)	0.4 (0.13)	0.13 (0.12)	0.34 (0.11)	0.85 (0.12)
Benzo(a)pyrene	43	--	7.7	--		ND (0.17)	0.067 J (0.15)	0.085 J (0.15)	ND (0.16)	1.4 (0.17)	0.17 (0.16)	0.62 (0.15)	0.97 (0.16)
Benzo(b)fluoranthene	430	--	3200	--		0.035 J (0.12)	NA	NA	ND (0.12)	1.2 (0.13)	0.18 (0.12)	0.68 (0.11)	0.92 (0.12)
Benzo(g,h,i)perylene	4600	--	14000	--		ND (0.17)	NA	NA	ND (0.16)	0.94 (0.17)	0.092 J (0.16)	0.31 (0.15)	0.45 (0.16)
Chrysene	43000	--	320000	--		0.03 J (0.12)	NA	NA	ND (0.12)	0.52 (0.13)	0.16 (0.12)	0.92 (0.11)	0.86 (0.12)
Fluorene	6200	--	18000	--		0.024 J (0.21)	NA	NA	ND (0.2)	0.14 J (0.22)	0.036 J (0.2)	1.2 (0.19)	0.53 (0.21)
Indeno(1,2,3-cd)pyrene	430	--	3200	--		NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27		ND (0.21)	0.081 (0.038)	0.098 (0.038)	ND (0.2)	<u>2.2 (0.22)</u>	0.16 J (0.2)	0.32 (0.19)	<u>1.3 (0.21)</u>
Phenanthrene	4600	--	14000	--		0.062 J (0.12)	NA	NA	ND (0.12)	0.34 (0.13)	0.083 J (0.12)	1.6 (0.11)	1.5 (0.12)
Pyrene	4600	--	14000	--		0.041 J (0.12)	NA	NA	ND (0.12)	0.38 (0.13)	0.16 (0.12)	0.62 (0.11)	1.5 (0.12)
Tetraethylene Glycol	350000	--	96000	120000		NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties													
pH	--	--	--	--		NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Lead	2520	--	2520	45000		85.3 (12.2)	NA	NA	40.8 (2.31)	13.9 (2.48)	193 (2.3)	97.5 (2.15)	375 (2.37)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR1116-14	GPR1116-15	GPR1117-01	GPR1117-02	GPR1117-03	GPR1117-03R	GPR1117-04	GPR1117-05
Field Sample ID					GPR1116-14-SS01	GPR1116-15-SS01	GPR1117-01-SS01	GPR1117-02-SS01	GPR1117-03-SS01	GPR1117-03R-0.0-0.5	GPR1117-04-SS01	GPR1117-05-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.5 - 4.0	1.5 - 2.0	4.5 - 5.0	4.0 - 4.5	3.5 - 4.0	0.0 - 0.5	4.5 - 5.0	4.0 - 4.5	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					8/1/2022	8/1/2022	7/18/2022	7/18/2022	7/18/2022	1/3/2023	7/18/2022	7/18/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	0.0012 (0.00093)	0.05 J (0.097)	ND (0.00087)	ND (0.00083)	0.00024 J (0.00071)	0.00032 J (0.0005)	0.11 J (0.28)	0.0011 (0.0011)	
Cumene	1000	6.1	87	1000	0.02 (0.0019)	1.1 (0.19)	0.0055 (0.0017)	0.001 J (0.0017)	0.00049 J (0.0014)	0.11 (0.00099)	3.7 (0.56)	ND (0.0022)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00093)	ND (0.097)	ND (0.00087)	ND (0.00083)	ND (0.00071)	NA	ND (0.28)	ND (0.0011)	
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0019)	ND (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	NA	ND (0.56)	ND (0.0022)	
Ethyl Benzene	2300	15	1300	820	0.00041 J (0.0019)	0.27 (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	ND (0.00099)	0.23 J (0.56)	ND (0.0022)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0037)	ND (0.39)	ND (0.0035)	ND (0.0033)	ND (0.0028)	ND (0.002)	ND (1.1)	ND (0.0044)	
Toluene	8000	76	650	9800	ND (0.0019)	0.35 (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	ND (0.00099)	0.34 J (0.56)	ND (0.0022)	
1,2,4-Trimethylbenzene	180	0.92	70	250	0.0014 J (0.0037)	<u>2.6 (0.39)</u>	0.0023 J (0.0035)	0.0017 J (0.0033)	0.00085 J (0.0028)	ND (0.002)	<u>1.3 (1.1)</u>	ND (0.0044)	
1,3,5-Trimethylbenzene	220	0.92	99	240	0.0012 J (0.0037)	0.38 J (0.39)	0.0016 J (0.0035)	0.0015 J (0.0033)	ND (0.0028)	ND (0.002)	0.41 J (1.1)	ND (0.0044)	
m,p-xylene	--	--	--	--	0.0012 J (0.0037)	1.1 (0.39)	ND (0.0035)	ND (0.0033)	ND (0.0028)	ND (0.002)	0.92 J (1.1)	ND (0.0044)	
ortho-xylene	--	--	--	--	0.0013 J (0.0019)	0.27 (0.19)	0.0014 J (0.0017)	0.00098 J (0.0017)	0.00048 J (0.0014)	ND (0.00099)	0.2 J (0.56)	ND (0.0022)	
Xylenes (total)	240	1.5	51	340	0.0025 J (0.0019)	1.4 (0.19)	0.0014 J (0.0017)	0.00098 J (0.0017)	0.00048 J (0.0014)	ND (0.00099)	1.1 J (0.56)	ND (0.0022)	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	0.18 (0.16)	1.3 (0.14)	0.22 (0.17)	0.29 (0.14)	1.4 (0.14)	NA	0.96 (0.12)	0.54 (0.22)	
Benzo(a)anthracene	430	--	3200	--	0.42 (0.16)	3.7 (0.14)	0.72 (0.17)	0.76 (0.14)	0.88 (0.14)	NA	2.9 (0.12)	0.67 (0.22)	
Benzo(a)pyrene	43	--	7.7	--	0.43 (0.22)	5.2 (0.18)	1 (0.22)	1.1 (0.19)	0.84 (0.19)	0.76 (0.16)	3.1 (0.16)	0.64 (0.3)	
Benzo(b)fluoranthene	430	--	3200	--	0.44 (0.16)	5.1 (0.14)	0.97 (0.17)	1 (0.14)	0.79 (0.14)	NA	3.4 (0.12)	0.75 (0.22)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.19 J (0.22)	3.8 (0.18)	0.5 (0.22)	0.58 (0.19)	0.41 (0.19)	NA	1.6 (0.16)	0.36 (0.3)	
Chrysene	43000	--	320000	--	0.36 (0.16)	3.7 (0.14)	0.79 (0.17)	0.88 (0.14)	1 (0.14)	NA	2.8 (0.12)	0.66 (0.22)	
Fluorene	6200	--	18000	--	0.74 (0.27)	0.52 (0.23)	0.26 J (0.28)	0.27 (0.24)	2.7 (0.24)	NA	1 (0.2)	0.19 J (0.37)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	0.37 (0.27)	<u>3.9 (0.23)</u>	<u>1.1 (0.28)</u>	<u>2 (0.24)</u>	<u>6.3 (0.24)</u>	0.46 (0.039)	<u>2 (0.2)</u>	0.32 J (0.37)	
Phenanthrene	4600	--	14000	--	1.5 (0.16)	2.8 (0.14)	0.86 (0.17)	0.8 (0.14)	8.9 (0.14)	NA	3.5 (0.12)	1.2 (0.22)	
Pyrene	4600	--	14000	--	0.62 (0.16)	4.3 (0.14)	1.2 (0.17)	1.5 (0.14)	3.2 (0.14)	NA	4.8 (0.12)	1.1 (0.22)	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	60.2 (3.22)	189 (2.68)	157 (6.55)	125 (5.59)	133 (5.8)	NA	66.9 (2.44)	619 (4.42)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR1117-06	GPR1117-07	GPR1117-08	GPR494-01	GPR494-02	GPR494-03	GPR494-04	GPR494-05
Field Sample ID					GPR1117-06-SS01	GPR1117-07-SS01	GPR1117-08-SS01	GPR494-01-SS01	GPR494-02-SS01	GPR494-03-SS01	GPR494-04-SS01	GPR494-05-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	1.5 - 2.0	4.0 - 4.5	2.0 - 2.5	4.5 - 5.0	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					7/18/2022	7/18/2022	7/18/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	0.0012 (0.00094)	0.00049 J (0.00097)	0.0054 (0.00059)	ND (0.025)	0.037 (0.036)	0.0004 J (0.00048)	0.00036 J (0.00061)	ND (0.068)	
Cumene	1000	6.1	87	1000	0.0012 J (0.0019)	ND (0.0019)	0.00028 J (0.0012)	ND (0.049)	0.63 (0.072)	0.034 (0.00096)	0.0072 (0.0012)	2.1 (0.14)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00094)	ND (0.00097)	ND (0.00059)	ND (0.025)	ND (0.036)	ND (0.00048)	ND (0.00061)	ND (0.068)	
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0019)	ND (0.0019)	ND (0.0012)	ND (0.049)	ND (0.072)	ND (0.00096)	ND (0.0012)	ND (0.14)	
Ethyl Benzene	2300	15	1300	820	ND (0.0019)	ND (0.0019)	ND (0.0012)	0.022 J (0.049)	0.064 J (0.072)	0.0012 (0.00096)	0.001 J (0.0012)	0.046 J (0.14)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0038)	ND (0.0039)	ND (0.0024)	ND (0.099)	ND (0.14)	ND (0.0019)	ND (0.0024)	ND (0.27)	
Toluene	8000	76	650	9800	0.002 (0.0019)	ND (0.0019)	ND (0.0012)	ND (0.049)	0.047 J (0.072)	0.00082 J (0.00096)	0.0011 J (0.0012)	0.089 J (0.14)	
1,2,4-Trimethylbenzene	180	0.92	70	250	0.009 (0.0038)	ND (0.0039)	ND (0.0024)	0.22 (0.099)	0.061 J (0.14)	0.0017 J (0.0019)	0.001 J (0.0024)	0.15 J (0.27)	
1,3,5-Trimethylbenzene	220	0.92	99	240	0.0025 J (0.0038)	ND (0.0039)	ND (0.0024)	0.06 J (0.099)	ND (0.14)	0.0004 J (0.0019)	0.0074 (0.0024)	ND (0.27)	
m,p-xylene	--	--	--	--	0.0036 J (0.0038)	ND (0.0039)	ND (0.0024)	0.078 J (0.099)	0.078 J (0.14)	0.0064 (0.0019)	0.0027 (0.0024)	0.16 J (0.27)	
ortho-xylene	--	--	--	--	0.0012 J (0.0019)	ND (0.0019)	ND (0.0012)	0.038 J (0.049)	0.14 (0.072)	0.0068 (0.00096)	0.0041 (0.0012)	0.086 J (0.14)	
Xylenes (total)	240	1.5	51	340	0.0048 J (0.0019)	ND (0.0019)	ND (0.0012)	0.12 J (0.049)	0.22 J (0.072)	0.013 (0.00096)	0.0068 (0.0012)	0.25 J (0.14)	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	0.22 (0.14)	0.098 J (0.17)	0.3 (0.13)	4.8 (1.1)	7.1 (1.1)	4 (0.54)	0.59 (0.56)	4.7 (1.2)	
Benzo(a)anthracene	430	--	3200	--	0.53 (0.14)	0.26 (0.17)	0.59 (0.13)	9.7 (1.1)	20 (1.1)	7.8 (0.54)	3.9 (0.56)	11 (1.2)	
Benzo(a)pyrene	43	--	7.7	--	0.72 (0.19)	0.3 (0.22)	0.54 (0.17)	7.7 (1.4)	<i>18 (1.5)</i>	7.4 (0.72)	7.4 (0.75)	<i>8.7 (1.6)</i>	
Benzo(b)fluoranthene	430	--	3200	--	0.76 (0.14)	0.36 (0.17)	0.61 (0.13)	3.7 (1.1)	8.4 (1.1)	3.6 (0.54)	4.6 (0.56)	3.9 (1.2)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.49 (0.19)	0.2 J (0.22)	0.26 (0.17)	2.5 (1.4)	7 (1.5)	2.4 (0.72)	3.5 (0.75)	2.7 (1.6)	
Chrysene	43000	--	320000	--	0.74 (0.14)	0.27 (0.17)	0.58 (0.13)	13 (1.1)	34 (1.1)	14 (0.54)	9.7 (0.56)	16 (1.2)	
Fluorene	6200	--	18000	--	0.12 J (0.24)	0.11 J (0.28)	0.12 J (0.21)	5.2 (1.8)	9 (1.9)	4.8 (0.91)	0.57 J (0.93)	8.1 (2)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	<u>1.2 (0.24)</u>	0.45 (0.28)	0.14 J (0.21)	<u>1.3 J (1.8)</u>	<u>1.4 J (1.9)</u>	ND (0.91)	0.36 J (0.93)	<u>0.94 J (2)</u>	
Phenanthrene	4600	--	14000	--	0.52 (0.14)	0.39 (0.17)	1.1 (0.13)	30 (1.1)	71 (1.1)	29 (0.54)	1.1 (0.56)	36 (1.2)	
Pyrene	4600	--	14000	--	0.76 (0.14)	0.39 (0.17)	1 (0.13)	11 (1.1)	39 (1.1)	20 (0.54)	8.6 (0.56)	15 (1.2)	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	687 (2.85)	981 (3.24)	20.4 (2.46)	517 (2.11)	90.3 (2.21)	12.9 (2.12)	238 (2.14)	32 (2.37)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR494-06	GPR494-07	GPR494-08	GPR494-08R	GPR494-09	GPR790-01	GPR790-02	GPR790-03
Field Sample ID						GPR494-06-SS01	GPR494-07-SS01	GPR494-08-SS01	TG07-MW-01-0.0-0.5	GPR494-09-SS01	GPR790-01-SS01	GPR790-02-SS01	GPR790-03-SS01
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		4.5 - 5.0	4.5 - 5.0	3.0 - 3.5	0.0 - 0.5	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date						8/2/2022	8/2/2022	8/2/2022	12/21/2022	8/2/2022	8/1/2022	8/1/2022	8/1/2022
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	0.00059 (0.00056)	0.0005 J (0.00059)	0.016 (0.0006)	0.0088 (0.00043)	ND (0.00069)	520 (3.4)	130 (0.3)	2.8 (0.26)	
Cumene	1000	6.1	87	1000	0.0091 (0.0011)	0.14 (0.0012)	0.0029 (0.0014)	ND (0.00086)	ND (0.0014)	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00056)	ND (0.00059)	ND (0.0006)	NA	ND (0.00069)	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0011)	ND (0.0012)	ND (0.0012)	NA	ND (0.0014)	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.00067 J (0.0011)	0.0028 (0.0012)	0.0036 (0.0012)	ND (0.00086)	ND (0.0014)	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0022)	ND (0.0024)	ND (0.0024)	ND (0.0017)	ND (0.0028)	NA	NA	NA	NA
Toluene	8000	76	650	9800	0.0012 (0.0011)	0.0043 (0.0012)	0.0057 (0.0012)	ND (0.00086)	ND (0.0014)	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	0.002 J (0.0022)	0.018 (0.0024)	0.012 (0.0028)	ND (0.0017)	ND (0.0028)	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0022)	0.0025 (0.0024)	0.0039 (0.0028)	ND (0.0017)	ND (0.0028)	NA	NA	NA	NA
m,p-xylene	--	--	--	--	0.0032 (0.0022)	0.041 (0.0024)	0.012 (0.0024)	0.00084 J (0.0017)	ND (0.0028)	NA	NA	NA	NA
ortho-xylene	--	--	--	--	0.0052 (0.0011)	0.02 (0.0012)	0.0083 (0.0012)	0.00071 J (0.00086)	ND (0.0014)	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	0.0084 (0.0011)	0.061 (0.0012)	0.02 (0.0012)	0.0016 J (0.00086)	ND (0.0014)	NA	NA	NA	NA
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	1.8 (1.1)	2.8 (0.58)	23 (4)	NA	0.13 (0.12)	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	2.8 (1.1)	3.5 (0.58)	71 (4)	NA	0.73 (0.12)	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	2.1 (1.4)	2.7 (0.78)	54 (5.4)	0.62 (0.46)	1.1 (0.16)	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	1.2 (1.1)	1.1 (0.58)	28 (4)	NA	1.2 (0.12)	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.75 J (1.4)	0.7 J (0.78)	18 (5.4)	NA	0.51 (0.16)	NA	NA	NA	NA
Chrysene	43000	--	320000	--	3.1 (1.1)	7 (0.58)	170 (4)	NA	0.7 (0.12)	NA	NA	NA	NA
Fluorene	6200	--	18000	--	1.4 J (1.8)	6.6 (0.98)	11 (6.7)	NA	0.03 J (0.2)	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.42 J (1.8)	ND (0.98)	4.8 J (6.7)	ND (0.11)	0.059 J (0.2)	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	7.6 (1.1)	30 (0.58)	110 (4)	NA	0.45 (0.12)	NA	NA	NA	NA
Pyrene	4600	--	14000	--	2.3 (1.1)	7.8 (0.58)	130 (4)	NA	0.84 (0.12)	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Lead	2520	--	2520	45000	78.1 (2.06)	19.3 (2.28)	114 (2.26)	NA	70.9 (2.36)	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR790-04	GPR790-05	GPR790-05R	GPR790-05R	GPR790-06	GPR790-07	GPR790-08	GPR791-01
Field Sample ID			Construction	Soil Migration to	GPR790-04-SS01	GPR790-05-SS01	TG07-MW-05-4.0-4.5	TG07-MW-05-4.5-5.0	GPR790-06-SS01	GPR790-07-SS01	GPR790-08-0.0-0.5	GPR791-01-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Worker Soil Direct	GW	3.0 - 3.5	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	0.0 - 0.5	4.5 - 5.0	
Sample Method	Soil Direct Contact	Soil VI	Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					8/1/2022	8/1/2022	12/21/2022	12/21/2022	8/1/2022	8/1/2022	1/3/2023	8/1/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	0.2 J (0.59)	3000 (26)	2300 (5.9)	1700 (4.9)	4.6 (0.42)	<u>34 (6.5)</u>	0.00076 (0.00051)	1200 (2.4)	
Cumene	1000	6.1	87	1000	NA	NA	<u>240 (12)</u>	<u>99 (4.9)</u>	NA	NA	0.0063 (0.001)	NA	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	
Ethyl Benzene	2300	15	1300	820	NA	NA	<u>25 (12)</u>	12 (4.9)	NA	NA	0.00019 J (0.001)	NA	
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	ND (24)	ND (9.9)	NA	NA	ND (0.002)	NA	
Toluene	8000	76	650	9800	NA	NA	<u>350 (12)</u>	<u>230 (4.9)</u>	NA	NA	0.00074 J (0.001)	NA	
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	<u>65 (24)</u>	<u>27 (9.9)</u>	NA	NA	0.00039 J (0.002)	NA	
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	<u>33 (24)</u>	<u>14 (9.9)</u>	NA	NA	ND (0.002)	NA	
m,p-xylene	--	--	--	--	NA	NA	120 (24)	57 (9.9)	NA	NA	0.00068 J (0.002)	NA	
ortho-xylene	--	--	--	--	NA	NA	21 (12)	9.2 (4.9)	NA	NA	ND (0.001)	NA	
Xylenes (total)	240	1.5	51	340	NA	NA	<u>140 (0.12)</u>	<u>66 (4.9)</u>	NA	NA	0.00068 J (0.001)	NA	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	NA	NA	ND (0.77)	ND (0.77)	NA	NA	0.47 (0.16)	NA	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	NA	NA	<u>7.5 (0.19)</u>	<u>5 (0.19)</u>	NA	NA	0.036 J (0.04)	NA	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR791-02	GPR791-03	GPR791-04	GPR791-04R	GPR791-04R	GPR791-05	GPR791-06	GPR791-07
Field Sample ID					GPR791-02-SS01	GPR791-03-SS01	GPR791-04-SS01	TG07-MW-06-4.0-4.5	TG07-MW-06-4.5-5.0	GPR791-05-SS01	GPR791-06-SS01	GPR791-07-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.5 - 4.0	4.0 - 4.5	3.0 - 3.5	4.0 - 4.5	4.5 - 5.0	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					8/1/2022	8/1/2022	8/1/2022	12/22/2022	12/22/2022	8/1/2022	8/1/2022	8/1/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	<u>4 J (4.5)</u>	160 (0.49)	1300 (5)	170 (6.2)	140 (3)	<u>9.8 (0.6)</u>	380 (1.8)	<u>13 (0.29)</u>	
Cumene	1000	6.1	87	1000	NA	NA	NA	3400 (12)	1900 (12)	NA	NA	NA	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	2.7 (0.62)	1 J (6)	NA	NA	NA	
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	ND (1.2)	ND (12)	NA	NA	NA	
Toluene	8000	76	650	9800	NA	NA	NA	3.6 (0.62)	3.8 J (6)	NA	NA	NA	
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	<u>4.9 (1.2)</u>	<u>2.8 J (12)</u>	NA	NA	NA	
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	0.28 J (1.2)	ND (12)	NA	NA	NA	
m,p-xylene	--	--	--	--	NA	NA	NA	2.1 (1.2)	ND (12)	NA	NA	NA	
ortho-xylene	--	--	--	--	NA	NA	NA	0.53 J (0.62)	ND (6)	NA	NA	NA	
Xylenes (total)	240	1.5	51	340	NA	NA	NA	<u>2.6 J (0.62)</u>	ND (6)	NA	NA	NA	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	0.18 (0.15)	ND (0.73)	NA	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	NA	NA	NA	<u>5.4 (0.037)</u>	0.37 (0.18)	NA	NA	NA	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR791-08	GPR791-09	GPR791-09	GPR792-01	GPR792-02	GPR792-02	GPR792-03	GPR792-03R
Field Sample ID						GPR791-08-SS01	GPR791-09-0.0-0.5	GPR791-09-2.0-2.5	GPR792-01-SS01	GPR792-02-SS01	DUP-49	GPR792-03-SS01	GPR792-03R-1.5-2.0
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		4.0 - 4.5	0.0 - 0.5	2.0 - 2.5	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	1.5 - 2.0
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date						8/1/2022	1/3/2023	1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/2/2022	1/3/2023
Comments						Field Duplicate							
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98		<u>7.1 (0.36)</u>	0.0046 (0.00041)	0.0035 (0.00049)	NA	NA	NA	NA	0.32 (0.14)
Cumene	1000	6.1	87	1000		NA	0.14 (0.00081)	0.0043 (0.00099)	2400 (15)	4700 (49)	4700 (59)	12000 (88)	<u>160 (0.56)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33		NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820		NA	0.00061 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	0.06 J (0.28)
Methyl tert-butyl ether	2400	16	390	5900		NA	ND (0.0016)	ND (0.002)	NA	NA	NA	NA	ND (0.56)
Toluene	8000	76	650	9800		NA	0.0045 (0.00081)	0.00064 J (0.00099)	NA	NA	NA	NA	ND (0.28)
1,2,4-Trimethylbenzene	180	0.92	70	250		NA	0.00067 J (0.0016)	ND (0.002)	NA	NA	NA	NA	0.12 J (0.56)
1,3,5-Trimethylbenzene	220	0.92	99	240		NA	0.00028 J (0.0016)	ND (0.002)	NA	NA	NA	NA	0.067 J (0.56)
m,p-xylene	--	--	--	--		NA	0.0021 (0.0016)	ND (0.002)	NA	NA	NA	NA	ND (0.56)
ortho-xylene	--	--	--	--		NA	0.00045 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	ND (0.28)
Xylenes (total)	240	1.5	51	340		NA	0.0026 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	ND (0.28)
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--		NA	0.51 (0.14)	ND (0.15)	NA	NA	NA	NA	ND (0.75)
Benzo(b)fluoranthene	430	--	3200	--		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--		NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--		NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--		NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--		NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27		NA	0.12 (0.036)	ND (0.037)	NA	NA	NA	NA	ND (0.19)
Phenanthrene	4600	--	14000	--		NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--		NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000		NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties													
pH	--	--	--	--		NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Lead	2520	--	2520	45000		NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR792-03R	GPR792-04	GPR792-05	GPR792-06	GPR792-07	GPR793-01	GPR793-02	GPR793-03
Field Sample ID						GPR792-03R-2.0-2.5	GPR792-04-SS01	GPR792-05-SS01	GPR792-06-SS01	GPR792-07-SS01	GPR793-01-SS01	GPR793-02-SS01	GPR793-03-SS01
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		2.0 - 2.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	3.5 - 4.0	4.0 - 4.5	4.0 - 4.5	4.5 - 5.0
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date						1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	0.46 (0.12)	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	<u>160 (1)</u>	5000 (54)	8900 (65)	4600 (70)	1400 (12)	5500 (92)	11000 (100)	15000 (120)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.052 J (0.25)	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	ND (0.25)	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	0.14 J (0.5)	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	0.074 J (0.5)	NA	NA	NA	NA	NA	NA	NA	NA
m,p-xylene	--	--	--	--	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	NA
ortho-xylene	--	--	--	--	ND (0.25)	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.25)	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	ND (2.8)	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.71)	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR793-03R	GPR793-03R	GPR793-04	GPR793-05	GPR793-06	GPR794-01	GPR794-01R	GPR794-02
Field Sample ID						GPR793-03R-2.5-3.0	GPR793-03R-3.0-3.5	GPR793-04-SS01	GPR793-05-SS01	GPR793-06-SS01	GPR794-01-SS01	GPR794-01R-SS01	GPR794-02-SS01
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		2.5 - 3.0	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	3.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date						1/3/2023	1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/3/2022	10/21/2022	8/3/2022
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	ND (2.5)	ND (2.8)	NA	NA	NA	2200 (14)	NA	2800 (8.3)	
Cumene	1000	6.1	87	1000	1500 (50)	2200 (22)	14000 (110)	1900 (9.2)	1800 (11)	4000 (29)	NA	3000 (16)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	ND (1.2)	NA	ND (2.1)	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	ND (2.3)	NA	ND (4.1)	
Ethyl Benzene	2300	15	1300	820	ND (5)	ND (5.6)	NA	NA	NA	<u>74 (2.3)</u>	NA	<u>26 (4.1)</u>	
Methyl tert-butyl ether	2400	16	390	5900	ND (10)	ND (11)	NA	NA	NA	ND (4.6)	NA	ND (8.3)	
Toluene	8000	76	650	9800	ND (5)	ND (5.6)	NA	NA	NA	<u>3400 (29)</u>	NA	<u>1200 (4.1)</u>	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (10)	ND (11)	NA	NA	NA	<u>32 (4.6)</u>	NA	<u>8.4 (8.3)</u>	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (10)	ND (11)	NA	NA	NA	<u>16 (4.6)</u>	NA	<u>3.9 J (8.3)</u>	
m,p-xylene	--	--	--	--	ND (10)	ND (11)	NA	NA	NA	240 (4.6)	NA	86 (8.3)	
ortho-xylene	--	--	--	--	ND (5)	ND (5.6)	NA	NA	NA	55 (2.3)	NA	25 (4.1)	
Xylenes (total)	240	1.5	51	340	ND (5)	ND (5.6)	NA	NA	NA	300 (2.3)	NA	<u>110 (4.1)</u>	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	0.51 J (1.2)	NA	ND (1.3)	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	0.27 J (1.2)	NA	0.46 J (1.3)	
Benzo(a)pyrene	43	--	7.7	--	ND (0.72)	ND (2.9)	NA	NA	NA	ND (1.5)	NA	ND (1.7)	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	ND (1.2)	NA	0.47 J (1.3)	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	ND (1.5)	NA	ND (1.7)	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	0.35 J (1.2)	NA	0.44 J (1.3)	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	2 (1.9)	NA	0.47 J (2.1)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	ND (0.18)	ND (0.73)	NA	NA	NA	<u>3.5 (1.9)</u>	NA	<u>1 J (2.1)</u>	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	8.7 (1.2)	NA	2.9 (1.3)	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	0.71 J (1.2)	NA	0.86 J (1.3)	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	ND (9.5)	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	408 (2.32)	NA	347 (2.56)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR794-02R	GPR794-03	GPR794-03R	GPR794-04	GPR794-04R	GPR794-05	GPR794-05R	GPR794-06
Field Sample ID					GPR794-02R-SS01	GPR794-03-SS01	GPR794-03R-SS01	GPR794-04-SS01	GPR794-04R-SS01	GPR794-05-SS01	GPR794-05R-SS01	GPR794-06-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	4.5 - 5.0	3.0 - 3.5	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	8/3/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	NA	0.41 (0.028)	NA	7800 (43)	NA	2600 (13)	NA	2000 (5.9)	
Cumene	1000	6.1	87	1000	NA	0.38 (0.055)	NA	12000 (87)	NA	2500 (27)	NA	4800 (59)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	ND (0.00045)	NA	ND (8.7)	NA	ND (1.7)	NA	ND (5.9)	
1,2-Dichloroethane	16	0.11	8.1	33	NA	ND (0.0009)	NA	ND (17)	NA	ND (3.4)	NA	ND (12)	
Ethyl Benzene	2300	15	1300	820	NA	0.02 (0.0009)	NA	<u>120 (17)</u>	NA	<u>31 (3.4)</u>	NA	<u>110 (12)</u>	
Methyl tert-butyl ether	2400	16	390	5900	NA	ND (0.0018)	NA	ND (35)	NA	ND (6.7)	NA	ND (24)	
Toluene	8000	76	650	9800	NA	0.21 (0.055)	NA	<u>6100 (87)</u>	NA	<u>1800 (27)</u>	NA	<u>4300 (59)</u>	
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	0.004 (0.0018)	NA	<u>79 (35)</u>	NA	<u>7.7 (6.7)</u>	NA	<u>48 (24)</u>	
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	0.0024 (0.0018)	NA	<u>35 (35)</u>	NA	<u>3.5 J (6.7)</u>	NA	<u>23 J (24)</u>	
m,p-xylene	--	--	--	--	NA	0.06 (0.0018)	NA	430 (35)	NA	110 (6.7)	NA	390 (24)	
ortho-xylene	--	--	--	--	NA	0.013 (0.0009)	NA	95 (17)	NA	25 (3.4)	NA	100 (12)	
Xylenes (total)	240	1.5	51	340	NA	0.073 (0.0009)	NA	520 (17)	NA	140 (3.4)	NA	490 (12)	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	ND (0.11)	NA	0.46 J (1.2)	NA	0.07 J (0.12)	NA	0.67 J (1.1)	
Benzo(a)anthracene	430	--	3200	--	NA	0.038 J (0.11)	NA	0.64 J (1.2)	NA	0.035 J (0.12)	NA	0.41 J (1.1)	
Benzo(a)pyrene	43	--	7.7	--	NA	0.049 J (0.14)	NA	0.48 J (1.5)	NA	ND (0.16)	NA	ND (1.5)	
Benzo(b)fluoranthene	430	--	3200	--	NA	0.065 J (0.11)	NA	0.78 J (1.2)	NA	ND (0.12)	NA	0.36 J (1.1)	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	0.03 J (0.14)	NA	0.41 J (1.5)	NA	ND (0.16)	NA	ND (1.5)	
Chrysene	43000	--	320000	--	NA	0.038 J (0.11)	NA	1.4 (1.2)	NA	0.033 J (0.12)	NA	0.35 J (1.1)	
Fluorene	6200	--	18000	--	NA	ND (0.18)	NA	1 J (1.9)	NA	0.17 J (0.2)	NA	1.4 J (1.9)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	NA	ND (0.18)	NA	<u>3.1 (1.9)</u>	NA	<u>1.7 (0.2)</u>	NA	<u>6.3 (1.9)</u>	
Phenanthrene	4600	--	14000	--	NA	0.037 J (0.11)	NA	1.9 (1.2)	NA	0.43 (0.12)	NA	3 (1.1)	
Pyrene	4600	--	14000	--	NA	0.049 J (0.11)	NA	2 (1.2)	NA	0.058 J (0.12)	NA	0.94 J (1.1)	
Tetraethylene Glycol	350000	--	96000	120000	ND (9.9)	NA	ND (9.9)	NA	ND (9.9)	NA	ND (9.3)	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	24.2 (2.2)	NA	63.8 (2.34)	NA	23.6 (2.35)	NA	429 (2.2)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR794-06R	GPR794-07	GPR794-07R	GPR794-08	GPR794-08R	GPR794-08R	GPR794-08R	GPR794-08R	GPR794-09
Field Sample ID						GPR794-06R-SS01	GPR794-07-SS01	GPR794-07R-SS01	GPR794-08-SS01	GPR794-08R-SS01	TG07-MW-07-4.0-4.5	TG07-MW-07-4.5-5.0	GPR794-09-1.5-2.0	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to		4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	1.5 - 2.0	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date						10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	12/21/2022	12/21/2022	1/3/2023	
Comments														
Volatile Organic Compounds														
Benzene	63	0.46	8.7	98	NA	130 (0.22)	NA	12000 (30)	NA	2500 (5.6)	3700 (29)	1 (0.024)		
Cumene	1000	6.1	87	1000	NA	330 (2.2)	NA	7600 (60)	NA	750 (11)	1600 (5.8)	18 (0.098)		
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	ND (0.22)	NA	ND (0.76)	NA	NA	NA	NA		
1,2-Dichloroethane	16	0.11	8.1	33	NA	ND (0.45)	NA	ND (1.5)	NA	NA	NA	NA		
Ethyl Benzene	2300	15	1300	820	NA	1.5 (0.45)	NA	120 (1.5)	NA	48 (11)	93 (5.8)	0.11 (0.049)		
Methyl tert-butyl ether	2400	16	390	5900	NA	ND (0.89)	NA	ND (3)	NA	ND (22)	ND (12)	ND (0.098)		
Toluene	8000	76	650	9800	NA	8.7 (0.45)	NA	6200 (60)	NA	240 (11)	540 (5.8)	0.42 (0.049)		
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	0.81 J (0.89)	NA	35 (3)	NA	140 (22)	330 (12)	ND (0.098)		
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	0.2 J (0.89)	NA	15 (3)	NA	57 (22)	140 (12)	ND (0.098)		
m,p-xylene	--	--	--	--	NA	3.1 (0.89)	NA	390 (3)	NA	240 (22)	460 (12)	0.32 (0.098)		
ortho-xylene	--	--	--	--	NA	ND (0.45)	NA	86 (1.5)	NA	54 (11)	100 (5.8)	ND (0.049)		
Xylenes (total)	240	1.5	51	340	NA	3.1 (0.45)	NA	480 (1.5)	NA	290 (11)	560 (5.8)	0.32 (0.049)		
Semivolatile Organic Compounds														
Anthracene	46000	--	46000	--	NA	ND (0.11)	NA	ND (1.2)	NA	NA	NA	NA		
Benzo(a)anthracene	430	--	3200	--	NA	0.027 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA		
Benzo(a)pyrene	43	--	7.7	--	NA	ND (0.15)	NA	ND (1.6)	NA	ND (1.5)	ND (1.5)	0.19 (0.14)		
Benzo(b)fluoranthene	430	--	3200	--	NA	0.034 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA		
Benzo(g,h,i)perylene	4600	--	14000	--	NA	ND (0.15)	NA	ND (1.6)	NA	NA	NA	NA		
Chrysene	43000	--	320000	--	NA	0.041 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA		
Fluorene	6200	--	18000	--	NA	ND (0.18)	NA	0.75 J (2)	NA	NA	NA	NA		
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA		
Naphthalene	41	0.54	6	27	NA	0.054 J (0.18)	NA	8.7 (2)	NA	36 (0.39)	52 (0.38)	0.031 J (0.036)		
Phenanthrene	4600	--	14000	--	NA	0.19 (0.11)	NA	2.3 (1.2)	NA	NA	NA	NA		
Pyrene	4600	--	14000	--	NA	0.077 J (0.11)	NA	0.28 J (1.2)	NA	NA	NA	NA		
Tetraethylene Glycol	350000	--	96000	120000	ND (9.1)	NA	ND (9.7)	NA	ND (9.3)	NA	NA	NA		
Physical Properties														
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA		
Metals														
Lead	2520	--	2520	45000	NA	3.73 (2.21)	NA	132 (2.4)	NA	NA	NA	NA		

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR794-09	GPR794-09	GPR794-10	GPR798-01	GPR798-02	GPR798-03	GPR798-04	GPR798-04
Field Sample ID					GPR794-09-2.0-2.5	GPR794-09-2.0-2.5D	GPR794-10-1.5-2.0	GPR798-01-SS01	GPR798-02-SS01	GPR798-03-SS01	GPR798-04-SS01	DUP-47	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	2.0 - 2.5	2.0 - 2.5	1.5 - 2.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date			Contact		1/3/2023	1/3/2023	1/3/2023	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	
Comments												Field Duplicate	
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	<u>2.6 (0.024)</u>	<u>1.1 (0.023)</u>	0.35 (0.047)	<u>3.4 (0.094)</u>	<u>6.2 (0.12)</u>	0.4 (0.069)	<u>14 (0.43)</u>	5900 (58)	
Cumene	1000	6.1	87	1000	<u>20 (0.12)</u>	<u>14 (0.093)</u>	<u>42 (0.47)</u>	NA	NA	NA	NA	NA	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	
Ethyl Benzene	2300	15	1300	820	0.32 (0.049)	0.21 (0.046)	0.02 J (0.094)	NA	NA	NA	NA	NA	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.097)	ND (0.093)	ND (0.19)	NA	NA	NA	NA	NA	
Toluene	8000	76	650	9800	1.7 (0.049)	0.83 (0.046)	0.27 (0.094)	NA	NA	NA	NA	NA	
1,2,4-Trimethylbenzene	180	0.92	70	250	0.047 J (0.097)	0.042 J (0.093)	ND (0.19)	NA	NA	NA	NA	NA	
1,3,5-Trimethylbenzene	220	0.92	99	240	0.016 J (0.097)	0.017 J (0.093)	ND (0.19)	NA	NA	NA	NA	NA	
m,p-xylene	--	--	--	--	1 (0.097)	0.72 (0.093)	0.076 J (0.19)	NA	NA	NA	NA	NA	
ortho-xylene	--	--	--	--	0.11 (0.049)	0.092 (0.046)	ND (0.094)	NA	NA	NA	NA	NA	
Xylenes (total)	240	1.5	51	340	1.1 (0.049)	0.81 (0.046)	0.076 J (0.094)	NA	NA	NA	NA	NA	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	0.087 J (0.14)	0.058 J (0.14)	0.047 J (0.14)	NA	NA	NA	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	0.27 (0.036)	0.2 (0.036)	0.3 (0.036)	NA	NA	NA	NA	NA	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPR798-04R	GPR798-04R	GPR798-05	GPR798-06	GPR798-07	GPR799-01	GPR799-02	GPR799-03
Field Sample ID					TG07-MW-04-1.5-2.0	TG07-MW-04-2.0-2.5	GPR798-05-SS01	GPR798-06-SS01	GPR798-07-SS01	GPR799-01-SS01	GPR799-02-SS01	GPR799-03-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	1.5 - 2.0	2.0 - 2.5	4.5 - 5.0	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					1/3/2023	1/3/2023	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	
Comments													
Volatile Organic Compounds													
Benzene	63	0.46	8.7	98	440 (3)	170 (0.72)	<u>1.4 (0.052)</u>	<u>2.2 (0.13)</u>	<u>7.8 (0.1)</u>	<u>2.2 (0.27)</u>	<u>1.6 (0.056)</u>	<u>16 (0.45)</u>	
Cumene	1000	6.1	87	1000	<u>41 (1.2)</u>	<u>42 (0.36)</u>	NA	NA	NA	NA	NA	NA	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA	
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA	
Ethyl Benzene	2300	15	1300	820	ND (1.2)	0.081 J (0.36)	NA	NA	NA	NA	NA	NA	
Methyl tert-butyl ether	2400	16	390	5900	ND (2.4)	ND (0.72)	NA	NA	NA	NA	NA	NA	
Toluene	8000	76	650	9800	ND (1.2)	0.28 J (0.36)	NA	NA	NA	NA	NA	NA	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (2.4)	0.51 J (0.72)	NA	NA	NA	NA	NA	NA	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (2.4)	0.24 J (0.72)	NA	NA	NA	NA	NA	NA	
m,p-xylene	--	--	--	--	ND (2.4)	ND (0.72)	NA	NA	NA	NA	NA	NA	
ortho-xylene	--	--	--	--	ND (1.2)	0.17 J (0.36)	NA	NA	NA	NA	NA	NA	
Xylenes (total)	240	1.5	51	340	ND (1.2)	0.17 J (0.36)	NA	NA	NA	NA	NA	NA	
Semivolatile Organic Compounds													
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	0.076 J (0.15)	ND (0.17)	NA	NA	NA	NA	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	<u>1 (0.038)</u>	0.23 (0.043)	NA	NA	NA	NA	NA	NA	
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA	
Physical Properties													
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	
Metals													
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location					GPR799-03R	GPR799-03R	GPR799-04	GPR799-05	GPR799-06	GPR799-07	GPR799-08	GPR799-08
Field Sample ID					GPR-799-03R-3.0-3.5	GPR-799-03R-3.5-4.0	GPR799-04-SS01	GPR799-05-SS01	GPR799-06-SS01	GPR799-07-SS01	GPR799-08-1.0-1.5	GPR799-08-3.0-3.5
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	1.0 - 1.5	3.0 - 3.5
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					12/21/2022	12/21/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	1/3/2023	1/3/2023
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>2.6 (0.031)</u>	<u>1.2 (0.04)</u>	<u>22 (0.22)</u>	<u>2.7 (0.046)</u>	<u>1.3 (0.052)</u>	<u>0.71 (0.1)</u>	0.2 (0.00047)	<u>0.77 (0.4)</u>
Cumene	1000	6.1	87	1000	0.78 (0.062)	<u>8.2 (0.079)</u>	NA	NA	NA	NA	0.0044 (0.00094)	<u>700 (4)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.025 J (0.062)	0.13 (0.079)	NA	NA	NA	NA	ND (0.00094)	0.13 J (0.8)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.12)	ND (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
Toluene	8000	76	650	9800	0.089 (0.062)	0.44 (0.079)	NA	NA	NA	NA	0.0048 (0.00094)	ND (0.8)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.043 J (0.12)	0.8 (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
1,3,5-Trimethylbenzene	220	0.92	99	240	0.018 J (0.12)	0.63 (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
m,p-xylene	--	--	--	--	0.16 (0.12)	0.43 (0.16)	NA	NA	NA	NA	ND (0.0019)	0.46 J (1.6)
ortho-xylene	--	--	--	--	0.11 (0.062)	0.098 (0.079)	NA	NA	NA	NA	ND (0.00094)	ND (0.8)
Xylenes (total)	240	1.5	51	340	0.27 (0.062)	0.53 (0.079)	NA	NA	NA	NA	ND (0.00094)	0.46 J (0.8)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	1.1 (0.8)	0.58 J (0.71)	NA	NA	NA	NA	ND (0.15)	0.83 (0.17)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.36 (0.2)	<u>2.2 (0.18)</u>	NA	NA	NA	NA	0.032 J (0.037)	<u>1.6 (0.042)</u>
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 1

Summary of PESRM Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location						GPU767-01	GPU767-02	GPU767-03	GPU767-04	GPU767-05	GPU767-06	GPU767-07
Field Sample ID					GPU767-01-SS01	GPU767-02-SS01	GPU767-03-SS01	GPU767-04-SS01	GPU767-05-SS01	GPU767-06-SS01	GPU767-07-SS01	
Collection Depth (ft bgs)	Routine Worker	Routine Worker	Construction	Soil Migration to	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	3.0 - 3.5	3.0 - 3.5	
Sample Method	Soil Direct Contact	Soil VI	Worker Soil Direct Contact	GW	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date					8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022	
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	ND (0.00069)	0.00007 J (0.00008)	0.071 (0.034)	0.021 J (0.036)	0.044 (0.029)	ND (0.00047)	ND (0.001)	
Cumene	1000	6.1	87	1000	0.0011 J (0.0014)	0.0093 (0.00018)	1.6 (0.067)	4.8 (0.071)	<u>24 (0.24)</u>	0.001 (0.00094)	0.00049 J (0.002)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00069)	ND (0.00008)	ND (0.00048)	ND (0.036)	ND (0.029)	ND (0.00047)	ND (0.001)	
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0014)	ND (0.00018)	ND (0.00095)	ND (0.071)	ND (0.059)	ND (0.00094)	ND (0.002)	
Ethyl Benzene	2300	15	1300	820	ND (0.0014)	0.00016 J (0.00018)	0.03 J (0.067)	0.047 J (0.071)	0.12 (0.059)	ND (0.00094)	ND (0.002)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0028)	ND (0.00035)	ND (0.0019)	ND (0.14)	ND (0.12)	ND (0.0019)	ND (0.004)	
Toluene	8000	76	650	9800	ND (0.0014)	0.00018 (0.00018)	0.052 J (0.067)	0.17 (0.071)	0.062 (0.059)	ND (0.00094)	ND (0.002)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0028)	0.00027 J (0.00035)	0.032 J (0.13)	0.037 J (0.14)	0.075 J (0.12)	ND (0.0019)	ND (0.004)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0028)	0.0001 J (0.00035)	0.016 J (0.13)	ND (0.14)	0.017 J (0.12)	ND (0.0019)	ND (0.004)	
m,p-xylene	--	--	--	--	ND (0.0028)	0.00026 J (0.00035)	0.049 J (0.13)	0.14 (0.14)	0.19 (0.12)	ND (0.0019)	ND (0.004)	
ortho-xylene	--	--	--	--	ND (0.0014)	0.00011 J (0.00018)	0.022 J (0.067)	ND (0.071)	0.021 J (0.059)	ND (0.00094)	ND (0.002)	
Xylenes (total)	240	1.5	51	340	ND (0.0014)	0.00037 J (0.00018)	0.071 J (0.067)	0.14 (0.071)	0.21 J (0.059)	ND (0.00094)	ND (0.002)	
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	ND (0.11)	0.058 J (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	0.053 J (0.1)	ND (0.1)	
Benzo(a)anthracene	430	--	3200	--	0.044 J (0.11)	0.12 (0.12)	ND (0.12)	0.037 J (0.12)	ND (0.11)	0.33 (0.1)	ND (0.1)	
Benzo(a)pyrene	43	--	7.7	--	0.07 J (0.15)	0.14 J (0.16)	ND (0.16)	0.049 J (0.16)	ND (0.15)	0.42 (0.14)	ND (0.14)	
Benzo(b)fluoranthene	430	--	3200	--	0.1 J (0.11)	0.15 (0.12)	ND (0.12)	0.054 J (0.12)	ND (0.11)	0.56 (0.1)	ND (0.1)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.076 J (0.15)	0.077 J (0.16)	ND (0.16)	0.064 J (0.16)	0.025 J (0.15)	0.29 (0.14)	ND (0.14)	
Chrysene	43000	--	320000	--	0.046 J (0.11)	0.12 (0.12)	ND (0.12)	0.093 J (0.12)	0.024 J (0.11)	0.38 (0.1)	ND (0.1)	
Fluorene	6200	--	18000	--	ND (0.19)	0.085 J (0.2)	ND (0.2)	ND (0.19)	ND (0.18)	0.03 J (0.18)	ND (0.17)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	0.077 J (0.15)	0.091 J (0.16)	ND (0.16)	ND (0.16)	ND (0.15)	0.35 (0.14)	ND (0.14)	
Naphthalene	41	0.54	6	27	ND (0.19)	0.048 J (0.2)	ND (0.2)	ND (0.19)	ND (0.18)	0.068 J (0.18)	ND (0.17)	
Phenanthrene	4600	--	14000	--	ND (0.11)	0.24 (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	0.19 (0.1)	ND (0.1)	
Pyrene	4600	--	14000	--	0.032 J (0.11)	0.18 (0.12)	ND (0.12)	0.09 J (0.12)	0.022 J (0.11)	0.34 (0.1)	ND (0.1)	
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Lead	2520	--	2520	45000	380 (2.2)	115 (2.3)	72 (2.3)	121 (2.22)	12.5 (2.23)	688 (2.05)	87 (2.01)	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 2

Summary of PESRM Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location	Routine			Construction	Off-Site	GW Migration	TG07-MW-03	TG07-MW-02	TG07-MW-01	TG07-MW-05	TG07-MW-07	TG07-MW-04	TG07-MW-08
Field Sample ID	Nonpotable	Worker GW	Routine	Worker GW	Resident GW	to SW	TG07-MW-03-230104	TG07-MW-02-230104	TG07-MW-01-230105	TG07-MW-05-230105	TG07-MW-07-230106	TG07-MW-04-230105	TG07-MW-08-230105
Sample Method	GW Use	Vol to Outdoor	Worker GW VI	Worker GW	VI		Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date		Air		Direct Contact			1/4/2023	1/4/2023	1/5/2023	1/5/2023	1/6/2023	1/5/2023	1/5/2023
Comments													
Volatile Organic Compounds													
Benzene	300	550000	3800	4000	250	130000	0.36 J (0.5)	17 (0.5)	ND (0.5)	<u>11000 (50)</u>	<u>240000 (1000)</u>	36 (1)	ND (12)
Cumene	37000	9100000	63000	30000	4000	2600	4 (0.5)	67 (0.5)	0.34 J (0.5)	<u>7200 (50)</u>	<u>5300 (200)</u>	290 (1)	<u>4400 (12)</u>
1,2-Dibromoethane	17	16000	110	910	160	--	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
1,2-Dichloroethane	330	170000	1200	4900	82	3100000	ND (0.5)	ND (0.5)	ND (0.5)	ND (50)	ND (200)	ND (1)	ND (12)
Ethyl Benzene	2000	22000000	150000	40000	9700	13000	ND (0.5)	0.42 J (0.5)	ND (0.5)	34 J (50)	360 (200)	1.9 (1)	ND (12)
Methyl tert-butyl ether	21000	29000000	210000	190000	42000	11000000	ND (1)	0.36 J (1)	ND (1)	ND (100)	ND (400)	ND (2)	ND (25)
Toluene	25000	100000000	700000	200000	45000	52000	0.23 J (0.75)	1.4 (0.75)	ND (0.75)	200 (75)	<u>27000 (300)</u>	3.8 (1.5)	ND (19)
1,2,4-Trimethylbenzene	8700	1400000	9700	15000	630	33000	3.4 (2.5)	0.5 J (2.5)	0.25 J (2.5)	30 J (250)	220 J (1000)	1.4 J (5)	ND (62)
1,3,5-Trimethylbenzene	8800	1300000	9100	15000	590	71000	ND (2.5)	0.24 J (2.5)	ND (2.5)	ND (250)	ND (1000)	0.72 J (5)	ND (62)
Xylenes (total)	3700	1900000	13000	17000	860	210000	1.2 J (1)	1.5 J (1)	ND (1)	41 J (100)	<u>1700 J (400)</u>	6.7 (2)	ND (25)
Semivolatile Organic Compounds													
Anthracene	240000	--	--	19000000	--	40000	0.1 (0.1)	0.24 (0.1)	0.05 J (0.1)	0.27 (0.1)	0.25 (0.1)	0.43 (0.1)	0.24 (0.1)
Benzo(a)anthracene	100	--	--	1400000	--	13	0.04 J (0.05)	0.11 (0.05)	0.08 (0.05)	0.07 (0.05)	0.12 J (0.25)	0.14 (0.05)	0.18 (0.05)
Benzo(a)pyrene	10	--	--	5800	--	1.3	ND (0.1)	0.07 J (0.1)	0.02 J (0.1)	0.04 J (0.1)	0.07 J (0.1)	0.07 J (0.1)	0.02 J (0.1)
Benzo(b)fluoranthene	160	--	--	1400000	--	13	ND (0.05)	0.07 (0.05)	0.02 J (0.05)	0.03 J (0.05)	0.04 J (0.05)	0.07 (0.05)	0.03 J (0.05)
Benzo(g,h,i)perylene	44000	--	--	5800000	--	12	ND (0.1)	0.04 J (0.1)	0.01 J (0.1)	ND (0.1)	0.01 J (0.1)	0.02 J (0.1)	ND (0.1)
Chrysene	16000	--	--	140000000	--	1300	ND (0.1)	0.07 J (0.1)	0.03 J (0.1)	0.04 J (0.1)	ND (0.5)	0.11 (0.1)	0.07 J (0.1)
Fluorene	97000	--	--	7800000	--	7000	0.58 (0.1)	2.2 (0.1)	0.13 (0.1)	2.7 (0.1)	2 (0.1)	4.8 (0.1)	2.9 (0.1)
Indeno(1,2,3-cd)pyrene	100	--	--	1400000	--	13	ND (0.1)	0.04 J (0.1)	ND (0.1)	0.01 J (0.1)	0.02 J (0.1)	0.02 J (0.1)	0.01 J (0.1)
Naphthalene	390	120000	880	280	67	43000	0.13 (0.1)	0.9 (0.1)	ND (0.1)	17 (0.1)	<u>130 (0.5)</u>	ND (0.1)	3.1 (0.1)
Phenanthrene	73000	--	--	5800000	--	1000	0.63 (0.05)	1.8 (0.05)	0.2 (0.05)	2.4 (0.05)	2.6 (0.05)	4.6 (0.05)	1.8 (0.05)
Pyrene	50000	--	--	5800000	--	3000	0.11 (0.1)	0.36 (0.1)	0.14 (0.1)	0.22 (0.1)	0.3 (0.1)	0.42 (0.1)	0.86 (0.1)
Metals													
Lead	--	--	--	--	--	2500	ND (1)	7.913 (1)	0.593 J (1)	ND (1)	ND (1)	ND (1)	ND (1)

Notes:

- All concentrations reported in ug/L (ppb); detection limits in parentheses.
- Underlined concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Italicized concentrations exceed the Routine Worker GW VI.
- Boldfaced concentrations exceed the Construction Worker GW Direct Contact.
- Grey-shaded concentrations exceed the Off-Site Resident GW VI.
- Blue font concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	1732_1733-01	1732_1733-02	1732_1733-02	1732_1733-03	1732_1733-03	1732_1733-04	1732_1733-04
					1732_1733-01_0-2_20220511 0 - 2 5/11/2022	1732_1733-02_0-2_20220511 0 - 2 5/11/2022	1732_1733-02_3-4_20220511 3 - 4 5/11/2022	1732_1733-03_0-2_20220511 0 - 2 5/11/2022	1732_1733-03_3-4_20220511 3 - 4 5/11/2022	1732_1733-04_0-2_20220511 0 - 2 5/11/2022	1732_1733-04_3-4_20220511 3 - 4 5/11/2022
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.0025 (0.00059)	ND (0.00071)	0.0075 (0.00051)	0.0019 (0.00063)	<u>0.534 E,J</u> (0.00044)	0.0887 (0.00064)	0.109 (0.00062)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.0659 (0.0024)	ND (0.0028)	<u>24.8</u> (2.3)	0.0299 (0.0025)	<u>118</u> (6.2)	<u>108</u> (2.6)	<u>556</u> (7.4)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.0012)	ND (0.0014)	ND (0.001)	ND (0.0013)	ND (0.00089)	ND (0.0013)	ND (0.0012)
Ethyl Benzene	2300	15	1300	820	ND (0.0012)	ND (0.0014)	0.0154 (0.001)	ND (0.0013)	0.0411 (0.00089)	ND (0.0013)	0.0012 (0.0012)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0012)	ND (0.0014)	ND (0.001)	ND (0.0013)	ND (0.00089)	ND (0.0013)	ND (0.0012)
Toluene	8000	76	650	9800	ND (0.0012)	ND (0.0014)	0.0028 (0.001)	ND (0.0013)	0.144 (0.00089)	ND (0.0013)	0.0017 (0.0012)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0024)	ND (0.0028)	0.0095 (0.0021)	ND (0.0025)	0.0099 (0.0018)	0.0093 (0.0026)	0.0246 (0.0025)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0024)	ND (0.0028)	0.0097 (0.0021)	ND (0.0025)	0.0041 (0.0018)	0.0048 (0.0026)	0.0158 (0.0025)
Xylenes (total)	240	1.5	51	340	0.0011 J (0.0012)	ND (0.0014)	0.011 (0.001)	ND (0.0013)	0.1 (0.00089)	0.0138 (0.0013)	0.0265 (0.0012)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.044 (0.038)	ND (0.04)	0.0637 (0.037)	3.44 (0.19)	0.144 (0.037)	ND (0.039)	0.134 (0.04)
Benzo(a)anthracene	430	--	3200	--	0.147 (0.038)	0.0549 (0.04)	0.184 (0.037)	12.6 (0.19)	0.161 (0.037)	0.054 (0.039)	0.211 (0.04)
Benzo(a)pyrene	43	--	7.7	--	0.187 (0.038)	0.0519 (0.04)	0.175 (0.037)	<u>14</u> (0.19)	0.128 (0.037)	0.0462 (0.039)	0.151 (0.04)
Benzo(b)fluoranthene	430	--	3200	--	0.22 (0.038)	0.0591 (0.04)	0.207 (0.037)	13.6 (0.19)	0.15 (0.037)	0.0613 (0.039)	0.181 (0.04)
Benzo(g,h,i)perylene	4600	--	14000	--	0.176 (0.038)	0.0327 J (0.04)	0.122 (0.037)	5.34 (0.19)	0.0778 (0.037)	0.0352 J (0.039)	0.0728 (0.04)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.191 (0.038)	0.0583 (0.04)	0.21 (0.037)	11.8 (0.19)	0.177 (0.037)	0.0553 (0.039)	0.192 (0.04)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.0478 (0.038)	ND (0.04)	0.0451 (0.037)	2.04 (0.19)	0.203 (0.037)	ND (0.039)	0.13 (0.04)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.0059)	ND (0.0071)	ND (0.0051)	ND (0.0063)	0.0206 (0.0044)	ND (0.0064)	ND (0.0062)
Phenanthrene	4600	--	14000	--	0.168 (0.038)	0.028 J (0.04)	0.146 (0.037)	8.05 (0.19)	0.574 (0.037)	0.0229 J (0.039)	0.417 (0.04)
Pyrene	4600	--	14000	--	0.259 (0.038)	0.0886 (0.04)	0.327 (0.037)	15.2 (0.19)	0.308 (0.037)	0.0981 (0.039)	0.413 (0.04)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	92.4 (2.2)	28.4 (2.5)	27.2 (2.1)	212 (2.4)	25.6 (2.3)	23.2 (2.4)	15.1 (2.5)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-102 BH-12-102_2-2.5' 2 - 2.5 12/4/2012	AOI6 BH-12-104 BH-12-104_0.5-1' 0.5 - 1 12/4/2012	AOI6 BH-12-114 BH-12-114_1-1.5' 1 - 1.5 12/3/2012	AOI6 BH-12-114 BH-12-114_3-3.5' 3 - 3.5 12/3/2012	AOI6 BH-12-124 BH-12-124_3-3.5' 3 - 3.5 12/4/2012	AOI6 BH-12-125 BH-12-125_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-126 BH-12-126_2.5-3' 2.5 - 3 12/4/2012
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.13)	ND (0.063)	ND (0.00094)	0.245 (0.059)	1380 (24)	ND (2.5)	87.2 (26)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	1.18 (0.66)	0.0351 J (0.32)	ND (0.0047)	0.387 (0.29)	2110 (120)	64.2 (12)	678 (130)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.13)	ND (0.063)	ND (0.00094)	ND (0.059)	ND (0.47)	ND (2.5)	ND (0.26)
Ethyl Benzene	2300	15	1300	820	ND (0.13)	ND (0.063)	ND (0.00094)	0.107 (0.059)	5.87 (0.47)	ND (2.5)	14.6 (0.26)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.13)	ND (0.063)	ND (0.00094)	ND (0.059)	ND (0.47)	ND (2.5)	ND (0.26)
Toluene	8000	76	650	9800	0.0547 J (0.13)	0.0154 J (0.063)	ND (0.00094)	0.224 (0.059)	1640 (24)	ND (2.5)	197 (26)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.66)	ND (0.32)	0.00055 J (0.0047)	0.131 J (0.29)	3.46 (2.4)	ND (12)	4.62 (1.3)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.66)	ND (0.32)	ND (0.0047)	0.0385 J (0.29)	1.21 J (2.4)	ND (12)	2.08 (1.3)
Xylenes (total)	240	1.5	51	340	0.0965 J (0.13)	ND (0.063)	0.00044 J (0.00094)	0.612 (0.059)	22.6 (0.47)	0.738 J (2.5)	68.5 (0.26)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	1.02 (0.049)	ND (0.038)	0.0343 J (0.035)	0.31 (0.038)	ND (0.033)	ND (0.035)	ND (0.073)
Benzo(a)anthracene	430	--	3200	--	0.276 (0.049)	0.0863 (0.038)	0.0569 (0.035)	0.699 (0.038)	0.021 J (0.033)	0.0226 J (0.035)	0.0707 J (0.073)
Benzo(a)pyrene	43	--	7.7	--	0.246 (0.049)	0.063 (0.038)	0.0748 (0.035)	0.653 (0.038)	0.0179 J (0.033)	ND (0.035)	0.0491 J (0.073)
Benzo(b)fluoranthene	430	--	3200	--	0.376 (0.049)	0.103 (0.038)	0.0956 (0.035)	0.615 (0.038)	ND (0.033)	ND (0.035)	0.0556 J (0.073)
Benzo(g,h,i)perylene	4600	--	14000	--	0.304 (0.049)	0.0866 (0.038)	0.1 (0.035)	0.537 (0.038)	ND (0.033)	ND (0.035)	0.0291 J (0.073)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.4 (0.049)	0.0989 (0.038)	0.0876 (0.035)	0.872 (0.038)	0.0197 J (0.033)	0.0298 J (0.035)	0.0845 (0.073)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	5.64 (0.25)	ND (0.038)	0.0227 J (0.035)	0.177 (0.038)	ND (0.033)	ND (0.035)	0.034 J (0.073)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.66)	ND (0.32)	ND (0.0047)	0.197 J (0.29)	0.479 J (2.4)	ND (12)	0.304 J (1.3)
Phenanthrene	4600	--	14000	--	10.4 (0.25)	0.0288 J (0.038)	0.055 (0.035)	0.751 (0.038)	0.0626 (0.033)	0.0208 J (0.035)	0.115 (0.073)
Pyrene	4600	--	14000	--	1.05 (0.049)	0.0825 (0.038)	0.103 (0.035)	1.24 (0.038)	0.0317 J (0.033)	0.0363 (0.035)	0.123 (0.073)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	283 (3.2)	161 (2.4)	49.1 (4.3)	34.7 (2.4)	5.5 (2.3)	11.4 (2.2)	8.7 (2.3)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-127 BH-12-127_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-128 BH-12-128_3-3.5' 3 - 3.5 12/4/2012	AOI6 BH-12-129 BH-12-129_1.5-2' 1.5 - 2 12/4/2012	AOI6 BH-12-129 BH-12-129_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-130 BH-12-130_1-2' 1 - 2 12/4/2012	AOI6 BH-12-147 BH-12-147_1-1.5' 1 - 1.5 12/5/2012	AOI6 BH-12-148 BH-12-148_0-1' 0 - 1 12/5/2012
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	149 (2.5)	535 (13)	91.6 (4.8)	1850 (54)	0.337 J (0.5)	ND (0.00089)	ND (0.0011)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	374 (13)	919 (63)	311 (24)	6600 (270)	32.9 (2.5)	ND (0.0044)	ND (0.0053)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.05)	ND (0.05)	ND (0.048)	ND (0.27)	ND (0.5)	ND (0.00089)	ND (0.0011)
Ethyl Benzene	2300	15	1300	820	18.7 (2.5)	57.8 (1.3)	0.837 (0.048)	12.6 (0.27)	ND (0.5)	ND (0.00089)	ND (0.0011)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.05)	ND (0.05)	ND (0.048)	ND (0.27)	ND (0.5)	ND (0.00089)	ND (0.0011)
Toluene	8000	76	650	9800	339 (2.5)	1050 (13)	116 (4.8)	2070 (54)	0.175 J (0.5)	ND (0.00089)	ND (0.0011)
1,2,4-Trimethylbenzene	180	0.92	70	250	3.04 (0.25)	6.32 (0.25)	0.705 (0.24)	9.43 (1.4)	ND (2.5)	ND (0.0044)	ND (0.0053)
1,3,5-Trimethylbenzene	220	0.92	99	240	1.41 (0.25)	2.92 (0.25)	0.257 (0.24)	3.38 (1.4)	ND (2.5)	ND (0.0044)	ND (0.0053)
Xylenes (total)	240	1.5	51	340	83.6 (2.5)	248 (1.3)	3.69 (0.048)	51.6 (0.27)	ND (0.5)	ND (0.00089)	ND (0.0011)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.032)	ND (0.035)	ND (0.033)	ND (0.07)	3.58 (0.73)	0.0166 J (0.034)	0.155 (0.041)
Benzo(a)anthracene	430	--	3200	--	0.0184 J (0.032)	ND (0.035)	0.0699 (0.033)	0.177 (0.07)	3.52 (0.036)	0.0519 (0.034)	0.328 (0.041)
Benzo(a)pyrene	43	--	7.7	--	0.0138 J (0.032)	ND (0.035)	0.0627 (0.033)	0.121 (0.07)	6.52 (0.73)	0.065 (0.034)	0.327 (0.041)
Benzo(b)fluoranthene	430	--	3200	--	ND (0.032)	ND (0.035)	0.0687 (0.033)	0.126 (0.07)	11.3 (0.73)	0.0787 (0.034)	0.334 (0.041)
Benzo(g,h,i)perylene	4600	--	14000	--	ND (0.032)	ND (0.035)	0.0498 (0.033)	0.0832 (0.07)	4.33 (0.73)	0.0542 (0.034)	0.205 (0.041)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.0164 J (0.032)	ND (0.035)	0.0711 (0.033)	0.243 (0.07)	9.88 (0.73)	0.0608 (0.034)	0.307 (0.041)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.032)	ND (0.035)	ND (0.033)	0.182 (0.07)	34.6 (0.73)	ND (0.034)	0.0308 J (0.041)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.103 J (0.25)	0.154 J (0.25)	0.0543 J (0.24)	0.898 J (1.4)	ND (2.5)	ND (0.034)	ND (0.041)
Phenanthrene	4600	--	14000	--	0.0161 J (0.032)	ND (0.035)	0.0395 (0.033)	0.437 (0.07)	10 (0.73)	0.0321 J (0.034)	0.425 (0.041)
Pyrene	4600	--	14000	--	0.0207 J (0.032)	ND (0.035)	0.121 (0.033)	0.406 (0.07)	12.1 (0.73)	0.0774 (0.034)	0.469 (0.041)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	13.8 (2.3)	6.5 (2.4)	48 (2.1)	107 (2.2)	84.4 (2.2)	286 (2.3)	745 (2.3)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-149 BH-12-149_1-1.5' 1 - 1.5 12/4/2012	AOI6 BH-12-149 BH-12-149_2.5-3' 2.5 - 3 12/4/2012	AOI6_B003 I6_B003_PFAS_0-1_20220624 0 - 1 6/24/2022	AOI6_B012 I6_B012_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B014 I6_B014_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B019 I6_B019_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B028 I6_B028_PFAS_0-1_20220628 0 - 1 6/28/2022
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.0506 J (0.07)	517 (2.8)	NA	NA	NA	NA	NA
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.147 J (0.35)	74.7 (7)	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	0.0223 J (0.07)	21.2 (1.4)	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.037)	ND (0.036)	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	0.0518 (0.037)	0.403 (0.036)	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.0576 (0.037)	0.452 (0.036)	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	0.067 (0.037)	0.708 (0.036)	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.0459 (0.037)	0.458 (0.036)	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.064 (0.037)	0.493 (0.036)	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.037)	ND (0.036)	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	0.0283 J (0.037)	0.154 (0.036)	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	0.0804 (0.037)	0.601 (0.036)	NA	NA	NA	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	ND (0.00056)	0.0029 (0.00056)	ND (0.0032)	0.00076 (0.0006)	ND (0.00062)
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	ND (0.00056)	0.00085 (0.00056)	0.0137 (0.00064)	0.00088 (0.0006)	0.00033 (0.00062)
Perfluorooctanoic Acid	--	--	--	--	NA	NA	ND (0.00056)	0.00048 (0.00056)	0.0011 (0.00064)	ND (0.0006)	ND (0.00062)
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	27.9 (2.6)	127 (2.2)	NA	NA	NA	NA	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-001	AOI6-BH-16-004	AOI6-BH-16-004	AOI6-BH-16-004	AOI6-BH-16-005	AOI6-BH-16-006	AOI6-BH-16-006	
					AOI6-BH-16-001-0-2-SOIL 1 - 1.5 4/12/2016	AOI6-BH-16-004-0-2-SOIL 0.75 - 1.75 4/21/2016	AOI6-BH-16-004-2-4-SOIL 1.75 - 2.3 4/21/2016	AOI6-BH16-DUP-SOIL-002 0.75 - 1.75 4/21/2016 FD	AOI6-BH-16-005-0-2-SOIL 0 - 0.5 4/12/2016	AOI6-BH-16-006-0-2-SOIL 1 - 1.5 4/22/2016	AOI6-BH-16-006-2-4-SOIL 1.5 - 2.25 4/22/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.002 J (0.006)	0.001 J (0.0005)	0.001 J (0.0005)	0.002 J (0.0005)	0.0004 J (0.004)	ND (0.028)	0.023 J (0.022)	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)	
Ethyl Benzene	2300	15	1300	820	ND (0.006)	ND (0.0009)	ND (0.0009)	0.001 J (0.001)	ND (0.004)	ND (0.055)	ND (0.044)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.006)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.004)	ND (0.028)	ND (0.022)	
Toluene	8000	76	650	9800	0.003 J (0.006)	0.003 J (0.0009)	0.002 J (0.0009)	0.003 J (0.001)	ND (0.004)	0.088 J (0.055)	0.073 J (0.044)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.006)	0.0009 J (0.0009)	ND (0.0009)	0.002 J (0.001)	ND (0.004)	ND (0.055)	ND (0.044)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)	
Xylenes (total)	240	1.5	51	340	0.001 J (0.006)	0.004 J (0.0009)	0.001 J (0.0009)	0.005 J (0.001)	ND (0.004)	0.063 J (0.055)	0.065 J (0.044)	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	0.73 (0.1)	0.43 (0.008)	0.55 (0.007)	0.6 (0.008)	0.016 J (0.018)	0.7 (0.008)	0.43 (0.007)	
Benzo(a)anthracene	430	--	3200	--	0.95 (0.1)	1.1 (0.008)	1.6 (0.007)	1.7 (0.008)	0.11 (0.018)	1.2 (0.008)	0.75 (0.007)	
Benzo(a)pyrene	43	--	7.7	--	1.1 (0.1)	1.1 (0.008)	1.5 (0.007)	1.5 (0.008)	0.13 (0.018)	1.2 (0.008)	0.74 (0.007)	
Benzo(b)fluoranthene	430	--	3200	--	1.5 (0.1)	1.3 (0.008)	1.7 (0.007)	1.9 (0.008)	0.18 (0.018)	1.3 (0.008)	1 (0.007)	
Benzo(g,h,i)perylene	4600	--	14000	--	1.3 (0.1)	0.7 (0.008)	0.84 (0.007)	0.94 (0.008)	0.15 (0.018)	0.76 (0.008)	0.52 (0.007)	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	1.1 (0.1)	1.1 (0.008)	1.5 (0.007)	1.7 (0.008)	0.12 (0.018)	1.3 (0.008)	0.82 (0.007)	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	0.32 (0.1)	0.16 (0.008)	0.2 (0.007)	0.19 (0.008)	0.005 J (0.018)	0.36 (0.008)	0.27 (0.007)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	<u>6.9 (0.1)</u>	<u>1.2 (0.008)</u>	<u>1.1 (0.007)</u>	<u>1.3 (0.008)</u>	0.025 (0.018)	<u>1.6 (0.008)</u>	<u>1.6 (0.007)</u>	
Phenanthrene	4600	--	14000	--	2 (0.1)	1.1 (0.008)	1.2 (0.007)	1.7 (0.008)	0.053 (0.018)	1.5 (0.008)	1.1 (0.007)	
Pyrene	4600	--	14000	--	1.6 (0.1)	1.3 (0.008)	1.9 (0.007)	2.3 (0.008)	0.15 (0.018)	2 (0.008)	1.2 (0.007)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	288 (1.24)	399 (0.411)	189 (0.398)	529 (0.452)	68.7 (1.05)	142 (0.51)	225 (0.435)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-010	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-016	AOI6-BH-16-016	
					AOI6-BH-16-010-0-2-SOIL 0.5 - 0.9 4/11/2016	AOI6-BH-16-015-0-2-SOIL 1.5 - 2 4/5/2016	AOI6-BH-16-015-2-4-SOIL 2 - 2.1 4/5/2016	AOI6-BH-16-015-0-2-071116 1 - 1.4 7/11/2016	AOI6-BH-16-015-2-4-071116 2 - 2.2 7/11/2016	AOI6-BH-16-016-0-2-SOIL 1 - 1.5 4/4/2016	AOI6-BH-16-016-2-4-SOIL 2 - 2.5 4/4/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.011 (0.005)	0.053 J (0.33)	ND (0.27)	NA	NA	0.004 J (0.006)	ND (0.34)	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	ND (0.005)	0.77 (0.33)	0.23 J (0.27)	NA	NA	ND (0.006)	0.44 (0.34)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Ethyl Benzene	2300	15	1300	820	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Toluene	8000	76	650	9800	0.004 J (0.005)	0.13 J (0.33)	ND (0.27)	NA	NA	0.003 J (0.006)	0.19 J (0.34)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.005)	0.11 J (0.33)	ND (0.27)	NA	NA	ND (0.006)	0.14 J (0.34)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Xylenes (total)	240	1.5	51	340	ND (0.005)	0.47 (0.33)	0.092 J (0.27)	NA	NA	ND (0.006)	0.16 J (0.34)	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	0.079 (0.021)	NA	NA	5.4 (2.1)	2.3 (0.24)	NA	NA	
Benzo(a)anthracene	430	--	3200	--	0.21 (0.021)	NA	NA	2 J (2.1)	1.2 (0.24)	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	0.26 (0.021)	NA	NA	1.6 J (2.1)	1.2 (0.24)	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	0.41 (0.021)	NA	NA	2.9 (2.1)	1.2 (0.24)	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	0.23 (0.021)	NA	NA	2.2 (2.1)	1.6 (0.24)	NA	NA	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	0.28 (0.021)	NA	NA	5.8 (2.1)	2.4 (0.24)	NA	NA	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	0.012 J (0.021)	NA	NA	7.4 (2.1)	2.6 (0.24)	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	0.22 (0.021)	NA	NA	<u>2.8 (2.1)</u>	<u>6.3 (0.24)</u>	NA	NA	
Phenanthrene	4600	--	14000	--	0.23 (0.021)	NA	NA	16 (2.1)	7.2 (0.24)	NA	NA	
Pyrene	4600	--	14000	--	0.43 (0.021)	NA	NA	8.4 (2.1)	3.2 (0.24)	NA	NA	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	1460 (1.7)	671 (1.6)	134 (1.91)	NA	NA	313 (1.47)	256 (2.02)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
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Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
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Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-016	AOI6-BH-16-016	AOI6-BH-16-025	AOI6-BH-16-025	AOI6-BH-16-025	AOI6-BH-16-026	AOI6-BH-16-027
					AOI6-BH-16-016-0-2-071116 1.5 - 2 7/11/2016	AOI6-BH-16-016-2-4-071116 2 - 2.25 7/11/2016	AOI6-BH-16-025-0-2-SOIL 1.5 - 1.9	AOI6-BH-16-025-2-4-SOIL 1.9 - 2.2 4/22/2016	AOI6-BH16-DUP-04-22-16-003 1.5 - 1.9 4/22/2016 FD	AOI6-BH-16-026-0-2-SOIL 0.4 - 1.3 4/22/2016	AOI6-BH-16-027-0-2-SOIL 1.75 - 2 4/13/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	NA	NA	<u>2.7 (0.022)</u>	1400 J (2.4)	<u>2.6 (0.021)</u>	<u>7.6 (0.022)</u>	ND (0.005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	NA	NA	2.9 (0.045)	2200 J (4.8)	2.6 (0.043)	1.8 (0.044)	ND (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	ND (0.045)	ND (4.8)	ND (0.043)	ND (0.044)	ND (0.005)
Ethyl Benzene	2300	15	1300	820	NA	NA	0.12 J (0.045)	<u>61 J (4.8)</u>	0.11 J (0.043)	0.082 J (0.044)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	ND (0.022)	ND (2.4)	ND (0.021)	ND (0.022)	ND (0.005)
Toluene	8000	76	650	9800	NA	NA	0.9 (0.045)	<u>640 J (4.8)</u>	0.75 (0.043)	ND (0.044)	ND (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	0.095 J (0.045)	<u>50 J (4.8)</u>	0.096 J (0.043)	ND (0.044)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	0.045 J (0.045)	<u>18 J (4.8)</u>	ND (0.043)	ND (0.044)	ND (0.005)
Xylenes (total)	240	1.5	51	340	NA	NA	0.53 (0.045)	340 J (4.8)	0.48 (0.043)	0.092 J (0.044)	ND (0.005)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	1.9 (0.24)	3.4 (0.25)	4.4 (0.018)	1.2 (0.004)	4.9 (0.018)	0.71 (0.015)	0.007 J (0.022)
Benzo(a)anthracene	430	--	3200	--	1.7 (0.24)	3.3 (0.25)	3.2 (0.018)	1.1 (0.004)	3.8 (0.018)	1.3 (0.015)	0.011 J (0.022)
Benzo(a)pyrene	43	--	7.7	--	1.7 (0.24)	3.3 (0.25)	2.3 (0.018)	0.69 (0.004)	2.7 (0.018)	1.3 (0.015)	0.01 J (0.022)
Benzo(b)fluoranthene	430	--	3200	--	2.3 (0.24)	3.6 (0.25)	2.8 (0.018)	1 (0.004)	3.2 (0.018)	0.89 (0.015)	0.016 J (0.022)
Benzo(g,h,i)perylene	4600	--	14000	--	1.6 (0.24)	3.5 (0.25)	0.93 (0.018)	0.33 (0.004)	1 (0.018)	0.72 (0.015)	0.009 J (0.022)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	2 (0.24)	3.7 (0.25)	2.8 (0.018)	0.97 (0.004)	3.2 (0.018)	2.2 (0.015)	0.021 J (0.022)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	5.1 (0.24)	6.3 (0.25)	4.2 (0.018)	0.85 (0.004)	4.4 (0.018)	0.51 (0.015)	0.009 J (0.022)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>9.3 (0.24)</u>	<u>18 (0.25)</u>	0.46 (0.018)	<u>2 (0.004)</u>	0.48 (0.018)	<u>1.1 (0.015)</u>	0.01 J (0.022)
Phenanthrene	4600	--	14000	--	9.6 (0.24)	17 (0.25)	13 (0.018)	4.1 (0.004)	14 (0.018)	1.9 (0.015)	0.02 J (0.022)
Pyrene	4600	--	14000	--	2.4 (0.24)	4.2 (0.25)	5.6 (0.018)	2.1 (0.004)	6.6 (0.018)	2.1 (0.015)	0.032 (0.022)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	NA	NA	10.3 (0.465)	64.3 (0.382)	10.2 (0.48)	61.8 (0.405)	20 (1.63)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-027	AOI6-BH-16-029	AOI6-BH-16-029	AOI6-BH-16-030	AOI6-BH-16-030	AOI6-BH-16-032	AOI6-BH-16-032	
					AOI6-BH-16-027-2-4-SOIL 2.5 - 2.75 4/13/2016	AOI6-BH-16-029-0-2-SOIL 1.75 - 2 4/13/2016	AOI6-BH-16-029-2-4-SOIL 2.25 - 2.5 4/13/2016	AOI6-BH-16-030-0-2-SOIL 1.5 - 2 4/14/2016	AOI6-BH-16-030-2-4-SOIL 2.5 - 2.75 4/14/2016	AOI6-BH-16-032-0-2-SOIL 1 - 2 4/13/2016	AOI6-BH-16-032-2-4-SOIL 2 - 2.5 4/13/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>2.5 J (5.3)</u>	<u>0.99 (0.25)</u>	<u>4.5 (0.28)</u>	<u>9.4 (4.4)</u>	130 (4.3)	0.12 J (0.22)	<u>3.7 (0.77)</u>	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	<u>360 (53)</u>	1.7 (0.25)	<u>10 (0.28)</u>	<u>18 (4.4)</u>	<u>710 (43)</u>	1.7 (0.22)	<u>110 (3.9)</u>	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (5.3)	ND (0.25)	ND (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	ND (0.77)	
Ethyl Benzene	2300	15	1300	820	ND (5.3)	0.3 (0.25)	0.81 (0.28)	ND (4.4)	ND (4.3)	0.051 J (0.22)	3.6 (0.77)	
Methyl tert-butyl ether	2400	16	390	5900	ND (5.3)	ND (0.25)	ND (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	ND (0.77)	
Toluene	8000	76	650	9800	3.9 J (5.3)	0.37 (0.25)	1.2 (0.28)	ND (4.4)	20 (4.3)	0.091 J (0.22)	45 (0.77)	
1,2,4-Trimethylbenzene	180	0.92	70	250	<u>10 (5.3)</u>	0.25 J (0.25)	<u>1 (0.28)</u>	ND (4.4)	ND (4.3)	ND (0.22)	0.7 J (0.77)	
1,3,5-Trimethylbenzene	220	0.92	99	240	<u>9.3 (5.3)</u>	0.095 J (0.25)	0.48 (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	0.37 J (0.77)	
Xylenes (total)	240	1.5	51	340	<u>3.3 J (5.3)</u>	0.6 (0.25)	1.5 (0.28)	ND (4.4)	<u>2.9 J (4.3)</u>	0.13 J (0.22)	<u>17 (0.77)</u>	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	3.4 (0.1)	2.9 (0.095)	2.2 (0.095)	0.037 J (0.095)	0.16 (0.019)	0.008 J (0.018)	0.004 J (0.018)	
Benzo(a)anthracene	430	--	3200	--	2.3 (0.1)	6.1 (0.095)	2.8 (0.095)	0.094 J (0.095)	0.079 (0.019)	0.032 (0.018)	0.014 J (0.018)	
Benzo(a)pyrene	43	--	7.7	--	1.7 (0.1)	6.2 (0.095)	2.6 (0.095)	0.12 (0.095)	0.079 (0.019)	0.036 (0.018)	0.013 J (0.018)	
Benzo(b)fluoranthene	430	--	3200	--	1.7 (0.1)	8.7 (0.095)	3.5 (0.095)	0.18 (0.095)	0.18 (0.019)	0.049 (0.018)	0.021 (0.018)	
Benzo(g,h,i)perylene	4600	--	14000	--	1 (0.1)	4.5 (0.095)	1.7 (0.095)	0.13 (0.095)	0.073 (0.019)	0.032 (0.018)	0.016 J (0.018)	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	4 (0.1)	6.1 (0.095)	3.3 (0.095)	0.098 (0.095)	0.094 (0.019)	0.038 (0.018)	0.018 J (0.018)	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	6.3 (0.1)	3.2 (0.095)	8.4 (0.095)	ND (0.095)	0.034 (0.019)	ND (0.018)	0.008 J (0.018)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	<u>7.8 (0.1)</u>	<u>3.1 (0.095)</u>	<u>4.8 (0.095)</u>	0.024 J (0.095)	<u>2.4 (0.019)</u>	ND (0.018)	0.029 (0.018)	
Phenanthrene	4600	--	14000	--	13 (0.1)	11 (0.095)	10 (0.095)	0.054 J (0.095)	3.3 (0.019)	0.025 (0.018)	0.013 J (0.018)	
Pyrene	4600	--	14000	--	6.2 (0.1)	11 (0.095)	5.8 (0.095)	0.13 (0.095)	0.14 (0.019)	0.057 (0.018)	0.025 (0.018)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	90.6 (1.43)	138 (1.15)	137 (1.26)	66 (1.18)	34.3 (1.35)	10.3 (1.12)	10.6 (1.35)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

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- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
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Abbreviations:

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- NA - Not Analyzed
- J - Estimated Concentration

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Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-033	AOI6-BH-16-033	AOI6-BH-16-034	AOI6-BH-16-034	AOI6-BH-16-035	AOI6-BH-16-035	AOI6-BH-16-036	
					AOI6-BH-16-033-0-2-SOIL 1.5 - 2 4/13/2016	AOI6-BH-16-033-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-034-0-2-SOIL 1.5 - 1.75 4/13/2016	AOI6-BH-16-034-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-035-0-2-SOIL 1.5 - 2 4/13/2016	AOI6-BH-16-035-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-036-0-2-SOIL 1.25 - 1.75 4/14/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.003 J (0.004)	ND (0.21)	<u>44</u> (5)	<u>96</u> (4.7)	0.001 J (0.004)	0.002 J (0.004)	<u>0.55</u> J (4.5)	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	0.019 (0.004)	0.13 J (0.21)	<u>230</u> (5)	<u>360</u> (4.7)	0.021 (0.004)	0.083 (0.004)	<u>59</u> (4.5)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Ethyl Benzene	2300	15	1300	820	ND (0.004)	ND (0.21)	ND (5)	1.2 J (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Toluene	8000	76	650	9800	ND (0.004)	ND (0.21)	38 (5)	<u>81</u> (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Xylenes (total)	240	1.5	51	340	ND (0.004)	ND (0.21)	<u>2.1</u> J (5)	<u>3.8</u> J (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	0.03 J (0.092)	0.006 J (0.018)	0.027 (0.019)	ND (0.092)	ND (0.019)	0.004 J (0.019)	0.064 J (0.094)	
Benzo(a)anthracene	430	--	3200	--	0.12 (0.092)	0.026 (0.018)	0.09 (0.019)	0.05 J (0.092)	0.008 J (0.019)	0.015 J (0.019)	0.35 (0.094)	
Benzo(a)pyrene	43	--	7.7	--	0.13 (0.092)	0.028 (0.018)	0.092 (0.019)	0.039 J (0.092)	0.009 J (0.019)	0.02 (0.019)	0.3 (0.094)	
Benzo(b)fluoranthene	430	--	3200	--	0.18 (0.092)	0.032 (0.018)	0.13 (0.019)	0.084 J (0.092)	0.014 J (0.019)	0.022 (0.019)	0.57 (0.094)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.13 (0.092)	0.029 (0.018)	0.083 (0.019)	0.042 J (0.092)	0.01 J (0.019)	0.024 (0.019)	0.27 (0.094)	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	0.14 (0.092)	0.032 (0.018)	0.11 (0.019)	0.095 (0.092)	0.01 J (0.019)	0.02 (0.019)	0.41 (0.094)	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	ND (0.092)	ND (0.018)	0.017 J (0.019)	0.033 J (0.092)	ND (0.019)	ND (0.019)	0.035 J (0.094)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	ND (0.092)	0.014 J (0.018)	0.07 (0.019)	0.16 (0.092)	ND (0.019)	ND (0.019)	0.099 (0.094)	
Phenanthrene	4600	--	14000	--	0.058 J (0.092)	0.011 J (0.018)	0.087 (0.019)	0.12 (0.092)	0.01 J (0.019)	0.014 J (0.019)	0.26 (0.094)	
Pyrene	4600	--	14000	--	0.19 (0.092)	0.042 (0.018)	0.16 (0.019)	0.12 (0.092)	0.015 J (0.019)	0.026 (0.019)	0.51 (0.094)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	12.8 (1.2)	9.85 (1.18)	14 (1.5)	15.3 (1.17)	10 (1.66)	10.9 (1.56)	60.8 (1.33)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-036	AOI6-BH-16-037	AOI6-BH-16-037	AOI6-BH-16-038	AOI6-BH-16-039	AOI6-BH-17-03	AOI6-BH-17-04
					AOI6-BH-16-036-2-4-SOIL 2 - 2.25 4/14/2016	AOI6-BH-16-037-0-2-SOIL 1 - 1.75 4/14/2016	AOI6-BH-16-037-2-4-SOIL 1.75 - 2.25 4/14/2016	AOI6-BH-16-038-0-2-SOIL 1.5 - 1.75 4/14/2016	AOI6-BH-16-039-0-2-SOIL 0.5 - 0.600000023841858 4/11/2016	AOI6-BH-17-03-0-2-SOIL 0 - 2 1/6/2017	AOI6-BH-17-04-0-2-SOIL 0 - 2 1/6/2017
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.7 J (4.2)	710 (94)	850 (97)	8.8 (4.8)	ND (0.005)	NA	NA
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	180 (4.2)	6500 (760)	8500 (970)	14 (4.8)	ND (0.005)	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Toluene	8000	76	650	9800	ND (4.2)	840 (94)	1200 (97)	ND (4.8)	ND (0.005)	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Xylenes (total)	240	1.5	51	340	ND (4.2)	26 J (94)	27 J (97)	ND (4.8)	ND (0.005)	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.036 (0.018)	0.068 J (0.1)	0.11 (0.02)	0.073 J (0.094)	0.005 J (0.023)	NA	NA
Benzo(a)anthracene	430	--	3200	--	0.086 (0.018)	0.11 (0.1)	0.05 (0.02)	0.19 (0.094)	0.019 J (0.023)	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.088 (0.018)	0.16 (0.1)	0.074 (0.02)	0.22 (0.094)	0.019 J (0.023)	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	0.12 (0.018)	0.24 (0.1)	0.11 (0.02)	0.33 (0.094)	0.033 (0.023)	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.083 (0.018)	0.19 (0.1)	0.07 (0.02)	0.2 (0.094)	0.015 J (0.023)	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.1 (0.018)	0.14 (0.1)	0.053 (0.02)	0.22 (0.094)	0.025 (0.023)	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.01 J (0.018)	0.049 J (0.1)	0.033 (0.02)	0.036 J (0.094)	ND (0.023)	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.018 J (0.018)	1.3 (0.1)	1.4 (0.02)	0.093 J (0.094)	0.006 J (0.023)	NA	NA
Phenanthrene	4600	--	14000	--	0.077 (0.018)	0.18 (0.1)	3.2 (0.02)	0.18 (0.094)	0.016 J (0.023)	NA	NA
Pyrene	4600	--	14000	--	0.16 (0.018)	0.22 (0.1)	0.084 (0.02)	0.28 (0.094)	0.033 (0.023)	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	18.9 (1.2)	100 (1.46)	105 (1.72)	33.1 (1.14)	7.22 (1.42)	899 (1.2)	7490 (17.7)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-19-001 AOI6-BH-19-001-0-2' 0 - 2 4/15/2019	AOI6-BH-19-003 AOI6-BH-19-003-0-2' 0 - 2 4/17/2019	AOI6-BH-19-003 AOI6-BH-19-003-2-2.5' 2 - 2.5 4/17/2019	AOI6-BH-19-005 AOI6-BH-19-005-0-2 0 - 2 5/7/2019	AOI6-BH-19-005 AOI6-BH-19-005-2-2.5 2 - 2.5 5/7/2019	AST-250-SS-1 AST-250-SS-1 0 - 0.5 5/15/2007	AST-250-SS-2 AST-250-SS-2 0 - 0.5 5/15/2007
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	NA	<u>13.7 (0.0834)</u>	<u>18.1 (0.0237)</u>	<u>7.02 (0.00889)</u>	0.223 (0.00106)	ND,D (0.081)	ND,D (0.097)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	ND (0.35)	ND (0.35)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	NA	NA	NA	NA	0.052 J,D (0.081)	0.067 J,D (0.097)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	1490 (0.583)	NA	NA	NA	NA	940 (0.54)	30 (0.53)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AST-250-SS-3 AST-250-SS-3 0 - 0.5 5/15/2007	AST-250-SS-4 AST-250-SS-4 0 - 0.5 5/15/2007	AST-250-SS-5 AST-250-SS-5 0 - 0.5 5/15/2007	AST-250-SS-6 AST-250-SS-6 0 - 0.5 5/15/2007	AST-250-SS-7 AST-250-SS-7 0 - 0.5 5/15/2007	AST-250-SS-8 AST-250-SS-8 0 - 0.5 5/15/2007	BH-B153-030106-1.5-2 1.5 - 2 3/1/2006	B-153 1.5 - 2 3/1/2006
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	ND,D (0.088)	0.12 D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
Ethyl Benzene	2300	15	1300	820	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	ND (0.42)	ND (0.42)
Toluene	8000	76	650	9800	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	0.098 D (0.088)	0.87 D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)	ND (0.42)
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.35)	0.62 (0.35)	ND (0.37)	ND (0.38)	ND (0.39)	ND (0.35)	4.2 (0.28)	4.2 (0.28)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.31 D (0.088)	<u>4.2 D (0.1)</u>	0.081 J,D (0.11)	0.065 J,D (0.069)	0.055 J,D (0.078)	0.075 J,D (0.092)	ND (0.28)	ND (0.28)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)	ND (0.28)
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	100 (0.54)	2.8 (0.54)	190 (0.56)	1500 (0.58)	140 (0.59)	13 (0.54)	66.3 (3.38)	66.3 (3.38)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	B-170 B-170_2' 1.5 - 2 12/13/2012	B-171 AOI6-B-171-0-2-SOIL 1 - 2 4/6/2016	BH-13-06 BH-13-06-032206-1-1.5 1 - 1.5 3/22/2006	BH-14-06 BH-14-06-032306-0.5-1 0.5 - 1 3/23/2006	BH-26-06 BH-26-06-032406-0.5-1 0.5 - 1 3/24/2006	BH-27-06 BH-27-06-032306-1-1.5 1 - 1.5 3/23/2006	GP 797-HA-1 HA-1 (1-1.5) 1 - 1.5 8/29/2002
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.001)	0.001 J (0.004)	NA	NA	180 (18)	2.2 (0.18)	920 D (0.24)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.003 J (0.0052)	ND (0.004)	NA	NA	800 (18)	9.1 (0.18)	1600 D (0.24)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.001)	ND (0.004)	NA	NA	ND (0.18)	ND (0.18)	NA
Ethyl Benzene	2300	15	1300	820	ND (0.001)	ND (0.004)	NA	NA	2.7 (0.18)	1.6 (0.18)	80 J,D (0.24)
Methyl tert-butyl ether	2400	16	390	5900	0.00054 J (0.001)	ND (0.004)	NA	NA	ND (0.18)	ND (0.18)	ND (0.24)
Toluene	8000	76	650	9800	0.0004 J (0.001)	ND (0.004)	NA	NA	260 (18)	ND (0.18)	1800 D (0.24)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0052)	ND (0.004)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0052)	ND (0.004)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.001)	ND (0.004)	NA	NA	9.3 (0.18)	0.77 (0.18)	381 J (0.24)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.257 (0.036)	0.12 (0.09)	NA	NA	ND (0.18)	3.3 (1.9)	NA
Benzo(a)anthracene	430	--	3200	--	0.578 (0.036)	0.44 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(a)pyrene	43	--	7.7	--	0.659 (0.036)	0.45 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(b)fluoranthene	430	--	3200	--	0.617 (0.036)	0.54 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.466 (0.036)	0.29 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.589 (0.036)	0.42 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.229 (0.036)	0.044 J (0.09)	NA	NA	ND (0.18)	16 (1.9)	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.114 (0.036)	0.23 (0.09)	NA	NA	ND (0.18)	12 (1.9)	0.65 (0.24)
Phenanthrene	4600	--	14000	--	0.379 (0.036)	0.22 (0.09)	NA	NA	0.21 (0.18)	36 (1.9)	NA
Pyrene	4600	--	14000	--	1.16 (0.036)	0.5 (0.09)	NA	NA	0.3 (0.18)	2 (1.9)	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	66.9 (2.3)	45.7 (1.13)	283 (3.15)	1040 (2.87)	32.6 (2.15)	167 (2.26)	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
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Appendix C

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Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP 797-HA-2 HA-2 (1-1.5) 1 - 1.5 5/24/2002	GP 797-HA-3 HA-3 (1-1.5) 1 - 1.5 5/24/2002	GP 797-HA-3 HA-3 (2) 1.5 - 2 5/24/2002	GP 797-HA-4 HA-4 (1-1.5) 1 - 1.5 5/24/2002	GP U 677-1 GP U 677-1(1.5-2.0) 1.5 - 2 6/8/2011	GP U 677-2 GP U 677-2(0.8-1.3) 0.8 - 1.3 6/8/2011	GP U 677-3 GP U 677-3(1.5-2.0) 1.5 - 2 6/8/2011
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	<u>28 D (0.26)</u>	310 D (0.27)	170 D (0.25)	190 D (0.25)	0.06 J (0.035)	ND (0.0006)	ND (0.0005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	<u>17 D (0.26)</u>	<u>1000 D (0.27)</u>	<u>230 D (0.25)</u>	<u>950 D (0.25)</u>	0.7 (0.07)	ND (0.001)	ND (0.001)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	<u>0.13 J (0.07)</u>	ND (0.001)	ND (0.001)
Ethyl Benzene	2300	15	1300	820	0.85 (0.26)	<u>37 J,D (0.27)</u>	8.5 (0.25)	<u>55 D (0.25)</u>	0.11 J (0.07)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.26)	ND (0.27)	ND (0.25)	ND (0.25)	ND (0.035)	ND (0.0006)	ND (0.0005)
Toluene	8000	76	650	9800	11 D (0.26)	<u>920 D (0.27)</u>	<u>300 D (0.25)</u>	<u>660 D (0.25)</u>	0.12 J (0.07)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	0.097 J (0.07)	ND (0.001)	ND (0.001)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	ND (0.07)	ND (0.001)	ND (0.001)
Xylenes (total)	240	1.5	51	340	<u>5.9 J (0.26)</u>	<u>169 J (0.27)</u>	<u>36.7 J (0.25)</u>	<u>260 J (0.25)</u>	0.42 (0.07)	ND (0.001)	ND (0.001)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	0.78 (0.017)	0.037 J (0.017)	0.5 (0.017)
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	1 (0.0084)	0.11 (0.0085)	1.2 (0.0086)
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	1.2 (0.0084)	0.12 (0.0085)	1.2 (0.0086)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	0.8 (0.0067)	0.091 (0.0068)	0.85 (0.0069)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	1.7 (0.051)	0.19 J (0.051)	1.5 (0.051)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	2 (0.076)	0.16 (0.076)	1.6 (0.077)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	1.3 (0.084)	ND (0.085)	0.39 (0.086)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.26)	0.41 (0.27)	0.3 (0.25)	0.29 (0.25)	0.29 J (0.07)	ND (0.001)	ND (0.001)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	2.2 (0.051)	0.09 J (0.051)	1.6 (0.051)
Pyrene	4600	--	14000	--	NA	NA	NA	NA	1.5 (0.084)	0.24 J (0.085)	2.3 (0.086)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	NA	NA	NA	NA	453 (0.268)	67 (0.276)	451 (0.272)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP U 677-4 GP U 677-4(0.3-0.8) 0.3 - 0.8 6/8/2011	GP U 677-5 GP U 677-5(0.8-1.3) 0.8 - 1.3 6/8/2011	GP676-1 GP676-1-(1.5')-20160428 1.5 4/28/2016	GP676-2 GP676-2-(1.5')-20160428 1.5 4/28/2016	GP676-3 GP676-3-(1.5')-20160428 1.5 4/28/2016	GP676-4 GP676-4-(1.5')-20160428 1.5 4/28/2016	GP676-5 GP676-5-(1.5')-20160428 1.5 4/28/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.0005)	ND (0.0005)	0.051 J (0.44)	ND (0.64)	ND (1.3)	ND (0.007)	ND (0.31)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0005)	ND (0.0005)	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	ND (0.001)	0.001 J (0.001)	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.001)	0.056 (0.001)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.001)	0.046 (0.001)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.001)	0.005 (0.001)	NA	NA	NA	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.028)	0.99 (0.036)	0.5 (0.023)	8 (0.2)	0.42 (0.13)	1.2 (0.12)	0.67 (0.1)
Benzo(a)anthracene	430	--	3200	--	0.031 (0.0071)	ND (0.59)	0.93 (0.023)	9.3 (0.2)	0.81 (0.13)	2.9 (0.12)	1.9 (0.1)
Benzo(a)pyrene	43	--	7.7	--	0.05 (0.0071)	0.62 (0.018)	0.93 (0.023)	5.2 (0.2)	0.87 (0.13)	3.8 (0.12)	1.9 (0.1)
Benzo(b)fluoranthene	430	--	3200	--	0.053 (0.0057)	0.81 (0.014)	1.1 (0.023)	2.6 (0.2)	1.2 (0.13)	4.2 (0.12)	2.2 (0.1)
Benzo(g,h,i)perylene	4600	--	14000	--	0.13 J (0.043)	1.4 (0.11)	0.75 (0.023)	1.7 (0.2)	0.66 (0.13)	2.9 (0.12)	1.3 (0.1)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.25 (0.064)	4.3 (0.16)	0.99 (0.023)	15 (0.2)	0.99 (0.13)	3 (0.12)	2 (0.1)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.071)	2.5 (0.18)	0.24 (0.023)	9.8 (0.2)	0.39 (0.13)	0.46 (0.12)	0.27 (0.1)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.001)	0.16 (0.001)	0.37 J (0.44)	ND (0.64)	ND (1.3)	ND (0.007)	0.094 J (0.31)
Phenanthrene	4600	--	14000	--	0.095 J (0.043)	5.2 (0.11)	1.3 (0.023)	38 (0.2)	1 (0.13)	3.4 (0.12)	1.3 (0.1)
Pyrene	4600	--	14000	--	ND (0.37)	ND (17)	1.2 (0.023)	18 (0.2)	1 (0.13)	3.1 (0.12)	2 (0.1)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	47.8 (0.232)	18.5 (0.232)	NA	NA	NA	NA	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP676-6 GP676-6-(1.5')-20160428 1.5 4/28/2016	GP676-7 GP676-7-(1.5')-20160428 1.5 4/28/2016	GP676-8 GP676-8-(1.5')-20160428 1.5 4/28/2016	GP676-9 GP676-9-(1.5')-20160428 1.5 4/28/2016	GP768-1 GP768-1-(3')-20160428 3 4/28/2016	GP768-2 GP768-2-(3')-20160428 3 4/28/2016	GP768-3 GP768-3-(3')-20160428 3 4/28/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.33)	ND (0.35)	ND (0.33)	ND (0.38)	0.0006 J (0.004)	0.0008 J (0.006)	0.001 J (0.005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	ND (0.004)	0.004 J (0.006)	0.001 J (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	ND (0.00052)	ND (0.00052)	ND (0.00058)
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Toluene	8000	76	650	9800	NA	NA	NA	NA	ND (0.004)	ND (0.006)	0.001 J (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	ND (0.018)	0.0056 J (0.019)	0.005 J (0.021)
Anthracene	46000	--	46000	--	0.29 (0.1)	1 J (1)	0.97 (0.11)	1.9 (1.1)	0.0059 J (0.018)	0.021 (0.019)	0.029 (0.021)
Benzo(a)anthracene	430	--	3200	--	0.68 (0.1)	0.83 J (1)	1.5 (0.11)	0.61 J (1.1)	0.024 (0.018)	0.073 (0.019)	0.058 (0.021)
Benzo(a)pyrene	43	--	7.7	--	0.56 (0.1)	1.5 (1)	0.86 (0.11)	0.59 J (1.1)	0.026 (0.018)	0.12 (0.019)	0.079 (0.021)
Benzo(b)fluoranthene	430	--	3200	--	0.4 (0.1)	0.61 J (1)	0.46 (0.11)	0.66 J (1.1)	0.037 (0.018)	0.14 (0.019)	0.15 (0.021)
Benzo(g,h,i)perylene	4600	--	14000	--	0.25 (0.1)	1.2 (1)	0.36 (0.11)	0.67 J (1.1)	0.024 (0.018)	0.11 (0.019)	0.12 (0.021)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	0.019 (0.018)	0.056 (0.019)	0.037 (0.021)
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	ND (0.034)	ND (0.037)	ND (0.04)
Chrysene	43000	--	320000	--	1.2 (0.1)	3.1 (1)	2.2 (0.11)	0.99 J (1.1)	0.026 (0.018)	0.084 (0.019)	0.067 (0.021)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	0.0087 J (0.018)	0.029 (0.019)	0.034 (0.021)
Fluoranthene	--	--	--	--	NA	NA	NA	NA	0.026 (0.018)	0.086 (0.019)	0.06 (0.021)
Fluorene	6200	--	18000	--	0.28 (0.1)	1 J (1)	0.85 (0.11)	3.1 (1.1)	ND (0.018)	0.0056 J (0.019)	0.0069 J (0.021)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	0.02 (0.018)	0.085 (0.019)	0.097 (0.021)
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	0.0049 J (0.018)	0.022 (0.019)	0.045 (0.021)
Naphthalene	41	0.54	6	27	0.14 J (0.33)	ND (0.35)	ND (0.33)	ND (0.38)	ND (0.004)	ND (0.006)	ND (0.005)
Phenanthrene	4600	--	14000	--	1.3 (0.1)	4 (1)	3.4 (0.11)	13 (1.1)	0.0095 J (0.018)	0.032 (0.019)	0.049 (0.021)
Pyrene	4600	--	14000	--	1.4 (0.1)	3.7 (1)	2.8 (0.11)	2.6 (1.1)	0.025 (0.018)	0.1 (0.019)	0.06 (0.021)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	4.34 (0.38)	6.41 (0.375)	9.74 (0.449)
Lead	2240	--	2240	45000	NA	NA	NA	NA	18.6 (1.14)	86.3 (1.12)	91.7 (1.35)
Nickel	6200	--	700	1700	NA	NA	NA	NA	43.1 (0.76)	45.3 (0.749)	149 (0.898)
Vanadium	1600	--	350	2800	NA	NA	NA	NA	149 (0.38)	214 (0.375)	321 (0.449)
Zinc	--	--	--	--	NA	NA	NA	NA	62.5 (1.52)	134 (1.5)	157 (1.8)

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 3

Summary of Historical Soil Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP768-4	GP768-5	GP768-6
					GP768-4-(2')-20160428	GP768-5-(2')-20160428	GP768-6-(2')-20160428
					2	2	2
					4/28/2016	4/28/2016	4/28/2016
Volatile Organic Compounds							
Benzene	63	0.46	8.7	98	ND (2.9)	0.005 (0.005)	ND (0.005)
sec-Butylbenzene	--	--	--	--	1.8 J (2.9)	ND (0.005)	ND (0.005)
Cumene	1000	6.1	87	1000	<u>70 (2.9)</u>	ND (0.005)	ND (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00051)	ND (0.00057)	ND (0.00052)
Ethyl Benzene	2300	15	1300	820	0.72 J (2.9)	ND (0.005)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	ND (2.9)	ND (0.005)	ND (0.005)
Toluene	8000	76	650	9800	1.7 J (2.9)	ND (0.005)	ND (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	<u>19 (2.9)</u>	ND (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	<u>15 (2.9)</u>	ND (0.005)	ND (0.005)
Xylenes (total)	240	1.5	51	340	<u>16 (2.9)</u>	ND (0.005)	ND (0.005)
Semivolatile Organic Compounds							
Acenaphthene	9300	--	9200	--	1.5 (0.089)	ND (0.02)	ND (0.018)
Anthracene	46000	--	46000	--	0.9 (0.089)	0.016 J (0.02)	ND (0.018)
Benzo(a)anthracene	430	--	3200	--	0.41 (0.089)	0.029 (0.02)	0.016 J (0.018)
Benzo(a)pyrene	43	--	7.7	--	0.33 (0.089)	0.05 (0.02)	0.021 (0.018)
Benzo(b)fluoranthene	430	--	3200	--	0.31 (0.089)	0.062 (0.02)	0.025 (0.018)
Benzo(g,h,i)perylene	4600	--	14000	--	0.21 (0.089)	0.059 (0.02)	0.02 (0.018)
Benzo(k)fluoranthene	4300	--	32000	--	0.083 J (0.089)	0.021 (0.02)	0.011 J (0.018)
1,1-Biphenyl	--	--	--	--	1 (0.17)	ND (0.038)	ND (0.036)
Chrysene	43000	--	320000	--	0.88 (0.089)	0.033 (0.02)	0.014 J (0.018)
Dibenz(a,h)anthracene	43	--	320	--	0.088 J (0.089)	0.013 J (0.02)	0.0074 J (0.018)
Fluoranthene	--	--	--	--	0.39 (0.089)	0.029 (0.02)	0.013 J (0.018)
Fluorene	6200	--	18000	--	2 (0.089)	0.0061 J (0.02)	ND (0.018)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	0.16 (0.089)	0.043 (0.02)	0.014 J (0.018)
2-Methylnaphthalene	--	--	--	--	13 (0.089)	0.018 J (0.02)	0.0046 J (0.018)
Naphthalene	41	0.54	6	27	<u>3.4 (2.9)</u>	ND (0.005)	ND (0.005)
Phenanthrene	4600	--	14000	--	4.3 (0.089)	0.02 (0.02)	0.006 J (0.018)
Pyrene	4600	--	14000	--	1.4 (0.089)	0.035 (0.02)	0.015 J (0.018)
Perfluoroalkyl and Polyfluoroalkyl Substances							
Perfluorononanoic acid	--	--	--	--	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA
Metals							
Cobalt	--	--	--	--	4.11 (0.414)	6.66 (0.495)	3.67 (0.397)
Lead	2240	--	2240	45000	39.5 (1.24)	27.8 (1.49)	10.8 (1.19)
Nickel	6200	--	700	1700	43.7 (0.828)	15.2 (0.991)	26.9 (0.793)
Vanadium	1600	--	350	2800	169 (0.414)	144 (0.495)	34.6 (0.397)
Zinc	--	--	--	--	307 (1.66)	60 (1.98)	25.2 (1.59)

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-153	B-153	B-153	B-165	B-165
							B153-060906	B-153_010413	GW-11109613-B153-05-04-16-RM-010	B-165_010413	B-165_010413
							6/9/2006	1/4/2013	5/4/2016	1/4/2013	6/3/2014
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.0005)
Cumene	37	9100	63	30	4	2.6	0.009 (0.005)	ND (0.002)	ND (0.0005)	0.003 (0.002)	0.0034 (0.001)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.00002)	ND (0.000095)	ND (0.00002)	ND (0.00002)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	0.00034 J (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	NA	ND (0.002)	ND (0.0005)	ND (0.002)	0.00023 J (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	NA	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.005)	0.0014 (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	NA	0.00019 (0.0001)	0.000099 (0.00001)	0.00079 (0.0001)	0.000416 (0.0001)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	NA	ND (0.0001)	0.000052 (0.00001)	0.000223 (0.0001)	0.000196 (0.0001)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	NA	ND (0.0001)	0.000038 J (0.00001)	ND (0.0001)	ND (0.0001)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	NA	ND (0.0001)	0.00004 J (0.00001)	ND (0.0001)	0.000124 (0.0001)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	NA	ND (0.0001)	0.000018 J (0.00001)	ND (0.0001)	ND (0.0001)
Chrysene	16	--	--	140000	--	1.3	ND (0.005)	ND (0.0001)	0.000058 (0.00001)	0.000148 (0.0001)	0.000134 (0.0001)
Fluorene	97	--	--	7800	--	7	ND (0.005)	0.000192 (0.0001)	0.000018 J (0.00001)	0.00203 (0.0001)	0.00167 (0.0001)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.005)	0.000466 (0.0001)	ND (0.00003)	0.00129 (0.0001)	ND (0.0001)
Phenanthrene	73	--	--	5800	--	1	ND (0.005)	ND (0.0001)	0.000043 J (0.00003)	0.000446 (0.0001)	0.000223 (0.0001)
Pyrene	50	--	--	5800	--	3	ND (0.005)	0.000213 (0.0001)	0.00027 (0.00001)	0.00165 (0.0001)	0.00114 (0.0001)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	NA	ND (0.003)	ND (0.00013)	ND (0.003)	0.0014 J (0.003)

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-165	B-165	B-165	B-165	B-165
							B-165_20150520	GW-11109613-B165-05-05-16-AC-015	B-165AOI6_20190627	B-165_20191104	B-165_20210505 2.549999952
							5/20/2015	5/5/2016	6/27/2019	11/4/2019	5/5/2021
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	0.004 (0.0005)	0.013 (0.001)	ND (0.001)	0.007 (0.001)
Cumene	37	9100	63	30	4	2.6	0.006 (0.002)	0.005 (0.0005)	0.0007 J (0.005)	0.006 (0.005)	0.00028 J (0.005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000096)	ND (0.000028)	ND (0.000028)	ND (0.000029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.0005)	ND (0.005)	ND (0.005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.0005)	ND (0.001)	0.0008 J (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	0.0006 J (0.001)	0.002 (0.0005)	0.0002 J (0.001)	0.0003 J (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	ND (0.05)
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	0.0005 J (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	ND (0.0005)	ND (0.005)	0.075 (0.005)	0.0044 J (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.0005)	ND (0.005)	0.016 (0.005)	0.0024 J (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.0005)	ND (0.005)	0.017 (0.003)	ND (0.006)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0006 (0.0005)	0.00048 (0.00001)	0.0005 (0.0005)	0.0003 J (0.0005)	ND (0.00055)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0002 J (0.0005)	0.00017 (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.0005)	0.000039 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0001 J (0.0005)	0.00005 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.0005)	0.000025 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Chrysene	16	--	--	140000	--	1.3	0.0002 J (0.0005)	0.00013 (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Fluorene	97	--	--	7800	--	7	0.002 (0.0005)	0.0014 (0.00001)	0.002 (0.0005)	0.002 (0.0005)	ND (0.00055)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.0005)	ND (0.000031)	ND (0.0005)	0.011 (0.0005)	ND (0.00055)
Phenanthrene	73	--	--	5800	--	1	0.0001 J (0.0005)	0.00037 (0.000031)	ND (0.0005)	0.001 (0.0005)	ND (0.00055)
Pyrene	50	--	--	5800	--	3	0.002 (0.0005)	0.0012 (0.00001)	0.001 (0.0005)	0.0006 (0.0005)	0.00022 J (0.00055)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	0.00011 J (0.001)	0.001 (0.00013)	ND (0.003)	0.00053 (0.0005)	0.000073 J (0.00052)

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location								B-165	B-165	B-168	B-168	B-169
Field Sample ID	Nonpotable	Routine	Routine	Construction	Off-Site	GW	B-165_20220110	B-165_20220412	B-168_010413	GW-11109613-B168-05-04-16-AC-009	B-169_010413	
Collection Depth (ft bgs)	GW Use	Worker GW	Worker GW	Worker GW	Resident GW	Migration to	12	2.799999952				
Sample Date		Vol to	VI	Direct	VI	SW	1/10/2022	4/12/2022	1/4/2013	5/4/2016	1/4/2013	
Comments		Outdoor Air		Contact								
Physical Parameters												
pH [SU]	--	--	--	--	--	--	6.51	NA	NA	NA	NA	
Volatile Organic Compounds												
Benzene	0.3	550	3.8	4	0.25	130	NA	ND (0.0005)	ND (0.001)	ND (0.0005)	0.0052 (0.001)	
Cumene	37	9100	63	30	4	2.6	NA	0.0033 (0.001)	0.0038 (0.002)	0.002 J (0.0005)	0.0083 (0.002)	
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	NA	ND (0.00002)	ND (0.00002)	ND (0.000094)	ND (0.00002)	
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	NA	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	
Ethyl Benzene	2	22000	150	40	9.7	13	NA	ND (0.001)	ND (0.001)	ND (0.0005)	0.0018 (0.001)	
Methyl tert-butyl ether	21	29000	210	190	42	11000	NA	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	
tert Butyl alcohol	--	--	--	--	--	--	NA	ND (0.01)	NA	NA	NA	
Toluene	25	100000	700	200	45	52	NA	ND (0.001)	ND (0.001)	ND (0.0005)	0.002 (0.001)	
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	NA	ND (0.002)	ND (0.002)	ND (0.0005)	0.0047 (0.002)	
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	NA	ND (0.002)	ND (0.002)	ND (0.0005)	ND (0.002)	
Xylenes (total)	3.7	1900	13	17	0.86	210	NA	ND (0.001)	0.002 (0.001)	0.0005 J (0.0005)	0.0063 (0.001)	
Semivolatile Organic Compounds												
Anthracene	240	--	--	19000	--	40	NA	0.0000856 (0.00008)	0.000503 (0.0001)	0.00052 (0.00001)	0.000377 (0.0001)	
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	NA	0.000247 (0.00004)	0.000254 (0.0001)	0.000066 (0.00001)	0.000197 (0.0001)	
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	NA	0.000254 (0.00004)	ND (0.0001)	0.000037 J (0.00001)	ND (0.0001)	
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	NA	0.00037 (0.00004)	ND (0.0001)	0.000038 J (0.00001)	ND (0.0001)	
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	NA	0.000254 (0.00008)	ND (0.0001)	0.000016 J (0.00001)	ND (0.0001)	
Chrysene	16	--	--	140000	--	1.3	NA	0.000313 (0.00008)	0.00019 (0.0001)	0.000063 (0.00001)	0.000131 (0.0001)	
Fluorene	97	--	--	7800	--	7	NA	0.0000534 J (0.00008)	0.00309 (0.0001)	0.0021 (0.00001)	0.00198 (0.0001)	
Naphthalene	0.39	120	0.88	0.28	0.067	43	NA	0.0000865 (0.00008)	0.00138 (0.0001)	ND (0.00003)	0.0417 (0.0001)	
Phenanthrene	73	--	--	5800	--	1	NA	0.000273 (0.00008)	0.000172 (0.0001)	0.00092 (0.00003)	0.00144 (0.0001)	
Pyrene	50	--	--	5800	--	3	NA	0.000481 (0.00008)	0.00107 (0.0001)	0.00041 (0.00001)	0.000646 (0.0001)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluoroheptanoic acid	--	--	--	--	--	--	0.000019 (0.0000017)	NA	NA	NA	NA	
Perfluorononanoic acid	--	--	--	--	--	--	0.0000045 (0.0000017)	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	0.0000017 (0.0000017)	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	--	--	0.000012 (0.0000017)	NA	NA	NA	NA	
Metals												
Lead (Dissolved)	--	--	--	--	--	2.5	NA	0.0023 (0.001)	ND (0.003)	ND (0.00013)	ND (0.003)	

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-169		B-169		B-169		B-169	
							B-169_010913	GW-11109613-B169-05-09-16-MM-024	GW-11109613-B-169-082216-KC-001		B-169_20190710		B-169_20191104	
							1/9/2013	5/9/2016	8/22/2016	7/10/2019	11/4/2019			
Physical Parameters														
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds														
Benzene	0.3	550	3.8	4	0.25	130	0.0064 (0.001)	0.0007 J (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.00002)	ND (0.000097)	ND (0.000028)	ND (0.000029)	ND (0.000028)	ND (0.000028)	ND (0.000028)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.003)
Semivolatile Organic Compounds														
Anthracene	240	--	--	19000	--	40	0.000217 (0.0001)	0.000084 (0.00001)	ND (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.000187 (0.0001)	0.00017 (0.00001)	0.000013 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.000223 (0.0001)	0.00017 (0.00001)	0.000015 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.000222 (0.0001)	0.00019 (0.00001)	0.00002 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.000173 (0.0001)	0.00012 (0.00001)	0.000016 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Chrysene	16	--	--	140000	--	1.3	0.000268 (0.0001)	0.00017 (0.00001)	0.000017 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Fluorene	97	--	--	7800	--	7	0.000527 (0.0001)	0.000043 J (0.00001)	ND (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.000165 (0.0001)	0.000071 (0.00003)	ND (0.000069)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Phenanthrene	73	--	--	5800	--	1	0.000296 (0.0001)	0.000069 (0.00003)	ND (0.000069)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Pyrene	50	--	--	5800	--	3	0.000587 (0.0001)	0.00027 (0.00001)	0.000035 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Perfluoroalkyl and Polyfluoroalkyl Substances														
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.003)	0.0338 (0.00013)	0.0065 (0.001)	ND (0.003)	0.0017 (0.0005)	ND (0.003)	0.0017 (0.0005)	0.0017 (0.0005)

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location	B-169		B-169		B-170		B-170		B-170		
Field Sample ID	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-169_20210429 1.46000038 4/29/2021	B-169_20220412 1.5 4/12/2022	GW-11109613-B170-05-05-16-AC-017 5/5/2016	GW-11109613-DUP2-05-05-16-AC-019 5/5/2016 FD	GW-11109613-B-170-082216-KC-003 8/22/2016
Collection Depth (ft bgs)											
Sample Date											
Comments											
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.0005)	0.005 (0.0005)	0.005 (0.0005)	0.003 (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.005)	ND (0.001)	0.006 (0.0005)	0.005 (0.0005)	0.005 (0.002)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.00029)	ND (0.00002)	ND (0.000095)	ND (0.000096)	ND (0.00029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	ND (0.05)	ND (0.01)	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	ND (0.002)	ND (0.0005)	ND (0.0005)	ND (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.002)	ND (0.0005)	ND (0.0005)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.006)	ND (0.001)	0.002 (0.0005)	0.001 (0.0005)	0.0007 J (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	ND (0.00055)	0.000089 (0.000077)	0.00036 (0.00001)	0.00037 (0.00001)	0.00026 (0.000057)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.00055)	0.0000391 (0.000038)	0.0001 (0.00001)	0.0001 (0.00001)	0.000065 (0.000057)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00055)	0.0000483 (0.000038)	0.00011 (0.00001)	0.00009 (0.00001)	0.000043 J (0.000057)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.00055)	0.000046 (0.000038)	0.00012 (0.00001)	0.000088 (0.00001)	0.000044 J (0.000057)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00055)	ND (0.000077)	0.000047 J (0.00001)	0.000043 J (0.00001)	0.00002 J (0.000057)
Chrysene	16	--	--	140000	--	1.3	ND (0.00055)	0.0000561 J (0.000077)	0.00011 (0.00001)	0.00011 (0.00001)	0.000069 (0.000057)
Fluorene	97	--	--	7800	--	7	ND (0.00055)	0.00019 (0.000077)	0.0025 (0.00001)	0.0023 (0.00001)	0.00061 (0.000057)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.00055)	0.0000644 J (0.000077)	0.0023 (0.000031)	0.0048 (0.000031)	ND (0.000068)
Phenanthrene	73	--	--	5800	--	1	ND (0.00055)	0.000431 (0.000077)	0.0013 (0.000031)	0.0018 (0.000031)	0.00099 (0.000068)
Pyrene	50	--	--	5800	--	3	ND (0.00055)	0.0000844 (0.000077)	0.00035 (0.00001)	0.00034 (0.00001)	0.00031 (0.000057)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	0.0016 (0.00052)	ND (0.001)	ND (0.00013)	ND (0.00013)	ND (0.001)

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-170	B-170	B-170	B-170	B-176
							B-170_20190710 7/10/2019	B-170_20191104 11/4/2019	B-170_20210429 1.25999999 4/29/2021	B-170_20220412 1.129999995 4/12/2022	B-176-20200220-WG 2/20/2020
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	0.002 (0.001)	0.001 (0.001)	0.00089 J (0.001)	0.0013 (0.0005)	0.141 (0.001)
Cumene	37	9100	63	30	4	2.6	0.006 (0.005)	0.005 J (0.005)	0.0061 (0.005)	0.01 (0.001)	0.0007 J (0.001)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000028)	ND (0.000028)	ND (0.000029)	ND (0.00002)	ND (0.000041)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	0.0003 J (0.001)	0.0002 J (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.001)	0.0085 (0.001)	0.0014 (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	ND (0.05)	ND (0.01)	0.641 (0.005)
Toluene	25	100000	700	200	45	52	0.0004 J (0.001)	0.0004 J (0.001)	0.00039 J (0.001)	0.00068 J (0.001)	0.00072 J (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	0.001 J (0.005)	ND (0.005)	ND (0.002)	ND (0.001)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.001)
Xylenes (total)	3.7	1900	13	17	0.86	210	0.001 J (0.005)	0.001 J (0.003)	ND (0.006)	0.0023 (0.001)	ND (0.003)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0004 J (0.0005)	0.0003 J (0.0006)	0.00034 J (0.00056)	0.000289 (0.000074)	NA
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000509 (0.000037)	NA
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000415 (0.000037)	NA
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.000042 (0.000037)	NA
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000375 J (0.000074)	NA
Chrysene	16	--	--	140000	--	1.3	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000412 J (0.000074)	NA
Fluorene	97	--	--	7800	--	7	0.004 (0.0005)	0.002 (0.0006)	0.0022 (0.00056)	0.00162 (0.000074)	NA
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.049 (0.0005)	0.015 (0.0006)	0.029 (0.00056)	0.0024 (0.00074)	NA
Phenanthrene	73	--	--	5800	--	1	0.004 (0.0005)	0.002 (0.0006)	0.0011 (0.00056)	0.000139 (0.000074)	NA
Pyrene	50	--	--	5800	--	3	0.0002 J (0.0005)	ND (0.0006)	ND (0.00056)	0.000127 (0.000074)	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.003)	0.000092 J (0.0005)	ND (0.00052)	ND (0.001)	NA

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-176	B-176	B-176	B-43	B-43
							B-176_20200910	B-176_20201215	B-176_20220518 14.14000034	B-43-20160523	GW-11109613-B-43-082216-KC-005
							9/10/2020	12/15/2020	5/18/2022	5/23/2016	8/22/2016
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.005)	ND (0.005)	ND (0.001)	0.004 (0.002)	0.006 (0.002)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000029)	ND (0.00002)	ND (0.000029)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	0.0016 (0.001)	0.0014 (0.001)	0.0016 (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	0.67 (0.05)	0.56 (0.05)	0.734 (0.01)	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.002)	ND (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.002)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.006)	ND (0.006)	ND (0.001)	ND (0.001)	0.0006 J (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.00036 J (0.00051)	0.00011 J,B (0.0005)	ND (0.00008)	0.0007 (0.0005)	0.00022 (0.000053)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.00072 (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00089 (0.000053)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00066 J (0.000053)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0005 J (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00075 J (0.000053)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00051)	ND (0.0005)	ND (0.00008)	0.001 (0.0005)	0.00032 J (0.000053)
Chrysene	16	--	--	140000	--	1.3	0.00024 J (0.00051)	ND (0.0005)	ND (0.00008)	0.003 (0.0005)	0.001 (0.000053)
Fluorene	97	--	--	7800	--	7	0.00065 (0.00051)	0.00023 J (0.0005)	ND (0.00008)	0.0009 (0.0005)	0.00034 (0.000053)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.00034 J (0.00051)	ND (0.0005)	0.0000613 J (0.00008)	ND (0.0005)	ND (0.000063)
Phenanthrene	73	--	--	5800	--	1	0.00064 (0.00051)	0.00011 J,B (0.0005)	ND (0.00008)	ND (0.0005)	0.00024 (0.000063)
Pyrene	50	--	--	5800	--	3	0.00099 (0.00051)	0.0001 J,B (0.0005)	ND (0.00008)	0.007 (0.0005)	0.0029 (0.000053)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.00052)	0.00018 J (0.00052)	ND (0.001)	ND (0.001)	0.0028 (0.001)

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-43	B-43	B-43	B-43	B-43
							B-43-20170522	B-43_20180627	B-43_20190627	B-43_20191101	B-43_20210504 2.769999981
							5/22/2017	6/27/2018	6/27/2019	11/1/2019	5/4/2021
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.001)	0.008 (0.001)	ND (0.001)	0.00031 J (0.001)
Cumene	37	9100	63	30	4	2.6	0.007 (0.002)	0.00235 (0.001)	0.003 J (0.005)	0.006 (0.005)	0.0064 (0.005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.00001)	ND (0.000028)	ND (0.000028)	ND (0.000029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.001)	0.001 J (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	ND (0.05)
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	0.0005 J (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.0008 J (0.002)	ND (0.001)	ND (0.005)	0.0008 J (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	0.002 (0.001)	ND (0.003)	ND (0.005)	0.002 J (0.003)	ND (0.006)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0004 J (0.0005)	ND (0.00005)	ND (0.0005)	0.0007 (0.0005)	ND (0.00055)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0004 J (0.0005)	0.000327 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0003 J (0.0005)	0.000253 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0003 J (0.0005)	0.000311 (0.00005)	ND (0.0005)	0.0001 J (0.0005)	ND (0.00055)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.0001 J (0.0005)	0.00016 (0.00005)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Chrysene	16	--	--	140000	--	1.3	0.0003 J (0.0005)	0.000326 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Fluorene	97	--	--	7800	--	7	0.0003 J (0.0005)	ND (0.00005)	ND (0.0005)	0.0009 (0.0005)	ND (0.00055)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.001 (0.0005)	ND (0.00025)	ND (0.0005)	0.01 (0.0005)	ND (0.00055)
Phenanthrene	73	--	--	5800	--	1	0.001 (0.0005)	ND (0.00005)	ND (0.0005)	0.002 (0.0005)	ND (0.00055)
Pyrene	50	--	--	5800	--	3	0.002 (0.0005)	0.00152 (0.00005)	0.0006 (0.0005)	0.001 (0.0005)	0.00051 J (0.00055)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	ND (0.002)	ND (0.003)	0.00045 J (0.0005)	ND (0.00052)

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location								B-43	B-46	B-46	B-46	B-46	B-95
Field Sample ID	Nonpotable	Routine	Routine	Construction	Off-Site	GW	B-43	B-46	B-46	B-46	B-46	B-95	
Collection Depth (ft bgs)	GW Use	Worker GW	Worker GW	Worker GW	Resident GW	Migration to	B-43_20220412	B46-052505	B46-060706	B46_010713	B-95 GP U 677-MW		
Sample Date		Vol to	VI	Direct	VI	SW	2.92000076	5/25/2005	6/7/2006	1/7/2013	6/8/2011		
Comments		Outdoor Air		Contact			4/12/2022						
Physical Parameters													
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA		
Volatile Organic Compounds													
Benzene	0.3	550	3.8	4	0.25	130	ND (0.0005)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)		
Cumene	37	9100	63	30	4	2.6	0.0069 (0.001)	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.0005)		
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000021)	ND (0.000029)	ND (0.000029)	ND (0.00002)	ND (0.000099)		
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)		
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.005)	ND (0.005)	0.002 (0.001)	ND (0.0005)		
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)		
tert Butyl alcohol	--	--	--	--	--	--	ND (0.01)	NA	NA	NA	NA		
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)		
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	NA	NA	0.0037 (0.002)	ND (0.0005)		
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	NA	NA	ND (0.002)	ND (0.0005)		
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.005)	ND (0.005)	0.0073 (0.001)	0.0005 J (0.0005)		
Semivolatile Organic Compounds													
Anthracene	240	--	--	19000	--	40	0.000102 (0.000083)	NA	NA	ND (0.0001)	NA		
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.000042)	NA	NA	0.000175 (0.0001)	NA		
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0000268 J (0.000042)	NA	NA	0.000177 (0.0001)	NA		
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.000042)	NA	NA	0.000167 (0.0001)	NA		
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.000083)	NA	NA	0.00012 (0.0001)	NA		
Chrysene	16	--	--	140000	--	1.3	ND (0.000083)	ND (0.001)	ND (0.005)	0.00019 (0.0001)	0.00018 J (0.000079)		
Fluorene	97	--	--	7800	--	7	0.0000754 J (0.000083)	ND (0.001)	ND (0.005)	0.000319 (0.0001)	NA		
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.000083)	ND (0.001)	ND (0.005)	0.000914 (0.0001)	ND (0.001)		
Phenanthrene	73	--	--	5800	--	1	ND (0.000083)	ND (0.001)	ND (0.005)	0.000219 (0.0001)	0.00018 J (0.000079)		
Pyrene	50	--	--	5800	--	3	0.000308 (0.000083)	ND (0.001)	ND (0.005)	0.00053 (0.0001)	0.0012 (0.000099)		
Perfluoroalkyl and Polyfluoroalkyl Substances													
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA		
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA		
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA		
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA		
Metals													
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	NA	NA	0.0042 (0.003)	ND (0.000052)		

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-95	URS-5	URS-5	URS-5	URS-5
							B-95-20160523	URSS-060606	GW-11109613-URSS-05-10-16-MM-040	GW-11109613-URS-5-082416-AC-020	GW-11109613-URS-5-082416-KC-021
							5/23/2016	6/6/2006	5/10/2016	8/24/2016	8/24/2016
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	<u>5.9 (0.25)</u>	<u>4 (0.013)</u>	<u>2.3 (0.1)</u>	<u>4.9 (0.2)</u>
Cumene	37	9100	63	30	4	2.6	ND (0.002)	0.037 (0.025)	0.022 J (0.013)	0.013 J (0.02)	0.031 J (0.04)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000029)	ND (0.000097)	0.000089 (0.000028)	ND (0.00004)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	<u>0.14 (0.025)</u>	ND (0.013)	ND (0.01)	ND (0.02)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	0.6 (0.025)	0.56 (0.013)	0.28 (0.01)	0.53 (0.02)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.025)	ND (0.013)	ND (0.01)	ND (0.02)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	4.9 (0.25)	8.6 (0.13)	1.5 (0.01)	6.5 (0.2)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	NA	0.19 (0.013)	0.092 (0.02)	0.23 (0.04)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	NA	0.056 (0.013)	0.027 (0.02)	0.072 (0.04)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	<u>2.9 (0.25)</u>	<u>3 (0.013)</u>	<u>1.5 (0.01)</u>	<u>2.8 (0.02)</u>
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	ND (0.0005)	NA	0.0056 (0.0001)	0.0033 (0.000051)	0.0048 (0.00051)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0002 J (0.0005)	NA	0.00096 (0.0001)	0.00023 (0.000051)	0.00046 J (0.00051)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0003 J (0.0005)	NA	0.00027 J (0.0001)	0.000058 (0.000051)	0.00015 J (0.00051)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0002 J (0.0005)	NA	0.00024 J (0.0001)	0.000056 (0.000051)	0.00014 J (0.00051)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.0002 J (0.0005)	NA	ND (0.0001)	0.000017 J (0.000051)	ND (0.00051)
Chrysene	16	--	--	140000	--	1.3	0.0004 J (0.0005)	ND (0.005)	0.00053 (0.0001)	0.00011 (0.000051)	0.00025 J (0.00051)
Fluorene	97	--	--	7800	--	7	ND (0.0005)	0.017 (0.005)	0.014 (0.0001)	0.0015 (0.000051)	0.014 (0.00051)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.0005)	<u>0.27 (0.024)</u>	<u>0.26 (0.003)</u>	<u>0.15 (0.0012)</u>	<u>0.22 (0.0061)</u>
Phenanthrene	73	--	--	5800	--	1	ND (0.0005)	0.025 (0.005)	0.02 (0.0003)	0.012 (0.0012)	0.021 (0.00061)
Pyrene	50	--	--	5800	--	3	0.0007 (0.0005)	ND (0.005)	0.0035 (0.0001)	0.0017 (0.000051)	0.0028 (0.00051)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	NA	ND (0.00013)	ND (0.001)	0.00014 J (0.001)

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	URS-5	URS-5	URS-5	URS-5	URS-5
							URS-5_20180629	URS-5_HS_20180629	URS-5_DUP_20180629	URS-5_20190701	URS-5_20191114
							6/29/2018	6/29/2018	6/29/2018 FD	7/1/2019	11/14/2019
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	3.26 (0.025)	3.43 (0.1)	3.98 (0.025)	3.3 (0.05)	3.5 (0.05)
Cumene	37	9100	63	30	4	2.6	0.0273 (0.001)	ND (0.1)	0.0254 (0.025)	0.026 (0.025)	0.021 J (0.025)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.00001)	ND (0.00001)	ND (0.00001)	ND (0.000029)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.1)	ND (0.025)	ND (0.025)	ND (0.025)
Ethyl Benzene	2	22000	150	40	9.7	13	0.664 (0.025)	0.539 (0.1)	0.613 (0.025)	0.53 (0.005)	0.5 (0.005)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.1)	ND (0.025)	ND (0.005)	ND (0.005)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	6.14 (0.05)	2.57 (0.1)	4.96 (0.025)	4.4 (0.05)	4.3 (0.05)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.212 (0.025)	0.186 (0.1)	0.219 (0.025)	0.24 (0.025)	0.21 (0.025)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	0.0649 (0.001)	ND (0.1)	0.065 (0.025)	0.073 (0.025)	0.058 (0.025)
Xylenes (total)	3.7	1900	13	17	0.86	210	3.05 (0.075)	2.36 (0.3)	2.77 (0.075)	2.3 (0.25)	2.4 (0.015)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0065 (0.00005)	0.00663 (0.00005)	0.00682 (0.00005)	0.004 (0.0005)	0.004 (0.0005)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.000174 (0.00005)	0.000168 (0.00005)	0.00018 (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00005)	ND (0.00005)	ND (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0000716 (0.00005)	0.0000571 (0.00005)	0.0000693 (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00005)	ND (0.00005)	ND (0.00005)	ND (0.0005)	ND (0.0005)
Chrysene	16	--	--	140000	--	1.3	0.00011 (0.00005)	0.000107 (0.00005)	0.000108 (0.00005)	ND (0.0005)	ND (0.0005)
Fluorene	97	--	--	7800	--	7	0.0243 (0.00005)	0.0213 (0.00005)	0.023 (0.00005)	0.014 (0.0005)	0.014 (0.0005)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.355 (0.0025)	0.414 (0.005)	0.359 (0.0025)	0.18 (0.003)	0.57 (0.003)
Phenanthrene	73	--	--	5800	--	1	0.0387 (0.00005)	0.0417 (0.00005)	0.0406 (0.00005)	0.025 (0.0005)	0.022 (0.0005)
Pyrene	50	--	--	5800	--	3	0.00321 (0.00005)	0.00354 (0.00005)	0.00346 (0.00005)	0.004 (0.0005)	0.003 (0.0005)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.003)	ND (0.0005)

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Appendix C

Table 4

Summary of Historical Groundwater Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing LLC, (PESRM) Philadelphia Refining Complex, Philadelphia, Pennsylvania

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	URS-5	URS-5	URS-5
							URS-5_20210506 5.25 5/6/2021	URS-5_20220414 5.170000076 4/14/2022	DUP-7_20220414 4/14/2022 FD
Physical Parameters									
pH [SU]	--	--	--	--	--	--	NA	NA	NA
Volatile Organic Compounds									
Benzene	0.3	550	3.8	4	0.25	130	3.9 (0.05)	4.85 (0.025)	4.68 (0.025)
Cumene	37	9100	63	30	4	2.6	0.026 (0.025)	0.0321 J (0.05)	0.0341 J (0.05)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	0.000066 (0.00002)	0.000051 (0.00002)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.05)	ND (0.05)
Ethyl Benzene	2	22000	150	40	9.7	13	0.68 (0.005)	0.828 (0.05)	0.817 (0.05)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.005)	ND (0.05)	ND (0.05)
tert Butyl alcohol	--	--	--	--	--	--	0.08 J (0.25)	ND (0.5)	ND (0.5)
Toluene	25	100000	700	200	45	52	8.7 (0.05)	7.95 (0.05)	7.77 (0.05)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.23 (0.025)	0.295 (0.1)	0.346 (0.1)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	0.068 (0.025)	0.0818 J (0.1)	0.0783 J (0.1)
Xylenes (total)	3.7	1900	13	17	0.86	210	3.3 (0.03)	3.91 (0.05)	3.88 (0.05)
Semivolatile Organic Compounds									
Anthracene	240	--	--	19000	--	40	0.0034 (0.00053)	0.00284 (0.000077)	0.00276 (0.000077)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.00053)	0.000143 (0.000038)	0.0000935 (0.000038)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00053)	0.0000347 J (0.000038)	0.0000341 J (0.000038)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.00053)	0.0000581 (0.000038)	0.0000416 (0.000038)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00053)	ND (0.000077)	ND (0.000077)
Chrysene	16	--	--	140000	--	1.3	ND (0.00053)	0.0000564 J (0.000077)	0.0000447 J (0.000077)
Fluorene	97	--	--	7800	--	7	0.014 (0.00053)	0.0207 (0.015)	0.0153 (0.015)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.28 (0.0026)	0.261 (0.015)	0.207 (0.015)
Phenanthrene	73	--	--	5800	--	1	0.026 (0.00053)	0.03 (0.015)	0.0238 (0.015)
Pyrene	50	--	--	5800	--	3	0.0024 (0.00053)	0.00145 (0.000077)	0.00116 (0.000077)
Perfluoroalkyl and Polyfluoroalkyl Substances									
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA
Metals									
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.00052)	ND (0.001)	ND (0.001)

Notes:

- 1 All concentrations reported in mg/L; detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 Boldfaced concentrations exceed the Nonpotable GW Use.
- 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- 5 Underlined concentrations exceed the Routine Worker GW VI.
- 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
- 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
- 8 No concentrations exceed the GW Migration to SW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

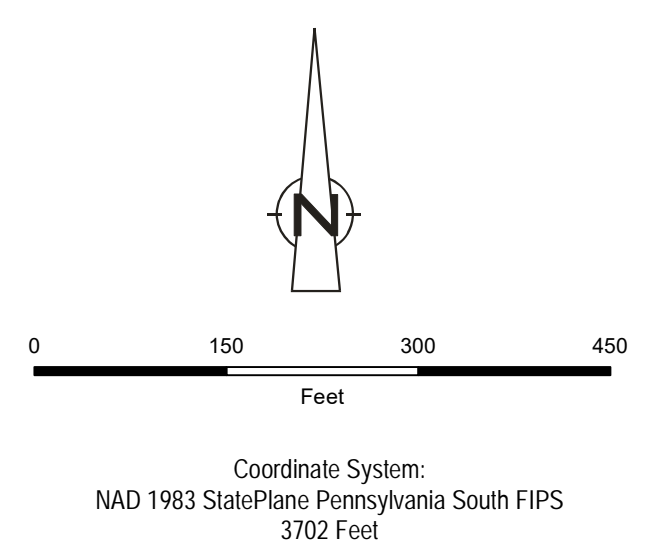
Appendix D

Select Figures from Sitewide RIR



Notes:
 - Tank Group 07 boundaries/notation and cross section lines were added by Terraphase and were not on the original figures.
 - The cross section lines were approximated from Figure 8 of the GHD 2016 AOI-6 RIR.

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



- Legend**
- 2016 RI Groundwater Sample
 - Water Table Monitoring Well
 - Recovery Well
 - Deep Monitoring Well
 - Damaged Monitoring Well
 - Destroyed Monitoring Well
 - ▲ Monitoring Well (Unable to Locate)
 - Piezometer
 - 2016 RI Soil Sample
 - 2017 RI Soil Sample
 - Historical Soil Sample
 - 2016 RI (Not Sampled)
 - 2016 RI (Attempted Sample Location)
 - Air Sample
 - Bulkhead
 - Tank
 - Tank Addressed in SCR/RACR 2017
 - Solid Waste Management Unit
 - Area Of Interest

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

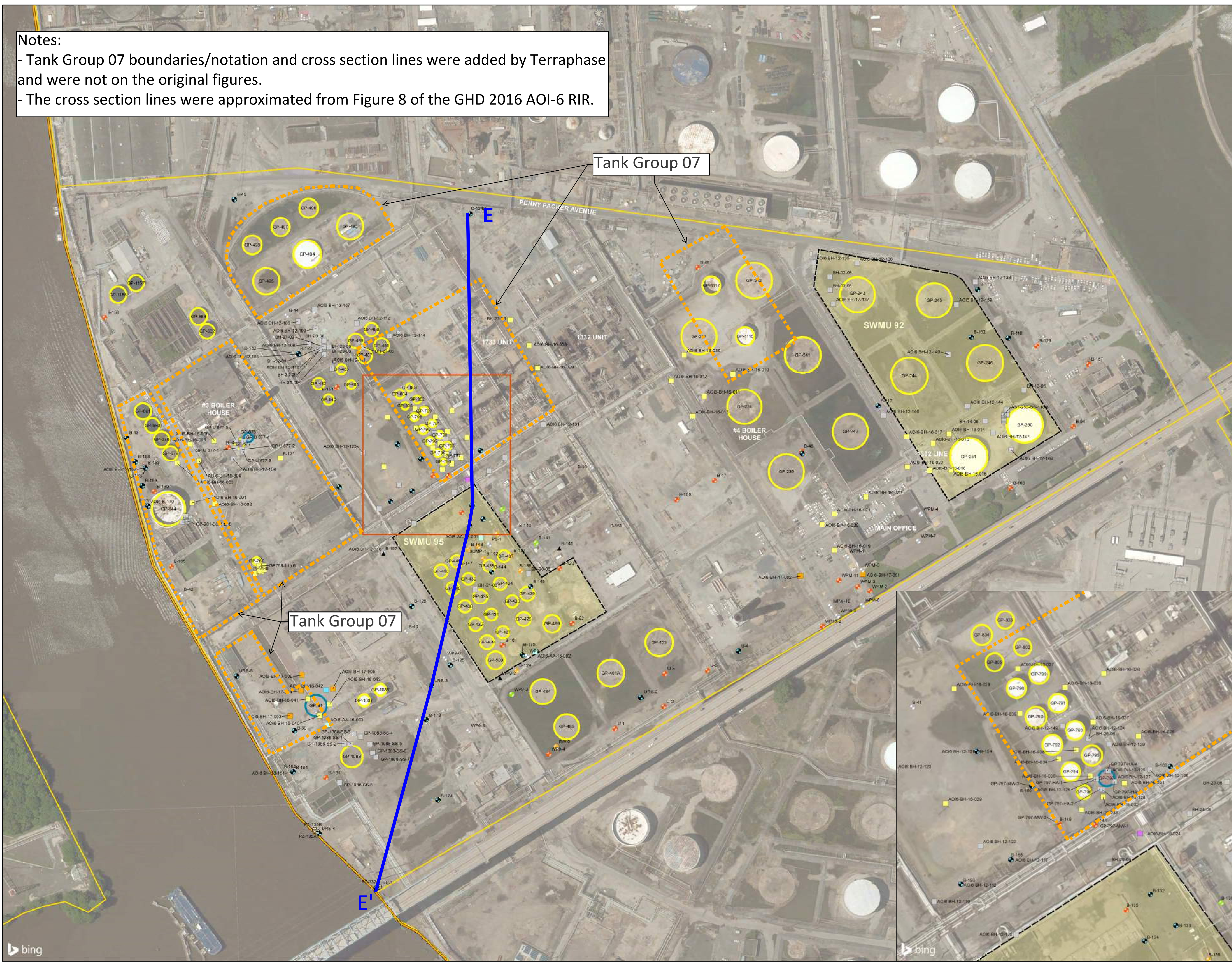
Project: 11109613
 Date: Nov 20, 2017

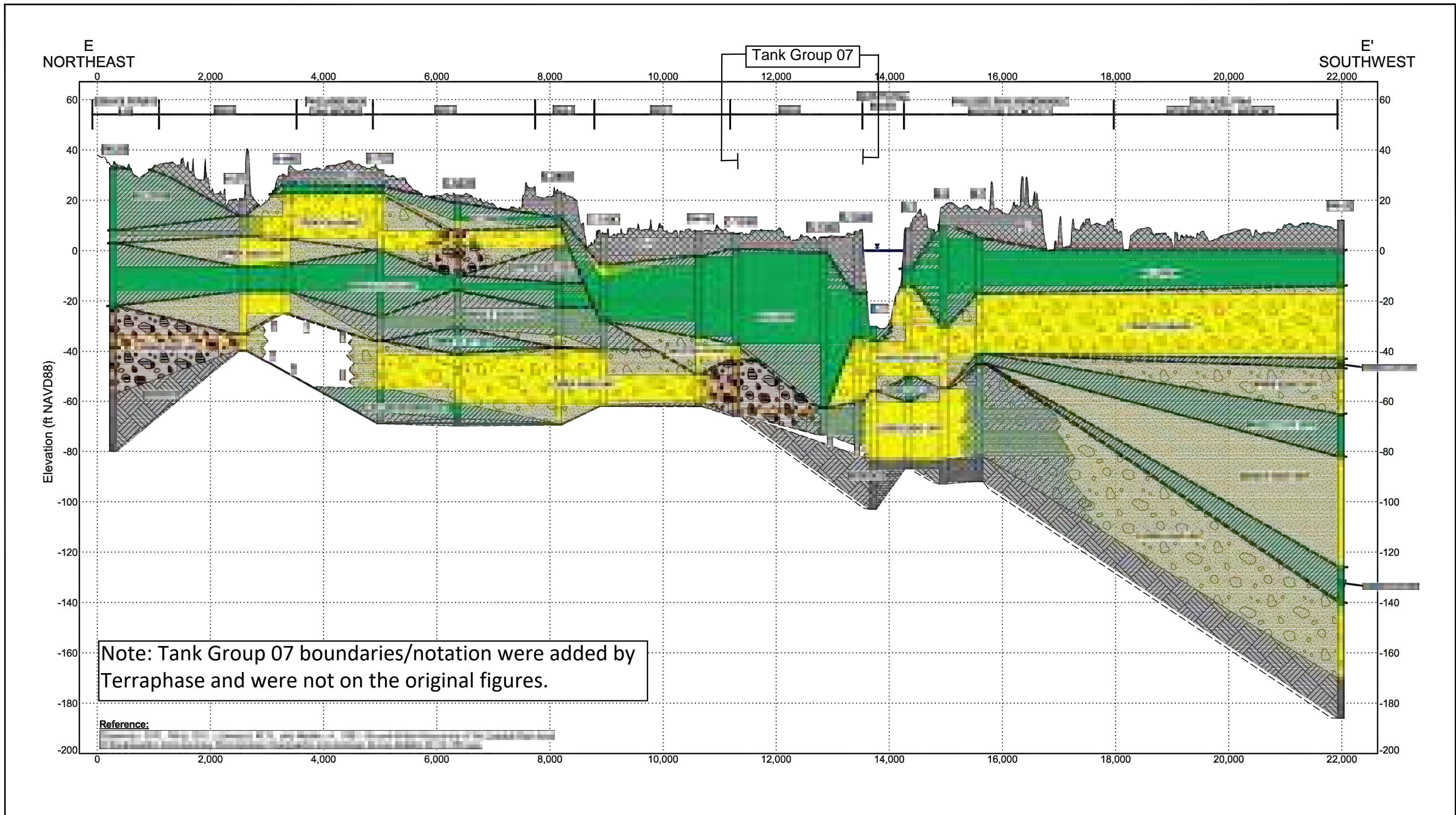
EVERGREEN RESOURCES MANAGEMENT
 AOI-6 PHILADELPHIA REFINERY OPERATIONS

AOI 6 SITE PLAN

Figure No.

FIGURE 2





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., 1991. Geographic locations for those historic borings were estimated by Stantec in a GIS using a georeferenced image of Plate 1 of that report. Fill thickness interpreted by Stantec.
3. PH-25 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



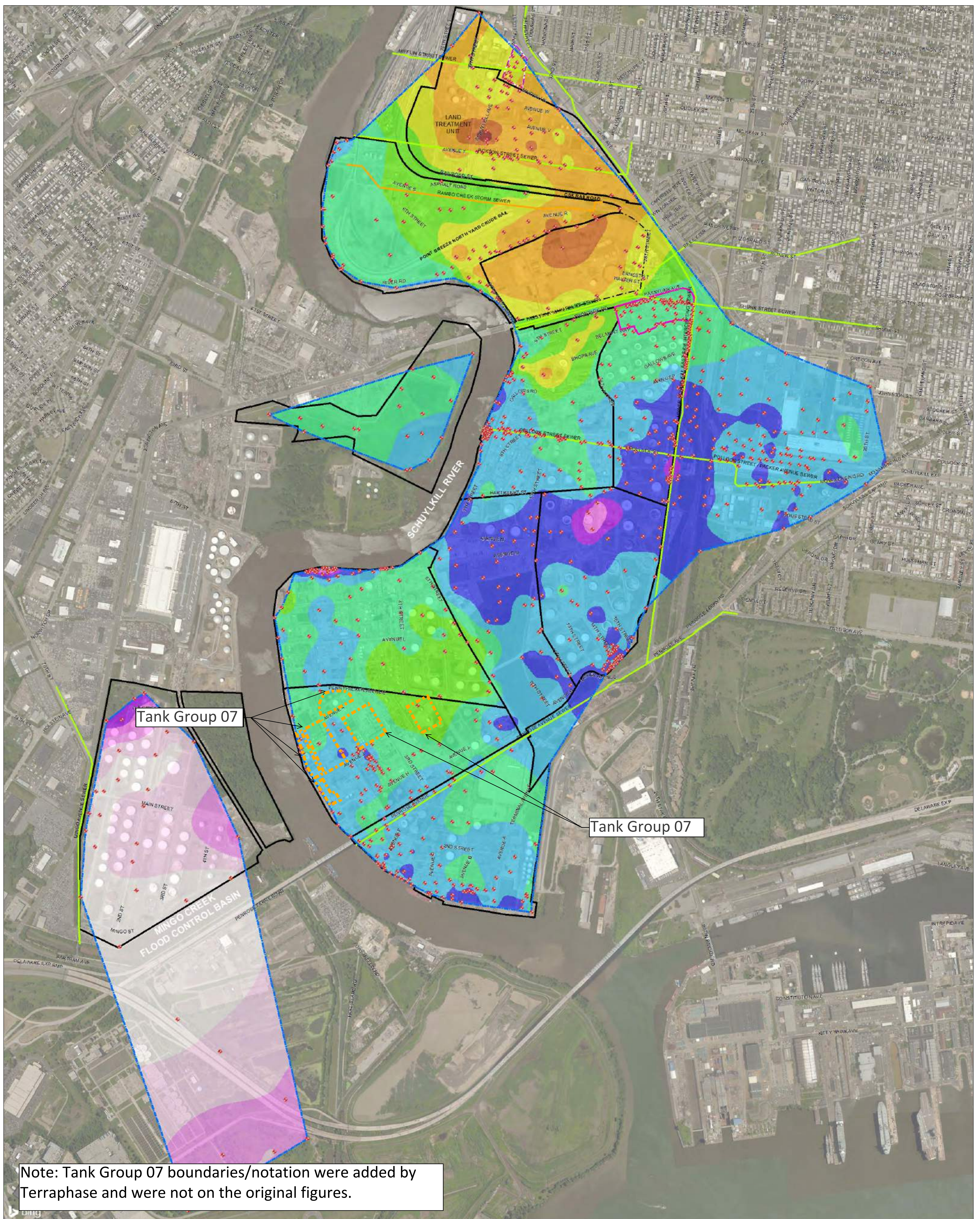
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT

STRATIGRAPHIC PROFILE

11109613-01

Dec 1, 2016

FIGURE 8



- LEGEND**
- ♦ WELL UTILIZED FOR THE JUNE 2018 WATER-TABLE ELEVATION SURFACE
 - APPROXIMATE LOCATION OF PHILADELPHIA WATER DEPARTMENT SEWER
 - APPROXIMATE LOCATION OF RAMBO CREEK STORM SEWER
 - PHILADELPHIA GAS WORKS (PGW) PASSYUNK FACILITY
 - VERIZON SOUTH DISTRICT WORK CENTER (SDWC) PROPERTY
 - AREA OF INTEREST (AOI) BOUNDARY
 - BELMONT TERMINAL
 - APPROXIMATE LIMITS OF WATER-TABLE WELL CONTROL

JUNE 2018 WATER-TABLE ELEVATION FT NAVD88	
14 - 16	
12 - 14	
10 - 12	
8 - 10	
6 - 8	
4 - 6	
2 - 4	
0 - 2	
-2 - 0	
-4 - -2	
-6 - -4	
-8 - -6	
-10 - -8	

0 500 1,000 1,500 Feet
1:8,100 (At original document size of 24x36)

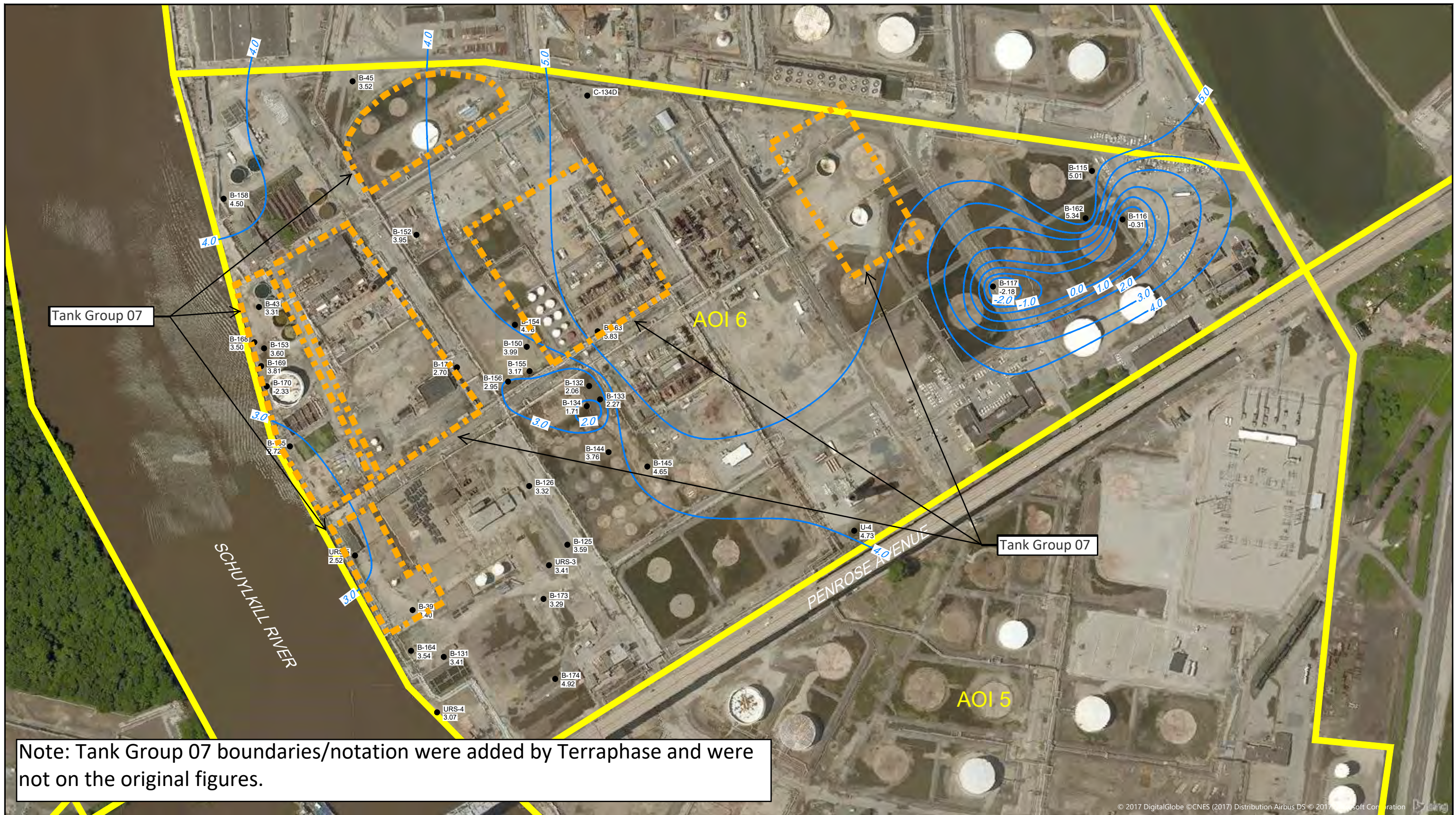
Figure No.
3-29
Title
JUNE 2018 WATER-TABLE ELEVATION

Client/Project
PHILADELPHIA REFINERY OPERATIONS, A SERIES OF
EVERGREEN RESOURCES GROUP, LLC
FORMER PHILADELPHIA REFINERY
3144 PASSYUNK AVENUE, PHILADELPHIA, PA 19145

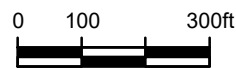
Project Location
City of Philadelphia,
Philadelphia County,
Pennsylvania

213402454
Prepared by ADK on 8/14/2018
Technical Review by ANP on 9/20/2018
Independent Review by JLM on 10/19/2018





Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date June 2014, Accessed: 2017



LEGEND

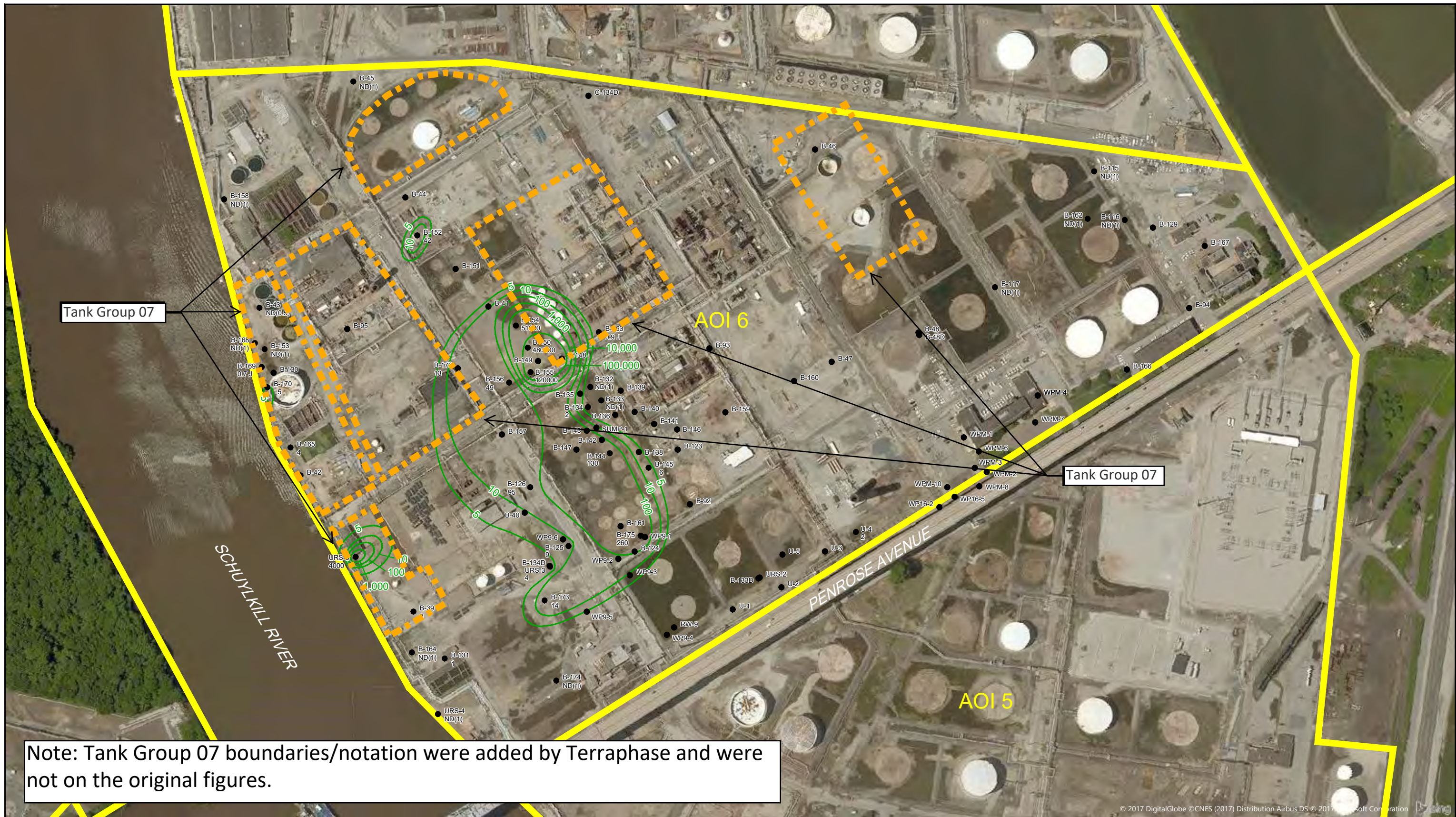
- B-39 SAMPLE LOCATION
- 3.40 WATER TABLE ELEVATION (ft. AMSL)
- 0.0 — WATER TABLE CONTOUR (ft. AMSL)



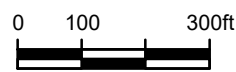
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT
 WATER TABLE CONTOURS
 MAY 2, 2016

11109613-01
 Nov 11, 2017

FIGURE 14



Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date June 2014, Accessed: 2017



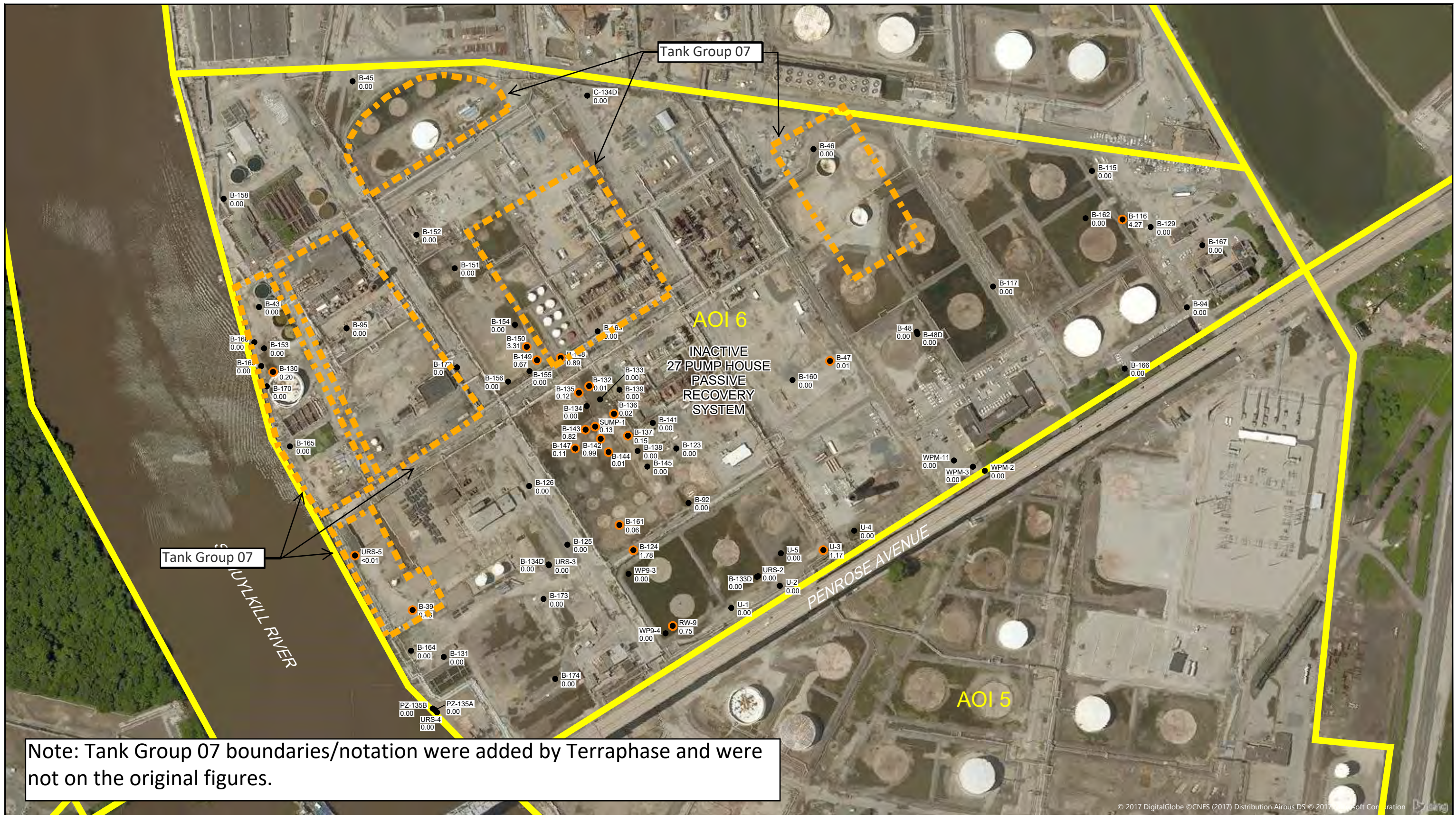
- LEGEND**
- B-173 SAMPLE LOCATION
 - 14 BENZENE CONCENTRATION (µg/L)
 - 0.0 — BENZENE ISO-CONCENTRATION CONTOUR (µg/L)
- NOTE: 5ppb IS THE NON-RESIDENTIAL GROUNDWATER MSC FOR BENZENE.



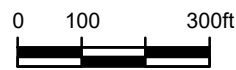
EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT
 DISSOLVED BENZENE GROUNDWATER CONCENTRATIONS
 MAY 2016

11109613-01
 Nov 10, 2017

FIGURE 19



Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date June 2014, Accessed: 2017



- LEGEND**
- B-174 SAMPLE LOCATION
 - 0.00 LNAPL APPARENT THICKNESS (ft.)
 - LNAPL PRESENT



EVERGREEN RESOURCES MANAGEMENT OPERATIONS LLC
 PHILADELPHIA REFINERY - 3144 PASSYUNK AVENUE, PHILADELPHIA, PA
 REMEDIAL INVESTIGATION REPORT
 LNAPL APPARENT THICKNESS
 MAY 11, 2017

11109613-01
 Nov 11, 2017

FIGURE 17

Appendix D

Historic Soil Sampling Results



Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	1732_1733-01	1732_1733-02	1732_1733-02	1732_1733-03	1732_1733-03	1732_1733-04	1732_1733-04
					1732_1733-01_0-2_20220511 0 - 2 5/11/2022	1732_1733-02_0-2_20220511 0 - 2 5/11/2022	1732_1733-02_3-4_20220511 3 - 4 5/11/2022	1732_1733-03_0-2_20220511 0 - 2 5/11/2022	1732_1733-03_3-4_20220511 3 - 4 5/11/2022	1732_1733-04_0-2_20220511 0 - 2 5/11/2022	1732_1733-04_3-4_20220511 3 - 4 5/11/2022
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.0025 (0.00059)	ND (0.00071)	0.0075 (0.00051)	0.0019 (0.00063)	<u>0.534 E,J</u> (0.00044)	0.0887 (0.00064)	0.109 (0.00062)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.0659 (0.0024)	ND (0.0028)	<u>24.8</u> (2.3)	0.0299 (0.0025)	<u>118</u> (6.2)	<u>108</u> (2.6)	<u>556</u> (7.4)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.0012)	ND (0.0014)	ND (0.001)	ND (0.0013)	ND (0.00089)	ND (0.0013)	ND (0.0012)
Ethyl Benzene	2300	15	1300	820	ND (0.0012)	ND (0.0014)	0.0154 (0.001)	ND (0.0013)	0.0411 (0.00089)	ND (0.0013)	0.0012 (0.0012)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0012)	ND (0.0014)	ND (0.001)	ND (0.0013)	ND (0.00089)	ND (0.0013)	ND (0.0012)
Toluene	8000	76	650	9800	ND (0.0012)	ND (0.0014)	0.0028 (0.001)	ND (0.0013)	0.144 (0.00089)	ND (0.0013)	0.0017 (0.0012)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0024)	ND (0.0028)	0.0095 (0.0021)	ND (0.0025)	0.0099 (0.0018)	0.0093 (0.0026)	0.0246 (0.0025)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0024)	ND (0.0028)	0.0097 (0.0021)	ND (0.0025)	0.0041 (0.0018)	0.0048 (0.0026)	0.0158 (0.0025)
Xylenes (total)	240	1.5	51	340	0.0011 J (0.0012)	ND (0.0014)	0.011 (0.001)	ND (0.0013)	0.1 (0.00089)	0.0138 (0.0013)	0.0265 (0.0012)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.044 (0.038)	ND (0.04)	0.0637 (0.037)	3.44 (0.19)	0.144 (0.037)	ND (0.039)	0.134 (0.04)
Benzo(a)anthracene	430	--	3200	--	0.147 (0.038)	0.0549 (0.04)	0.184 (0.037)	12.6 (0.19)	0.161 (0.037)	0.054 (0.039)	0.211 (0.04)
Benzo(a)pyrene	43	--	7.7	--	0.187 (0.038)	0.0519 (0.04)	0.175 (0.037)	<u>14</u> (0.19)	0.128 (0.037)	0.0462 (0.039)	0.151 (0.04)
Benzo(b)fluoranthene	430	--	3200	--	0.22 (0.038)	0.0591 (0.04)	0.207 (0.037)	13.6 (0.19)	0.15 (0.037)	0.0613 (0.039)	0.181 (0.04)
Benzo(g,h,i)perylene	4600	--	14000	--	0.176 (0.038)	0.0327 J (0.04)	0.122 (0.037)	5.34 (0.19)	0.0778 (0.037)	0.0352 J (0.039)	0.0728 (0.04)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.191 (0.038)	0.0583 (0.04)	0.21 (0.037)	11.8 (0.19)	0.177 (0.037)	0.0553 (0.039)	0.192 (0.04)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.0478 (0.038)	ND (0.04)	0.0451 (0.037)	2.04 (0.19)	0.203 (0.037)	ND (0.039)	0.13 (0.04)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.0059)	ND (0.0071)	ND (0.0051)	ND (0.0063)	0.0206 (0.0044)	ND (0.0064)	ND (0.0062)
Phenanthrene	4600	--	14000	--	0.168 (0.038)	0.028 J (0.04)	0.146 (0.037)	8.05 (0.19)	0.574 (0.037)	0.0229 J (0.039)	0.417 (0.04)
Pyrene	4600	--	14000	--	0.259 (0.038)	0.0886 (0.04)	0.327 (0.037)	15.2 (0.19)	0.308 (0.037)	0.0981 (0.039)	0.413 (0.04)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	92.4 (2.2)	28.4 (2.5)	27.2 (2.1)	212 (2.4)	25.6 (2.3)	23.2 (2.4)	15.1 (2.5)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-102 BH-12-102_2-2.5' 2 - 2.5 12/4/2012	AOI6 BH-12-104 BH-12-104_0.5-1' 0.5 - 1 12/4/2012	AOI6 BH-12-114 BH-12-114_1-1.5' 1 - 1.5 12/3/2012	AOI6 BH-12-114 BH-12-114_3-3.5' 3 - 3.5 12/3/2012	AOI6 BH-12-124 BH-12-124_3-3.5' 3 - 3.5 12/4/2012	AOI6 BH-12-125 BH-12-125_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-126 BH-12-126_2.5-3' 2.5 - 3 12/4/2012
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.13)	ND (0.063)	ND (0.00094)	0.245 (0.059)	1380 (24)	ND (2.5)	87.2 (26)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	1.18 (0.66)	0.0351 J (0.32)	ND (0.0047)	0.387 (0.29)	2110 (120)	64.2 (12)	678 (130)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.13)	ND (0.063)	ND (0.00094)	ND (0.059)	ND (0.47)	ND (2.5)	ND (0.26)
Ethyl Benzene	2300	15	1300	820	ND (0.13)	ND (0.063)	ND (0.00094)	0.107 (0.059)	5.87 (0.47)	ND (2.5)	14.6 (0.26)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.13)	ND (0.063)	ND (0.00094)	ND (0.059)	ND (0.47)	ND (2.5)	ND (0.26)
Toluene	8000	76	650	9800	0.0547 J (0.13)	0.0154 J (0.063)	ND (0.00094)	0.224 (0.059)	1640 (24)	ND (2.5)	197 (26)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.66)	ND (0.32)	0.00055 J (0.0047)	0.131 J (0.29)	3.46 (2.4)	ND (12)	4.62 (1.3)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.66)	ND (0.32)	ND (0.0047)	0.0385 J (0.29)	1.21 J (2.4)	ND (12)	2.08 (1.3)
Xylenes (total)	240	1.5	51	340	0.0965 J (0.13)	ND (0.063)	0.00044 J (0.00094)	0.612 (0.059)	22.6 (0.47)	0.738 J (2.5)	68.5 (0.26)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	1.02 (0.049)	ND (0.038)	0.0343 J (0.035)	0.31 (0.038)	ND (0.033)	ND (0.035)	ND (0.073)
Benzo(a)anthracene	430	--	3200	--	0.276 (0.049)	0.0863 (0.038)	0.0569 (0.035)	0.699 (0.038)	0.021 J (0.033)	0.0226 J (0.035)	0.0707 J (0.073)
Benzo(a)pyrene	43	--	7.7	--	0.246 (0.049)	0.063 (0.038)	0.0748 (0.035)	0.653 (0.038)	0.0179 J (0.033)	ND (0.035)	0.0491 J (0.073)
Benzo(b)fluoranthene	430	--	3200	--	0.376 (0.049)	0.103 (0.038)	0.0956 (0.035)	0.615 (0.038)	ND (0.033)	ND (0.035)	0.0556 J (0.073)
Benzo(g,h,i)perylene	4600	--	14000	--	0.304 (0.049)	0.0866 (0.038)	0.1 (0.035)	0.537 (0.038)	ND (0.033)	ND (0.035)	0.0291 J (0.073)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.4 (0.049)	0.0989 (0.038)	0.0876 (0.035)	0.872 (0.038)	0.0197 J (0.033)	0.0298 J (0.035)	0.0845 (0.073)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	5.64 (0.25)	ND (0.038)	0.0227 J (0.035)	0.177 (0.038)	ND (0.033)	ND (0.035)	0.034 J (0.073)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.66)	ND (0.32)	ND (0.0047)	0.197 J (0.29)	0.479 J (2.4)	ND (12)	0.304 J (1.3)
Phenanthrene	4600	--	14000	--	10.4 (0.25)	0.0288 J (0.038)	0.055 (0.035)	0.751 (0.038)	0.0626 (0.033)	0.0208 J (0.035)	0.115 (0.073)
Pyrene	4600	--	14000	--	1.05 (0.049)	0.0825 (0.038)	0.103 (0.035)	1.24 (0.038)	0.0317 J (0.033)	0.0363 (0.035)	0.123 (0.073)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	283 (3.2)	161 (2.4)	49.1 (4.3)	34.7 (2.4)	5.5 (2.3)	11.4 (2.2)	8.7 (2.3)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-127 BH-12-127_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-128 BH-12-128_3-3.5' 3 - 3.5 12/4/2012	AOI6 BH-12-129 BH-12-129_1.5-2' 1.5 - 2 12/4/2012	AOI6 BH-12-129 BH-12-129_2.5-3' 2.5 - 3 12/4/2012	AOI6 BH-12-130 BH-12-130_1-2' 1 - 2 12/4/2012	AOI6 BH-12-147 BH-12-147_1-1.5' 1 - 1.5 12/5/2012	AOI6 BH-12-148 BH-12-148_0-1' 0 - 1 12/5/2012
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	149 (2.5)	535 (13)	91.6 (4.8)	1850 (54)	0.337 J (0.5)	ND (0.0089)	ND (0.0011)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	374 (13)	919 (63)	311 (24)	6600 (270)	32.9 (2.5)	ND (0.0044)	ND (0.0053)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.05)	ND (0.05)	ND (0.048)	ND (0.27)	ND (0.5)	ND (0.0089)	ND (0.0011)
Ethyl Benzene	2300	15	1300	820	18.7 (2.5)	57.8 (1.3)	0.837 (0.048)	12.6 (0.27)	ND (0.5)	ND (0.0089)	ND (0.0011)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.05)	ND (0.05)	ND (0.048)	ND (0.27)	ND (0.5)	ND (0.0089)	ND (0.0011)
Toluene	8000	76	650	9800	339 (2.5)	1050 (13)	116 (4.8)	2070 (54)	0.175 J (0.5)	ND (0.0089)	ND (0.0011)
1,2,4-Trimethylbenzene	180	0.92	70	250	3.04 (0.25)	6.32 (0.25)	0.705 (0.24)	9.43 (1.4)	ND (2.5)	ND (0.0044)	ND (0.0053)
1,3,5-Trimethylbenzene	220	0.92	99	240	1.41 (0.25)	2.92 (0.25)	0.257 (0.24)	3.38 (1.4)	ND (2.5)	ND (0.0044)	ND (0.0053)
Xylenes (total)	240	1.5	51	340	83.6 (2.5)	248 (1.3)	3.69 (0.048)	51.6 (0.27)	ND (0.5)	ND (0.0089)	ND (0.0011)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.032)	ND (0.035)	ND (0.033)	ND (0.07)	3.58 (0.73)	0.0166 J (0.034)	0.155 (0.041)
Benzo(a)anthracene	430	--	3200	--	0.0184 J (0.032)	ND (0.035)	0.0699 (0.033)	0.177 (0.07)	3.52 (0.036)	0.0519 (0.034)	0.328 (0.041)
Benzo(a)pyrene	43	--	7.7	--	0.0138 J (0.032)	ND (0.035)	0.0627 (0.033)	0.121 (0.07)	6.52 (0.73)	0.065 (0.034)	0.327 (0.041)
Benzo(b)fluoranthene	430	--	3200	--	ND (0.032)	ND (0.035)	0.0687 (0.033)	0.126 (0.07)	11.3 (0.73)	0.0787 (0.034)	0.334 (0.041)
Benzo(g,h,i)perylene	4600	--	14000	--	ND (0.032)	ND (0.035)	0.0498 (0.033)	0.0832 (0.07)	4.33 (0.73)	0.0542 (0.034)	0.205 (0.041)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.0164 J (0.032)	ND (0.035)	0.0711 (0.033)	0.243 (0.07)	9.88 (0.73)	0.0608 (0.034)	0.307 (0.041)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.032)	ND (0.035)	ND (0.033)	0.182 (0.07)	34.6 (0.73)	ND (0.034)	0.0308 J (0.041)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.103 J (0.25)	0.154 J (0.25)	0.0543 J (0.24)	0.898 J (1.4)	ND (2.5)	ND (0.034)	ND (0.041)
Phenanthrene	4600	--	14000	--	0.0161 J (0.032)	ND (0.035)	0.0395 (0.033)	0.437 (0.07)	10 (0.73)	0.0321 J (0.034)	0.425 (0.041)
Pyrene	4600	--	14000	--	0.0207 J (0.032)	ND (0.035)	0.121 (0.033)	0.406 (0.07)	12.1 (0.73)	0.0774 (0.034)	0.469 (0.041)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	13.8 (2.3)	6.5 (2.4)	48 (2.1)	107 (2.2)	84.4 (2.2)	286 (2.3)	745 (2.3)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

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- 5 Underlined concentrations exceed the Routine Worker Soil VI.
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- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

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J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6 BH-12-149 BH-12-149_1-1.5' 1 - 1.5 12/4/2012	AOI6 BH-12-149 BH-12-149_2.5-3' 2.5 - 3 12/4/2012	AOI6_B003 I6_B003_PFAS_0-1_20220624 0 - 1 6/24/2022	AOI6_B012 I6_B012_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B014 I6_B014_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B019 I6_B019_PFAS_0-1_20220628 0 - 1 6/28/2022	AOI6_B028 I6_B028_PFAS_0-1_20220628 0 - 1 6/28/2022
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.0506 J (0.07)	517 (2.8)	NA	NA	NA	NA	NA
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.147 J (0.35)	74.7 (7)	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	0.0223 J (0.07)	21.2 (1.4)	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.07)	ND (1.4)	NA	NA	NA	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.037)	ND (0.036)	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	0.0518 (0.037)	0.403 (0.036)	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.0576 (0.037)	0.452 (0.036)	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	0.067 (0.037)	0.708 (0.036)	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.0459 (0.037)	0.458 (0.036)	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.064 (0.037)	0.493 (0.036)	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.037)	ND (0.036)	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.35)	ND (7)	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	0.0283 J (0.037)	0.154 (0.036)	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	0.0804 (0.037)	0.601 (0.036)	NA	NA	NA	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	ND (0.00056)	0.0029 (0.00056)	ND (0.0032)	0.00076 (0.0006)	ND (0.00062)
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	ND (0.00056)	0.00085 (0.00056)	0.0137 (0.00064)	0.00088 (0.0006)	0.00033 (0.00062)
Perfluorooctanoic Acid	--	--	--	--	NA	NA	ND (0.00056)	0.00048 (0.00056)	0.0011 (0.00064)	ND (0.0006)	ND (0.00062)
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	27.9 (2.6)	127 (2.2)	NA	NA	NA	NA	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
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5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
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Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-001	AOI6-BH-16-004	AOI6-BH-16-004	AOI6-BH-16-004	AOI6-BH-16-005	AOI6-BH-16-006	AOI6-BH-16-006
					AOI6-BH-16-001-0-2-SOIL 1 - 1.5 4/12/2016	AOI6-BH-16-004-0-2-SOIL 0.75 - 1.75 4/21/2016	AOI6-BH-16-004-2-4-SOIL 1.75 - 2.3 4/21/2016	AOI6-BH16-DUP-SOIL-002 0.75 - 1.75 4/21/2016 FD	AOI6-BH-16-005-0-2-SOIL 0 - 0.5 4/12/2016	AOI6-BH-16-006-0-2-SOIL 1 - 1.5 4/22/2016	AOI6-BH-16-006-2-4-SOIL 1.5 - 2.25 4/22/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.002 J (0.006)	0.001 J (0.0005)	0.001 J (0.0005)	0.002 J (0.0005)	0.0004 J (0.004)	ND (0.028)	0.023 J (0.022)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)
Ethyl Benzene	2300	15	1300	820	ND (0.006)	ND (0.0009)	ND (0.0009)	0.001 J (0.001)	ND (0.004)	ND (0.055)	ND (0.044)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.006)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.004)	ND (0.028)	ND (0.022)
Toluene	8000	76	650	9800	0.003 J (0.006)	0.003 J (0.0009)	0.002 J (0.0009)	0.003 J (0.001)	ND (0.004)	0.088 J (0.055)	0.073 J (0.044)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.006)	0.0009 J (0.0009)	ND (0.0009)	0.002 J (0.001)	ND (0.004)	ND (0.055)	ND (0.044)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.006)	ND (0.0009)	ND (0.0009)	ND (0.001)	ND (0.004)	ND (0.055)	ND (0.044)
Xylenes (total)	240	1.5	51	340	0.001 J (0.006)	0.004 J (0.0009)	0.001 J (0.0009)	0.005 J (0.001)	ND (0.004)	0.063 J (0.055)	0.065 J (0.044)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.73 (0.1)	0.43 (0.008)	0.55 (0.007)	0.6 (0.008)	0.016 J (0.018)	0.7 (0.008)	0.43 (0.007)
Benzo(a)anthracene	430	--	3200	--	0.95 (0.1)	1.1 (0.008)	1.6 (0.007)	1.7 (0.008)	0.11 (0.018)	1.2 (0.008)	0.75 (0.007)
Benzo(a)pyrene	43	--	7.7	--	1.1 (0.1)	1.1 (0.008)	1.5 (0.007)	1.5 (0.008)	0.13 (0.018)	1.2 (0.008)	0.74 (0.007)
Benzo(b)fluoranthene	430	--	3200	--	1.5 (0.1)	1.3 (0.008)	1.7 (0.007)	1.9 (0.008)	0.18 (0.018)	1.3 (0.008)	1 (0.007)
Benzo(g,h,i)perylene	4600	--	14000	--	1.3 (0.1)	0.7 (0.008)	0.84 (0.007)	0.94 (0.008)	0.15 (0.018)	0.76 (0.008)	0.52 (0.007)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	1.1 (0.1)	1.1 (0.008)	1.5 (0.007)	1.7 (0.008)	0.12 (0.018)	1.3 (0.008)	0.82 (0.007)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.32 (0.1)	0.16 (0.008)	0.2 (0.007)	0.19 (0.008)	0.005 J (0.018)	0.36 (0.008)	0.27 (0.007)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>6.9 (0.1)</u>	<u>1.2 (0.008)</u>	<u>1.1 (0.007)</u>	<u>1.3 (0.008)</u>	0.025 (0.018)	<u>1.6 (0.008)</u>	<u>1.6 (0.007)</u>
Phenanthrene	4600	--	14000	--	2 (0.1)	1.1 (0.008)	1.2 (0.007)	1.7 (0.008)	0.053 (0.018)	1.5 (0.008)	1.1 (0.007)
Pyrene	4600	--	14000	--	1.6 (0.1)	1.3 (0.008)	1.9 (0.007)	2.3 (0.008)	0.15 (0.018)	2 (0.008)	1.2 (0.007)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	288 (1.24)	399 (0.411)	189 (0.398)	529 (0.452)	68.7 (1.05)	142 (0.51)	225 (0.435)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
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Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-010	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-015	AOI6-BH-16-016	AOI6-BH-16-016	
					AOI6-BH-16-010-0-2-SOIL 0.5 - 0.9 4/11/2016	AOI6-BH-16-015-0-2-SOIL 1.5 - 2 4/5/2016	AOI6-BH-16-015-2-4-SOIL 2 - 2.1 4/5/2016	AOI6-BH-16-015-0-2-071116 1 - 1.4 7/11/2016	AOI6-BH-16-015-2-4-071116 2 - 2.2 7/11/2016	AOI6-BH-16-016-0-2-SOIL 1 - 1.5 4/4/2016	AOI6-BH-16-016-2-4-SOIL 2 - 2.5 4/4/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.011 (0.005)	0.053 J (0.33)	ND (0.27)	NA	NA	0.004 J (0.006)	ND (0.34)	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	ND (0.005)	0.77 (0.33)	0.23 J (0.27)	NA	NA	ND (0.006)	0.44 (0.34)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Ethyl Benzene	2300	15	1300	820	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Toluene	8000	76	650	9800	0.004 J (0.005)	0.13 J (0.33)	ND (0.27)	NA	NA	0.003 J (0.006)	0.19 J (0.34)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.005)	0.11 J (0.33)	ND (0.27)	NA	NA	ND (0.006)	0.14 J (0.34)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.005)	ND (0.33)	ND (0.27)	NA	NA	ND (0.006)	ND (0.34)	
Xylenes (total)	240	1.5	51	340	ND (0.005)	0.47 (0.33)	0.092 J (0.27)	NA	NA	ND (0.006)	0.16 J (0.34)	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	0.079 (0.021)	NA	NA	5.4 (2.1)	2.3 (0.24)	NA	NA	
Benzo(a)anthracene	430	--	3200	--	0.21 (0.021)	NA	NA	2 J (2.1)	1.2 (0.24)	NA	NA	
Benzo(a)pyrene	43	--	7.7	--	0.26 (0.021)	NA	NA	1.6 J (2.1)	1.2 (0.24)	NA	NA	
Benzo(b)fluoranthene	430	--	3200	--	0.41 (0.021)	NA	NA	2.9 (2.1)	1.2 (0.24)	NA	NA	
Benzo(g,h,i)perylene	4600	--	14000	--	0.23 (0.021)	NA	NA	2.2 (2.1)	1.6 (0.24)	NA	NA	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	0.28 (0.021)	NA	NA	5.8 (2.1)	2.4 (0.24)	NA	NA	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	0.012 J (0.021)	NA	NA	7.4 (2.1)	2.6 (0.24)	NA	NA	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	0.22 (0.021)	NA	NA	<u>2.8 (2.1)</u>	<u>6.3 (0.24)</u>	NA	NA	
Phenanthrene	4600	--	14000	--	0.23 (0.021)	NA	NA	16 (2.1)	7.2 (0.24)	NA	NA	
Pyrene	4600	--	14000	--	0.43 (0.021)	NA	NA	8.4 (2.1)	3.2 (0.24)	NA	NA	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	1460 (1.7)	671 (1.6)	134 (1.91)	NA	NA	313 (1.47)	256 (2.02)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
- 6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-016	AOI6-BH-16-016	AOI6-BH-16-025	AOI6-BH-16-025	AOI6-BH-16-025	AOI6-BH-16-026	AOI6-BH-16-027
					AOI6-BH-16-016-0-2-071116 1.5 - 2 7/11/2016	AOI6-BH-16-016-2-4-071116 2 - 2.25 7/11/2016	AOI6-BH-16-025-0-2-SOIL 1.5 - 1.9	AOI6-BH-16-025-2-4-SOIL 1.9 - 2.2 4/22/2016	AOI6-BH16-DUP-04-22-16-003 1.5 - 1.9 4/22/2016 FD	AOI6-BH-16-026-0-2-SOIL 0.4 - 1.3 4/22/2016	AOI6-BH-16-027-0-2-SOIL 1.75 - 2 4/13/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	NA	NA	<u>2.7 (0.022)</u>	1400 J (2.4)	<u>2.6 (0.021)</u>	<u>7.6 (0.022)</u>	ND (0.005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	NA	NA	2.9 (0.045)	2200 J (48)	2.6 (0.043)	1.8 (0.044)	ND (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	ND (0.045)	ND (4.8)	ND (0.043)	ND (0.044)	ND (0.005)
Ethyl Benzene	2300	15	1300	820	NA	NA	0.12 J (0.045)	<u>61 J (4.8)</u>	0.11 J (0.043)	0.082 J (0.044)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	ND (0.022)	ND (2.4)	ND (0.021)	ND (0.022)	ND (0.005)
Toluene	8000	76	650	9800	NA	NA	0.9 (0.045)	<u>640 J (4.8)</u>	0.75 (0.043)	ND (0.044)	ND (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	0.095 J (0.045)	<u>50 J (4.8)</u>	0.096 J (0.043)	ND (0.044)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	0.045 J (0.045)	<u>18 J (4.8)</u>	ND (0.043)	ND (0.044)	ND (0.005)
Xylenes (total)	240	1.5	51	340	NA	NA	0.53 (0.045)	340 J (4.8)	0.48 (0.043)	0.092 J (0.044)	ND (0.005)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	1.9 (0.24)	3.4 (0.25)	4.4 (0.018)	1.2 (0.004)	4.9 (0.018)	0.71 (0.015)	0.007 J (0.022)
Benzo(a)anthracene	430	--	3200	--	1.7 (0.24)	3.3 (0.25)	3.2 (0.018)	1.1 (0.004)	3.8 (0.018)	1.3 (0.015)	0.011 J (0.022)
Benzo(a)pyrene	43	--	7.7	--	1.7 (0.24)	3.3 (0.25)	2.3 (0.018)	0.69 (0.004)	2.7 (0.018)	1.3 (0.015)	0.01 J (0.022)
Benzo(b)fluoranthene	430	--	3200	--	2.3 (0.24)	3.6 (0.25)	2.8 (0.018)	1 (0.004)	3.2 (0.018)	0.89 (0.015)	0.016 J (0.022)
Benzo(g,h,i)perylene	4600	--	14000	--	1.6 (0.24)	3.5 (0.25)	0.93 (0.018)	0.33 (0.004)	1 (0.018)	0.72 (0.015)	0.009 J (0.022)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	2 (0.24)	3.7 (0.25)	2.8 (0.018)	0.97 (0.004)	3.2 (0.018)	2.2 (0.015)	0.021 J (0.022)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	5.1 (0.24)	6.3 (0.25)	4.2 (0.018)	0.85 (0.004)	4.4 (0.018)	0.51 (0.015)	0.009 J (0.022)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>9.3 (0.24)</u>	<u>18 (0.25)</u>	0.46 (0.018)	<u>2 (0.004)</u>	0.48 (0.018)	<u>1.1 (0.015)</u>	0.01 J (0.022)
Phenanthrene	4600	--	14000	--	9.6 (0.24)	17 (0.25)	13 (0.018)	4.1 (0.004)	14 (0.018)	1.9 (0.015)	0.02 J (0.022)
Pyrene	4600	--	14000	--	2.4 (0.24)	4.2 (0.25)	5.6 (0.018)	2.1 (0.004)	6.6 (0.018)	2.1 (0.015)	0.032 (0.022)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	NA	NA	10.3 (0.465)	64.3 (0.382)	10.2 (0.48)	61.8 (0.405)	20 (1.63)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-027	AOI6-BH-16-029	AOI6-BH-16-029	AOI6-BH-16-030	AOI6-BH-16-030	AOI6-BH-16-032	AOI6-BH-16-032
					AOI6-BH-16-027-2-4-SOIL 2.5 - 2.75 4/13/2016	AOI6-BH-16-029-0-2-SOIL 1.75 - 2 4/13/2016	AOI6-BH-16-029-2-4-SOIL 2.25 - 2.5 4/13/2016	AOI6-BH-16-030-0-2-SOIL 1.5 - 2 4/14/2016	AOI6-BH-16-030-2-4-SOIL 2.5 - 2.75 4/14/2016	AOI6-BH-16-032-0-2-SOIL 1 - 2 4/13/2016	AOI6-BH-16-032-2-4-SOIL 2 - 2.5 4/13/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	<u>2.5 J (5.3)</u>	<u>0.99 (0.25)</u>	<u>4.5 (0.28)</u>	<u>9.4 (4.4)</u>	130 (4.3)	0.12 J (0.22)	<u>3.7 (0.77)</u>
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	<u>360 (53)</u>	1.7 (0.25)	<u>10 (0.28)</u>	<u>18 (4.4)</u>	<u>710 (43)</u>	1.7 (0.22)	<u>110 (3.9)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (5.3)	ND (0.25)	ND (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	ND (0.77)
Ethyl Benzene	2300	15	1300	820	ND (5.3)	0.3 (0.25)	0.81 (0.28)	ND (4.4)	ND (4.3)	0.051 J (0.22)	3.6 (0.77)
Methyl tert-butyl ether	2400	16	390	5900	ND (5.3)	ND (0.25)	ND (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	ND (0.77)
Toluene	8000	76	650	9800	3.9 J (5.3)	0.37 (0.25)	1.2 (0.28)	ND (4.4)	20 (4.3)	0.091 J (0.22)	45 (0.77)
1,2,4-Trimethylbenzene	180	0.92	70	250	<u>10 (5.3)</u>	0.25 J (0.25)	<u>1 (0.28)</u>	ND (4.4)	ND (4.3)	ND (0.22)	0.7 J (0.77)
1,3,5-Trimethylbenzene	220	0.92	99	240	<u>9.3 (5.3)</u>	0.095 J (0.25)	0.48 (0.28)	ND (4.4)	ND (4.3)	ND (0.22)	0.37 J (0.77)
Xylenes (total)	240	1.5	51	340	<u>3.3 J (5.3)</u>	0.6 (0.25)	1.5 (0.28)	ND (4.4)	<u>2.9 J (4.3)</u>	0.13 J (0.22)	<u>17 (0.77)</u>
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	3.4 (0.1)	2.9 (0.095)	2.2 (0.095)	0.037 J (0.095)	0.16 (0.019)	0.008 J (0.018)	0.004 J (0.018)
Benzo(a)anthracene	430	--	3200	--	2.3 (0.1)	6.1 (0.095)	2.8 (0.095)	0.094 J (0.095)	0.079 (0.019)	0.032 (0.018)	0.014 J (0.018)
Benzo(a)pyrene	43	--	7.7	--	1.7 (0.1)	6.2 (0.095)	2.6 (0.095)	0.12 (0.095)	0.079 (0.019)	0.036 (0.018)	0.013 J (0.018)
Benzo(b)fluoranthene	430	--	3200	--	1.7 (0.1)	8.7 (0.095)	3.5 (0.095)	0.18 (0.095)	0.18 (0.019)	0.049 (0.018)	0.021 (0.018)
Benzo(g,h,i)perylene	4600	--	14000	--	1 (0.1)	4.5 (0.095)	1.7 (0.095)	0.13 (0.095)	0.073 (0.019)	0.032 (0.018)	0.016 J (0.018)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	4 (0.1)	6.1 (0.095)	3.3 (0.095)	0.098 (0.095)	0.094 (0.019)	0.038 (0.018)	0.018 J (0.018)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	6.3 (0.1)	3.2 (0.095)	8.4 (0.095)	ND (0.095)	0.034 (0.019)	ND (0.018)	0.008 J (0.018)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>7.8 (0.1)</u>	<u>3.1 (0.095)</u>	<u>4.8 (0.095)</u>	0.024 J (0.095)	<u>2.4 (0.019)</u>	ND (0.018)	0.029 (0.018)
Phenanthrene	4600	--	14000	--	13 (0.1)	11 (0.095)	10 (0.095)	0.054 J (0.095)	3.3 (0.019)	0.025 (0.018)	0.013 J (0.018)
Pyrene	4600	--	14000	--	6.2 (0.1)	11 (0.095)	5.8 (0.095)	0.13 (0.095)	0.14 (0.019)	0.057 (0.018)	0.025 (0.018)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	90.6 (1.43)	138 (1.15)	137 (1.26)	66 (1.18)	34.3 (1.35)	10.3 (1.12)	10.6 (1.35)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

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- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

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- NA - Not Analyzed
- J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-033	AOI6-BH-16-033	AOI6-BH-16-034	AOI6-BH-16-034	AOI6-BH-16-035	AOI6-BH-16-035	AOI6-BH-16-036	
					AOI6-BH-16-033-0-2-SOIL 1.5 - 2 4/13/2016	AOI6-BH-16-033-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-034-0-2-SOIL 1.5 - 1.75 4/13/2016	AOI6-BH-16-034-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-035-0-2-SOIL 1.5 - 2 4/13/2016	AOI6-BH-16-035-2-4-SOIL 2 - 2.25 4/13/2016	AOI6-BH-16-036-0-2-SOIL 1.25 - 1.75 4/14/2016	
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.003 J (0.004)	ND (0.21)	<u>44</u> (5)	<u>96</u> (4.7)	0.001 J (0.004)	0.002 J (0.004)	<u>0.55</u> J (4.5)	
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Cumene	1000	6.1	87	1000	0.019 (0.004)	0.13 J (0.21)	<u>230</u> (5)	<u>360</u> (4.7)	0.021 (0.004)	0.083 (0.004)	<u>59</u> (4.5)	
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Ethyl Benzene	2300	15	1300	820	ND (0.004)	ND (0.21)	ND (5)	1.2 J (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Methyl tert-butyl ether	2400	16	390	5900	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Toluene	8000	76	650	9800	ND (0.004)	ND (0.21)	38 (5)	<u>81</u> (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.004)	ND (0.21)	ND (5)	ND (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Xylenes (total)	240	1.5	51	340	ND (0.004)	ND (0.21)	<u>2.1</u> J (5)	<u>3.8</u> J (4.7)	ND (0.004)	ND (0.004)	ND (4.5)	
Semivolatile Organic Compounds												
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA	
Anthracene	46000	--	46000	--	0.03 J (0.092)	0.006 J (0.018)	0.027 (0.019)	ND (0.092)	ND (0.019)	0.004 J (0.019)	0.064 J (0.094)	
Benzo(a)anthracene	430	--	3200	--	0.12 (0.092)	0.026 (0.018)	0.09 (0.019)	0.05 J (0.092)	0.008 J (0.019)	0.015 J (0.019)	0.35 (0.094)	
Benzo(a)pyrene	43	--	7.7	--	0.13 (0.092)	0.028 (0.018)	0.092 (0.019)	0.039 J (0.092)	0.009 J (0.019)	0.02 (0.019)	0.3 (0.094)	
Benzo(b)fluoranthene	430	--	3200	--	0.18 (0.092)	0.032 (0.018)	0.13 (0.019)	0.084 J (0.092)	0.014 J (0.019)	0.022 (0.019)	0.57 (0.094)	
Benzo(g,h,i)perylene	4600	--	14000	--	0.13 (0.092)	0.029 (0.018)	0.083 (0.019)	0.042 J (0.092)	0.01 J (0.019)	0.024 (0.019)	0.27 (0.094)	
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA	
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Chrysene	43000	--	320000	--	0.14 (0.092)	0.032 (0.018)	0.11 (0.019)	0.095 (0.092)	0.01 J (0.019)	0.02 (0.019)	0.41 (0.094)	
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA	
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Fluorene	6200	--	18000	--	ND (0.092)	ND (0.018)	0.017 J (0.019)	0.033 J (0.092)	ND (0.019)	ND (0.019)	0.035 J (0.094)	
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Naphthalene	41	0.54	6	27	ND (0.092)	0.014 J (0.018)	0.07 (0.019)	0.16 (0.092)	ND (0.019)	ND (0.019)	0.099 (0.094)	
Phenanthrene	4600	--	14000	--	0.058 J (0.092)	0.011 J (0.018)	0.087 (0.019)	0.12 (0.092)	0.01 J (0.019)	0.014 J (0.019)	0.26 (0.094)	
Pyrene	4600	--	14000	--	0.19 (0.092)	0.042 (0.018)	0.16 (0.019)	0.12 (0.092)	0.015 J (0.019)	0.026 (0.019)	0.51 (0.094)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Metals												
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	
Lead	2240	--	2240	45000	12.8 (1.2)	9.85 (1.18)	14 (1.5)	15.3 (1.17)	10 (1.66)	10.9 (1.56)	60.8 (1.33)	
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA	
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA	
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-16-036	AOI6-BH-16-037	AOI6-BH-16-037	AOI6-BH-16-038	AOI6-BH-16-039	AOI6-BH-17-03	AOI6-BH-17-04
					AOI6-BH-16-036-2-4-SOIL 2 - 2.25 4/14/2016	AOI6-BH-16-037-0-2-SOIL 1 - 1.75 4/14/2016	AOI6-BH-16-037-2-4-SOIL 1.75 - 2.25 4/14/2016	AOI6-BH-16-038-0-2-SOIL 1.5 - 1.75 4/14/2016	AOI6-BH-16-039-0-2-SOIL 0.5 - 0.600000023841858 4/11/2016	AOI6-BH-17-03-0-2-SOIL 0 - 2 1/6/2017	AOI6-BH-17-04-0-2-SOIL 0 - 2 1/6/2017
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	0.7 J (4.2)	710 (94)	850 (97)	8.8 (4.8)	ND (0.005)	NA	NA
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	180 (4.2)	6500 (760)	8500 (970)	14 (4.8)	ND (0.005)	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Toluene	8000	76	650	9800	ND (4.2)	840 (94)	1200 (97)	ND (4.8)	ND (0.005)	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (4.2)	ND (94)	ND (97)	ND (4.8)	ND (0.005)	NA	NA
Xylenes (total)	240	1.5	51	340	ND (4.2)	26 J (94)	27 J (97)	ND (4.8)	ND (0.005)	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.036 (0.018)	0.068 J (0.1)	0.11 (0.02)	0.073 J (0.094)	0.005 J (0.023)	NA	NA
Benzo(a)anthracene	430	--	3200	--	0.086 (0.018)	0.11 (0.1)	0.05 (0.02)	0.19 (0.094)	0.019 J (0.023)	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.088 (0.018)	0.16 (0.1)	0.074 (0.02)	0.22 (0.094)	0.019 J (0.023)	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	0.12 (0.018)	0.24 (0.1)	0.11 (0.02)	0.33 (0.094)	0.033 (0.023)	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.083 (0.018)	0.19 (0.1)	0.07 (0.02)	0.2 (0.094)	0.015 J (0.023)	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.1 (0.018)	0.14 (0.1)	0.053 (0.02)	0.22 (0.094)	0.025 (0.023)	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.01 J (0.018)	0.049 J (0.1)	0.033 (0.02)	0.036 J (0.094)	ND (0.023)	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.018 J (0.018)	1.3 (0.1)	1.4 (0.02)	0.093 J (0.094)	0.006 J (0.023)	NA	NA
Phenanthrene	4600	--	14000	--	0.077 (0.018)	0.18 (0.1)	3.2 (0.02)	0.18 (0.094)	0.016 J (0.023)	NA	NA
Pyrene	4600	--	14000	--	0.16 (0.018)	0.22 (0.1)	0.084 (0.02)	0.28 (0.094)	0.033 (0.023)	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	18.9 (1.2)	100 (1.46)	105 (1.72)	33.1 (1.14)	7.22 (1.42)	899 (1.2)	7490 (17.7)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AOI6-BH-19-001 AOI6-BH-19-001-0-2' 0 - 2 4/15/2019	AOI6-BH-19-003 AOI6-BH-19-003-0-2' 0 - 2 4/17/2019	AOI6-BH-19-003 AOI6-BH-19-003-2-2.5' 2 - 2.5 4/17/2019	AOI6-BH-19-005 AOI6-BH-19-005-0-2 0 - 2 5/7/2019	AOI6-BH-19-005 AOI6-BH-19-005-2-2.5 2 - 2.5 5/7/2019	AST-250-SS-1 AST-250-SS-1 0 - 0.5 5/15/2007	AST-250-SS-2 AST-250-SS-2 0 - 0.5 5/15/2007
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	NA	<u>13.7 (0.0834)</u>	<u>18.1 (0.0237)</u>	<u>7.02 (0.00889)</u>	0.223 (0.00106)	ND,D (0.081)	ND,D (0.097)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	NA	ND,D (0.081)	ND,D (0.097)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	ND (0.35)	ND (0.35)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	NA	NA	NA	NA	0.052 J,D (0.081)	0.067 J,D (0.097)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	1490 (0.583)	NA	NA	NA	NA	940 (0.54)	30 (0.53)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

- Notes:**
- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
 - Only compounds with at least one detection are shown.
 - D is an unknown qualifier.
 - Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
 - Underlined concentrations exceed the Routine Worker Soil VI.
 - Italicized concentrations exceed the Construction Worker Soil Direct Contact.
 - Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
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J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	AST-250-SS-3	AST-250-SS-4	AST-250-SS-5	AST-250-SS-6	AST-250-SS-7	AST-250-SS-8	B-153
					AST-250-SS-3 0 - 0.5 5/15/2007	AST-250-SS-4 0 - 0.5 5/15/2007	AST-250-SS-5 0 - 0.5 5/15/2007	AST-250-SS-6 0 - 0.5 5/15/2007	AST-250-SS-7 0 - 0.5 5/15/2007	AST-250-SS-8 0 - 0.5 5/15/2007	BH-B153-030106-1.5-2 1.5 - 2 3/1/2006
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	ND,D (0.088)	0.12 D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
Ethyl Benzene	2300	15	1300	820	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	ND (0.42)
Toluene	8000	76	650	9800	ND,D (0.088)	ND,D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	0.098 D (0.088)	0.87 D (0.1)	ND,D (0.11)	ND,D (0.069)	ND,D (0.078)	ND,D (0.092)	ND (0.42)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.35)	0.62 (0.35)	ND (0.37)	ND (0.38)	ND (0.39)	ND (0.35)	4.2 (0.28)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.31 D (0.088)	<u>4.2 D (0.1)</u>	0.081 J,D (0.11)	0.065 J,D (0.069)	0.055 J,D (0.078)	0.075 J,D (0.092)	ND (0.28)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	ND (0.28)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	100 (0.54)	2.8 (0.54)	190 (0.56)	1500 (0.58)	140 (0.59)	13 (0.54)	66.3 (3.38)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
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Abbreviations:

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Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	B-170 B-170_2' 1.5 - 2 12/13/2012	B-171 AOI6-B-171-0-2-SOIL 1 - 2 4/6/2016	BH-13-06 BH-13-06-032206-1-1.5 1 - 1.5 3/22/2006	BH-14-06 BH-14-06-032306-0.5-1 0.5 - 1 3/23/2006	BH-26-06 BH-26-06-032406-0.5-1 0.5 - 1 3/24/2006	BH-27-06 BH-27-06-032306-1-1.5 1 - 1.5 3/23/2006	GP 797-HA-1 HA-1 (1-1.5) 1 - 1.5 8/29/2002
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.001)	0.001 J (0.004)	NA	NA	180 (18)	2.2 (0.18)	920 D (0.24)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	0.003 J (0.0052)	ND (0.004)	NA	NA	800 (18)	9.1 (0.18)	1600 D (0.24)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.001)	ND (0.004)	NA	NA	ND (0.18)	ND (0.18)	NA
Ethyl Benzene	2300	15	1300	820	ND (0.001)	ND (0.004)	NA	NA	2.7 (0.18)	1.6 (0.18)	80 J,D (0.24)
Methyl tert-butyl ether	2400	16	390	5900	0.00054 J (0.001)	ND (0.004)	NA	NA	ND (0.18)	ND (0.18)	ND (0.24)
Toluene	8000	76	650	9800	0.0004 J (0.001)	ND (0.004)	NA	NA	260 (18)	ND (0.18)	1800 D (0.24)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0052)	ND (0.004)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0052)	ND (0.004)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.001)	ND (0.004)	NA	NA	9.3 (0.18)	0.77 (0.18)	381 J (0.24)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	0.257 (0.036)	0.12 (0.09)	NA	NA	ND (0.18)	3.3 (1.9)	NA
Benzo(a)anthracene	430	--	3200	--	0.578 (0.036)	0.44 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(a)pyrene	43	--	7.7	--	0.659 (0.036)	0.45 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(b)fluoranthene	430	--	3200	--	0.617 (0.036)	0.54 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.466 (0.036)	0.29 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.589 (0.036)	0.42 (0.09)	NA	NA	ND (0.18)	ND (1.9)	NA
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	0.229 (0.036)	0.044 J (0.09)	NA	NA	ND (0.18)	16 (1.9)	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.114 (0.036)	0.23 (0.09)	NA	NA	ND (0.18)	12 (1.9)	0.65 (0.24)
Phenanthrene	4600	--	14000	--	0.379 (0.036)	0.22 (0.09)	NA	NA	0.21 (0.18)	36 (1.9)	NA
Pyrene	4600	--	14000	--	1.16 (0.036)	0.5 (0.09)	NA	NA	0.3 (0.18)	2 (1.9)	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	66.9 (2.3)	45.7 (1.13)	283 (3.15)	1040 (2.87)	32.6 (2.15)	167 (2.26)	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP 797-HA-2 HA-2 (1-1.5) 1 - 1.5 5/24/2002	GP 797-HA-3 HA-3 (1-1.5) 1 - 1.5 5/24/2002	GP 797-HA-3 HA-3 (2) 1.5 - 2 5/24/2002	GP 797-HA-4 HA-4 (1-1.5) 1 - 1.5 5/24/2002	GP U 677-1 GP U 677-1(1.5-2.0) 1.5 - 2 6/8/2011	GP U 677-2 GP U 677-2(0.8-1.3) 0.8 - 1.3 6/8/2011	GP U 677-3 GP U 677-3(1.5-2.0) 1.5 - 2 6/8/2011
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	<u>28 D (0.26)</u>	310 D (0.27)	170 D (0.25)	190 D (0.25)	0.06 J (0.035)	ND (0.0006)	ND (0.0005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	<u>17 D (0.26)</u>	<u>1000 D (0.27)</u>	<u>230 D (0.25)</u>	<u>950 D (0.25)</u>	0.7 (0.07)	ND (0.001)	ND (0.001)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	<u>0.13 J (0.07)</u>	ND (0.001)	ND (0.001)
Ethyl Benzene	2300	15	1300	820	0.85 (0.26)	<u>37 J,D (0.27)</u>	8.5 (0.25)	<u>55 D (0.25)</u>	0.11 J (0.07)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.26)	ND (0.27)	ND (0.25)	ND (0.25)	ND (0.035)	ND (0.0006)	ND (0.0005)
Toluene	8000	76	650	9800	11 D (0.26)	<u>920 D (0.27)</u>	<u>300 D (0.25)</u>	<u>660 D (0.25)</u>	0.12 J (0.07)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	0.097 J (0.07)	ND (0.001)	ND (0.001)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	ND (0.07)	ND (0.001)	ND (0.001)
Xylenes (total)	240	1.5	51	340	<u>5.9 J (0.26)</u>	<u>169 J (0.27)</u>	<u>36.7 J (0.25)</u>	<u>260 J (0.25)</u>	0.42 (0.07)	ND (0.001)	ND (0.001)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	NA	NA	NA	NA	0.78 (0.017)	0.037 J (0.017)	0.5 (0.017)
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	1 (0.0084)	0.11 (0.0085)	1.2 (0.0086)
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	1.2 (0.0084)	0.12 (0.0085)	1.2 (0.0086)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	0.8 (0.0067)	0.091 (0.0068)	0.85 (0.0069)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	1.7 (0.051)	0.19 J (0.051)	1.5 (0.051)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	2 (0.076)	0.16 (0.076)	1.6 (0.077)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	1.3 (0.084)	ND (0.085)	0.39 (0.086)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.26)	0.41 (0.27)	0.3 (0.25)	0.29 (0.25)	0.29 J (0.07)	ND (0.001)	ND (0.001)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	2.2 (0.051)	0.09 J (0.051)	1.6 (0.051)
Pyrene	4600	--	14000	--	NA	NA	NA	NA	1.5 (0.084)	0.24 J (0.085)	2.3 (0.086)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	NA	NA	NA	NA	453 (0.268)	67 (0.276)	451 (0.272)
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:
1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
6 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1

Historical Soil Sampling Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP U 677-4 GP U 677-4(0.3-0.8) 0.3 - 0.8 6/8/2011	GP U 677-5 GP U 677-5(0.8-1.3) 0.8 - 1.3 6/8/2011	GP676-1 GP676-1-(1.5')-20160428 1.5 4/28/2016	GP676-2 GP676-2-(1.5')-20160428 1.5 4/28/2016	GP676-3 GP676-3-(1.5')-20160428 1.5 4/28/2016	GP676-4 GP676-4-(1.5')-20160428 1.5 4/28/2016	GP676-5 GP676-5-(1.5')-20160428 1.5 4/28/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.0005)	ND (0.0005)	0.051 J (0.44)	ND (0.64)	ND (1.3)	ND (0.007)	ND (0.31)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (0.001)	ND (0.001)	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0005)	ND (0.0005)	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	ND (0.001)	0.001 J (0.001)	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.001)	0.056 (0.001)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.001)	0.046 (0.001)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.001)	0.005 (0.001)	NA	NA	NA	NA	NA
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	NA	NA	NA
Anthracene	46000	--	46000	--	ND (0.028)	0.99 (0.036)	0.5 (0.023)	8 (0.2)	0.42 (0.13)	1.2 (0.12)	0.67 (0.1)
Benzo(a)anthracene	430	--	3200	--	0.031 (0.0071)	ND (0.59)	0.93 (0.023)	9.3 (0.2)	0.81 (0.13)	2.9 (0.12)	1.9 (0.1)
Benzo(a)pyrene	43	--	7.7	--	0.05 (0.0071)	0.62 (0.018)	0.93 (0.023)	5.2 (0.2)	0.87 (0.13)	3.8 (0.12)	1.9 (0.1)
Benzo(b)fluoranthene	430	--	3200	--	0.053 (0.0057)	0.81 (0.014)	1.1 (0.023)	2.6 (0.2)	1.2 (0.13)	4.2 (0.12)	2.2 (0.1)
Benzo(g,h,i)perylene	4600	--	14000	--	0.13 J (0.043)	1.4 (0.11)	0.75 (0.023)	1.7 (0.2)	0.66 (0.13)	2.9 (0.12)	1.3 (0.1)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	NA	NA	NA
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	0.25 (0.064)	4.3 (0.16)	0.99 (0.023)	15 (0.2)	0.99 (0.13)	3 (0.12)	2 (0.1)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	ND (0.071)	2.5 (0.18)	0.24 (0.023)	9.8 (0.2)	0.39 (0.13)	0.46 (0.12)	0.27 (0.1)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.001)	0.16 (0.001)	0.37 J (0.44)	ND (0.64)	ND (1.3)	ND (0.007)	0.094 J (0.31)
Phenanthrene	4600	--	14000	--	0.095 J (0.043)	5.2 (0.11)	1.3 (0.023)	38 (0.2)	1 (0.13)	3.4 (0.12)	1.3 (0.1)
Pyrene	4600	--	14000	--	ND (0.37)	ND (17)	1.2 (0.023)	18 (0.2)	1 (0.13)	3.1 (0.12)	2 (0.1)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Lead	2240	--	2240	45000	47.8 (0.232)	18.5 (0.232)	NA	NA	NA	NA	NA
Nickel	6200	--	700	1700	NA	NA	NA	NA	NA	NA	NA
Vanadium	1600	--	350	2800	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	--	--	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.
- 3 D is an unknown qualifier.
- 4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 5 Underlined concentrations exceed the Routine Worker Soil VI.
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- 7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table D1
Historical Soil Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP676-6 GP676-6-(1.5')-20160428 1.5 4/28/2016	GP676-7 GP676-7-(1.5')-20160428 1.5 4/28/2016	GP676-8 GP676-8-(1.5')-20160428 1.5 4/28/2016	GP676-9 GP676-9-(1.5')-20160428 1.5 4/28/2016	GP768-1 GP768-1-(3')-20160428 3 4/28/2016	GP768-2 GP768-2-(3')-20160428 3 4/28/2016	GP768-3 GP768-3-(3')-20160428 3 4/28/2016
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.33)	ND (0.35)	ND (0.33)	ND (0.38)	0.0006 J (0.004)	0.0008 J (0.006)	0.001 J (0.005)
sec-Butylbenzene	--	--	--	--	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	ND (0.004)	0.004 J (0.006)	0.001 J (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	ND (0.00052)	ND (0.00052)	ND (0.00058)
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Toluene	8000	76	650	9800	NA	NA	NA	NA	ND (0.004)	ND (0.006)	0.001 J (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	ND (0.004)	ND (0.006)	ND (0.005)
Semivolatile Organic Compounds											
Acenaphthene	9300	--	9200	--	NA	NA	NA	NA	ND (0.018)	0.0056 J (0.019)	0.005 J (0.021)
Anthracene	46000	--	46000	--	0.29 (0.1)	1 J (1)	0.97 (0.11)	1.9 (1.1)	0.0059 J (0.018)	0.021 (0.019)	0.029 (0.021)
Benzo(a)anthracene	430	--	3200	--	0.68 (0.1)	0.83 J (1)	1.5 (0.11)	0.61 J (1.1)	0.024 (0.018)	0.073 (0.019)	0.058 (0.021)
Benzo(a)pyrene	43	--	7.7	--	0.56 (0.1)	1.5 (1)	0.86 (0.11)	0.59 J (1.1)	0.026 (0.018)	0.12 (0.019)	0.079 (0.021)
Benzo(b)fluoranthene	430	--	3200	--	0.4 (0.1)	0.61 J (1)	0.46 (0.11)	0.66 J (1.1)	0.037 (0.018)	0.14 (0.019)	0.15 (0.021)
Benzo(g,h,i)perylene	4600	--	14000	--	0.25 (0.1)	1.2 (1)	0.36 (0.11)	0.67 J (1.1)	0.024 (0.018)	0.11 (0.019)	0.12 (0.021)
Benzo(k)fluoranthene	4300	--	32000	--	NA	NA	NA	NA	0.019 (0.018)	0.056 (0.019)	0.037 (0.021)
1,1-Biphenyl	--	--	--	--	NA	NA	NA	NA	ND (0.034)	ND (0.037)	ND (0.04)
Chrysene	43000	--	320000	--	1.2 (0.1)	3.1 (1)	2.2 (0.11)	0.99 J (1.1)	0.026 (0.018)	0.084 (0.019)	0.067 (0.021)
Dibenz(a,h)anthracene	43	--	320	--	NA	NA	NA	NA	0.0087 J (0.018)	0.029 (0.019)	0.034 (0.021)
Fluoranthene	--	--	--	--	NA	NA	NA	NA	0.026 (0.018)	0.086 (0.019)	0.06 (0.021)
Fluorene	6200	--	18000	--	0.28 (0.1)	1 J (1)	0.85 (0.11)	3.1 (1.1)	ND (0.018)	0.0056 J (0.019)	0.0069 J (0.021)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	0.02 (0.018)	0.085 (0.019)	0.097 (0.021)
2-Methylnaphthalene	--	--	--	--	NA	NA	NA	NA	0.0049 J (0.018)	0.022 (0.019)	0.045 (0.021)
Naphthalene	41	0.54	6	27	0.14 J (0.33)	ND (0.35)	ND (0.33)	ND (0.38)	ND (0.004)	ND (0.006)	ND (0.005)
Phenanthrene	4600	--	14000	--	1.3 (0.1)	4 (1)	3.4 (0.11)	13 (1.1)	0.0095 J (0.018)	0.032 (0.019)	0.049 (0.021)
Pyrene	4600	--	14000	--	1.4 (0.1)	3.7 (1)	2.8 (0.11)	2.6 (1.1)	0.025 (0.018)	0.1 (0.019)	0.06 (0.021)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluorononanoic acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Cobalt	--	--	--	--	NA	NA	NA	NA	4.34 (0.38)	6.41 (0.375)	9.74 (0.449)
Lead	2240	--	2240	45000	NA	NA	NA	NA	18.6 (1.14)	86.3 (1.12)	91.7 (1.35)
Nickel	6200	--	700	1700	NA	NA	NA	NA	43.1 (0.76)	45.3 (0.749)	149 (0.898)
Vanadium	1600	--	350	2800	NA	NA	NA	NA	149 (0.38)	214 (0.375)	321 (0.449)
Zinc	--	--	--	--	NA	NA	NA	NA	62.5 (1.52)	134 (1.5)	157 (1.8)

Notes:
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3 D is an unknown qualifier.
4 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
5 Underlined concentrations exceed the Routine Worker Soil VI.
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7 Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D1

Historical Soil Sampling Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Routine Worker Soil Direct Contact	Routine Worker Soil VI	Construction Worker Soil Direct Contact	Soil Migration to GW	GP768-4	GP768-5	GP768-6
					GP768-4-(2')-20160428	GP768-5-(2')-20160428	GP768-6-(2')-20160428
					2	2	2
					4/28/2016	4/28/2016	4/28/2016
Volatile Organic Compounds							
Benzene	63	0.46	8.7	98	ND (2.9)	0.005 (0.005)	ND (0.005)
sec-Butylbenzene	--	--	--	--	1.8 J (2.9)	ND (0.005)	ND (0.005)
Cumene	1000	6.1	87	1000	<u>70 (2.9)</u>	ND (0.005)	ND (0.005)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00051)	ND (0.00057)	ND (0.00052)
Ethyl Benzene	2300	15	1300	820	0.72 J (2.9)	ND (0.005)	ND (0.005)
Methyl tert-butyl ether	2400	16	390	5900	ND (2.9)	ND (0.005)	ND (0.005)
Toluene	8000	76	650	9800	1.7 J (2.9)	ND (0.005)	ND (0.005)
1,2,4-Trimethylbenzene	180	0.92	70	250	<u>19 (2.9)</u>	ND (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	220	0.92	99	240	<u>15 (2.9)</u>	ND (0.005)	ND (0.005)
Xylenes (total)	240	1.5	51	340	<u>16 (2.9)</u>	ND (0.005)	ND (0.005)
Semivolatile Organic Compounds							
Acenaphthene	9300	--	9200	--	1.5 (0.089)	ND (0.02)	ND (0.018)
Anthracene	46000	--	46000	--	0.9 (0.089)	0.016 J (0.02)	ND (0.018)
Benzo(a)anthracene	430	--	3200	--	0.41 (0.089)	0.029 (0.02)	0.016 J (0.018)
Benzo(a)pyrene	43	--	7.7	--	0.33 (0.089)	0.05 (0.02)	0.021 (0.018)
Benzo(b)fluoranthene	430	--	3200	--	0.31 (0.089)	0.062 (0.02)	0.025 (0.018)
Benzo(g,h,i)perylene	4600	--	14000	--	0.21 (0.089)	0.059 (0.02)	0.02 (0.018)
Benzo(k)fluoranthene	4300	--	32000	--	0.083 J (0.089)	0.021 (0.02)	0.011 J (0.018)
1,1-Biphenyl	--	--	--	--	1 (0.17)	ND (0.038)	ND (0.036)
Chrysene	43000	--	320000	--	0.88 (0.089)	0.033 (0.02)	0.014 J (0.018)
Dibenz(a,h)anthracene	43	--	320	--	0.088 J (0.089)	0.013 J (0.02)	0.0074 J (0.018)
Fluoranthene	--	--	--	--	0.39 (0.089)	0.029 (0.02)	0.013 J (0.018)
Fluorene	6200	--	18000	--	2 (0.089)	0.0061 J (0.02)	ND (0.018)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	0.16 (0.089)	0.043 (0.02)	0.014 J (0.018)
2-Methylnaphthalene	--	--	--	--	13 (0.089)	0.018 J (0.02)	0.0046 J (0.018)
Naphthalene	41	0.54	6	27	<u>3.4 (2.9)</u>	ND (0.005)	ND (0.005)
Phenanthrene	4600	--	14000	--	4.3 (0.089)	0.02 (0.02)	0.006 J (0.018)
Pyrene	4600	--	14000	--	1.4 (0.089)	0.035 (0.02)	0.015 J (0.018)
Perfluoroalkyl and Polyfluoroalkyl Substances							
Perfluorononanoic acid	--	--	--	--	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	NA	NA	NA
Metals							
Cobalt	--	--	--	--	4.11 (0.414)	6.66 (0.495)	3.67 (0.397)
Lead	2240	--	2240	45000	39.5 (1.24)	27.8 (1.49)	10.8 (1.19)
Nickel	6200	--	700	1700	43.7 (0.828)	15.2 (0.991)	26.9 (0.793)
Vanadium	1600	--	350	2800	169 (0.414)	144 (0.495)	34.6 (0.397)
Zinc	--	--	--	--	307 (1.66)	60 (1.98)	25.2 (1.59)

Notes:

- All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- Only compounds with at least one detection are shown.
- D is an unknown qualifier.
- Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- Underlined concentrations exceed the Routine Worker Soil VI.
- Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- Grey shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-153 B153-060906 6/9/2006	B-153 B-153_010413 1/4/2013	B-153 GW-11109613-B153-05-04-16-RM-010 5/4/2016	B-165 B-165_010413 1/4/2013	B-165 B-165 6/3/2014
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.0005)
Cumene	37	9100	63	30	4	2.6	0.009 (0.005)	ND (0.002)	ND (0.0005)	0.003 (0.002)	0.0034 (0.001)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.00002)	ND (0.000095)	ND (0.00002)	ND (0.00002)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	0.00034 J (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.005)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	NA	ND (0.002)	ND (0.0005)	ND (0.002)	0.00023 J (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	NA	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.005)	0.0014 (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	NA	0.00019 (0.0001)	0.000099 (0.00001)	0.00079 (0.0001)	0.000416 (0.0001)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	NA	ND (0.0001)	0.000052 (0.00001)	0.000223 (0.0001)	0.000196 (0.0001)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	NA	ND (0.0001)	0.000038 J (0.00001)	ND (0.0001)	ND (0.0001)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	NA	ND (0.0001)	0.00004 J (0.00001)	ND (0.0001)	0.000124 (0.0001)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	NA	ND (0.0001)	0.000018 J (0.00001)	ND (0.0001)	ND (0.0001)
Chrysene	16	--	--	140000	--	1.3	ND (0.005)	ND (0.0001)	0.000058 (0.00001)	0.000148 (0.0001)	0.000134 (0.0001)
Fluorene	97	--	--	7800	--	7	ND (0.005)	0.000192 (0.0001)	0.000018 J (0.00001)	0.00203 (0.0001)	0.00167 (0.0001)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.005)	0.000466 (0.0001)	ND (0.00003)	0.00129 (0.0001)	ND (0.0001)
Phenanthrene	73	--	--	5800	--	1	ND (0.005)	ND (0.0001)	0.000043 J (0.00003)	0.000446 (0.0001)	0.000223 (0.0001)
Pyrene	50	--	--	5800	--	3	ND (0.005)	0.000213 (0.0001)	0.00027 (0.00001)	0.00165 (0.0001)	0.00114 (0.0001)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	NA	ND (0.003)	ND (0.00013)	ND (0.003)	0.0014 J (0.003)

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-165	B-165	B-165	B-165	B-165
							B-165_20150520	GW-11109613-B165-05-05-16-AC-015	B-165AOI6_20190627	B-165_20191104	B-165_20210505 2.549999952
							5/20/2015	5/5/2016	6/27/2019	11/4/2019	5/5/2021
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	0.004 (0.0005)	0.013 (0.001)	ND (0.001)	0.007 (0.001)
Cumene	37	9100	63	30	4	2.6	0.006 (0.002)	0.005 (0.0005)	0.0007 J (0.005)	0.006 (0.005)	0.00028 J (0.0005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000096)	ND (0.000028)	ND (0.000028)	ND (0.000029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.0005)	ND (0.005)	ND (0.005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.0005)	ND (0.001)	0.0008 J (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	0.0006 J (0.001)	0.002 (0.0005)	0.0002 J (0.001)	0.0003 J (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	ND (0.05)
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	0.0005 J (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	ND (0.0005)	ND (0.005)	0.075 (0.005)	0.0044 J (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.0005)	ND (0.005)	0.016 (0.005)	0.0024 J (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.0005)	ND (0.005)	0.017 (0.003)	ND (0.006)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0006 (0.0005)	0.00048 (0.00001)	0.0005 (0.0005)	0.0003 J (0.0005)	ND (0.00055)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0002 J (0.0005)	0.00017 (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.0005)	0.000039 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0001 J (0.0005)	0.00005 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.0005)	0.000025 J (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Chrysene	16	--	--	140000	--	1.3	0.0002 J (0.0005)	0.00013 (0.00001)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Fluorene	97	--	--	7800	--	7	0.002 (0.0005)	0.0014 (0.00001)	0.002 (0.0005)	0.002 (0.0005)	ND (0.00055)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.0005)	ND (0.000031)	ND (0.0005)	0.011 (0.0005)	ND (0.00055)
Phenanthrene	73	--	--	5800	--	1	0.0001 J (0.0005)	0.00037 (0.000031)	ND (0.0005)	0.001 (0.0005)	ND (0.00055)
Pyrene	50	--	--	5800	--	3	0.002 (0.0005)	0.0012 (0.00001)	0.001 (0.0005)	0.0006 (0.0005)	0.00022 J (0.00055)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	0.00011 J (0.001)	0.001 (0.00013)	ND (0.003)	0.00053 (0.0005)	0.000073 J (0.00052)

- Notes:**
- 1 All concentrations reported in mg/L; detection limits in parentheses.
 - 2 Only compounds with at least one detection are shown.
 - 3 Boldfaced concentrations exceed the Nonpotable GW Use.
 - 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
 - 5 Underlined concentrations exceed the Routine Worker GW VI.
 - 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
 - 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
 - 8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location								B-165	B-165	B-168	B-168	B-169
Field Sample ID	Nonpotable	Routine	Routine	Construction	Off-Site	GW	B-165_20220110	B-165_20220412	B-168_010413	GW-11109613-B168-05-04-16-AC-009	B-169_010413	
Collection Depth (ft bgs)	GW Use	Worker GW	Worker GW	Worker GW	Resident GW	Migration to	12	2.799999952				
Sample Date		Vol to	VI	Direct	VI	SW	1/10/2022	4/12/2022	1/4/2013	5/4/2016	1/4/2013	
Comments		Outdoor Air		Contact								
Physical Parameters												
pH [SU]	--	--	--	--	--	--	6.51	NA	NA	NA	NA	
Volatile Organic Compounds												
Benzene	0.3	550	3.8	4	0.25	130	NA	ND (0.0005)	ND (0.001)	ND (0.0005)	0.0052 (0.001)	
Cumene	37	9100	63	30	4	2.6	NA	0.0033 (0.001)	0.0038 (0.002)	0.002 J (0.0005)	0.0083 (0.002)	
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	NA	ND (0.00002)	ND (0.00002)	ND (0.000094)	ND (0.00002)	
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	NA	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	
Ethyl Benzene	2	22000	150	40	9.7	13	NA	ND (0.001)	ND (0.001)	ND (0.0005)	0.0018 (0.001)	
Methyl tert-butyl ether	21	29000	210	190	42	11000	NA	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	
tert Butyl alcohol	--	--	--	--	--	--	NA	ND (0.01)	NA	NA	NA	
Toluene	25	100000	700	200	45	52	NA	ND (0.001)	ND (0.001)	ND (0.0005)	0.002 (0.001)	
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	NA	ND (0.002)	ND (0.002)	ND (0.0005)	0.0047 (0.002)	
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	NA	ND (0.002)	ND (0.002)	ND (0.0005)	ND (0.002)	
Xylenes (total)	3.7	1900	13	17	0.86	210	NA	ND (0.001)	0.002 (0.001)	0.0005 J (0.0005)	0.0063 (0.001)	
Semivolatile Organic Compounds												
Anthracene	240	--	--	19000	--	40	NA	0.0000856 (0.00008)	0.000503 (0.0001)	0.00052 (0.00001)	0.000377 (0.0001)	
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	NA	0.000247 (0.00004)	0.000254 (0.0001)	0.000066 (0.00001)	0.000197 (0.0001)	
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	NA	0.000254 (0.00004)	ND (0.0001)	0.000037 J (0.00001)	ND (0.0001)	
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	NA	0.00037 (0.00004)	ND (0.0001)	0.000038 J (0.00001)	ND (0.0001)	
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	NA	0.000254 (0.00008)	ND (0.0001)	0.000016 J (0.00001)	ND (0.0001)	
Chrysene	16	--	--	140000	--	1.3	NA	0.000313 (0.00008)	0.00019 (0.0001)	0.000063 (0.00001)	0.000131 (0.0001)	
Fluorene	97	--	--	7800	--	7	NA	0.0000534 J (0.00008)	0.00309 (0.0001)	0.0021 (0.00001)	0.00198 (0.0001)	
Naphthalene	0.39	120	0.88	0.28	0.067	43	NA	0.0000865 (0.00008)	0.00138 (0.0001)	ND (0.00003)	0.0417 (0.0001)	
Phenanthrene	73	--	--	5800	--	1	NA	0.000273 (0.00008)	0.000172 (0.0001)	0.00092 (0.00003)	0.00144 (0.0001)	
Pyrene	50	--	--	5800	--	3	NA	0.000481 (0.00008)	0.00107 (0.0001)	0.00041 (0.00001)	0.000646 (0.0001)	
Perfluoroalkyl and Polyfluoroalkyl Substances												
Perfluoroheptanoic acid	--	--	--	--	--	--	0.000019 (0.0000017)	NA	NA	NA	NA	
Perfluorononanoic acid	--	--	--	--	--	--	0.0000045 (0.0000017)	NA	NA	NA	NA	
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	0.0000017 (0.0000017)	NA	NA	NA	NA	
Perfluorooctanoic Acid	--	--	--	--	--	--	0.000012 (0.0000017)	NA	NA	NA	NA	
Metals												
Lead (Dissolved)	--	--	--	--	--	2.5	NA	0.0023 (0.001)	ND (0.003)	ND (0.00013)	ND (0.003)	

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-169		B-169		B-169		B-169	
							B-169_010913	GW-11109613-B169-05-09-16-MM-024	B-169_010913	GW-11109613-B-169-082216-KC-001	B-169_010913	GW-11109613-B-169-082216-KC-001	B-169_20190710	B-169_20191104
							1/9/2013	5/9/2016	8/22/2016	7/10/2019	11/4/2019			
Physical Parameters														
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds														
Benzene	0.3	550	3.8	4	0.25	130	0.0064 (0.001)	0.0007 J (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.00002)	ND (0.000097)	ND (0.000028)	ND (0.000029)	ND (0.000028)	ND (0.000029)	ND (0.000028)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.0005)	ND (0.002)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.003)
Semivolatile Organic Compounds														
Anthracene	240	--	--	19000	--	40	0.000217 (0.0001)	0.000084 (0.00001)	ND (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.000187 (0.0001)	0.00017 (0.00001)	0.000013 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.000223 (0.0001)	0.00017 (0.00001)	0.000015 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.000222 (0.0001)	0.00019 (0.00001)	0.00002 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.000173 (0.0001)	0.00012 (0.00001)	0.000016 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Chrysene	16	--	--	140000	--	1.3	0.000268 (0.0001)	0.00017 (0.00001)	0.000017 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Fluorene	97	--	--	7800	--	7	0.000527 (0.0001)	0.000043 J (0.00001)	ND (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.000165 (0.0001)	0.000071 (0.00003)	ND (0.000069)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Phenanthrene	73	--	--	5800	--	1	0.000296 (0.0001)	0.000069 (0.00003)	ND (0.000069)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Pyrene	50	--	--	5800	--	3	0.000587 (0.0001)	0.00027 (0.00001)	0.000035 J (0.000057)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
Perfluoroalkyl and Polyfluoroalkyl Substances														
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.003)	0.0338 (0.00013)	0.0065 (0.001)	ND (0.003)	0.0017 (0.0005)	ND (0.003)	0.0017 (0.0005)	0.0017 (0.0005)

- Notes:**
- 1 All concentrations reported in mg/L; detection limits in parentheses.
 - 2 Only compounds with at least one detection are shown.
 - 3 Boldfaced concentrations exceed the Nonpotable GW Use.
 - 4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
 - 5 Underlined concentrations exceed the Routine Worker GW VI.
 - 6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
 - 7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
 - 8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	B-169		B-169		B-170		B-170		B-170		
Field Sample ID	B-169_20210429	B-169_20220412	GW-11109613-B170-05-05-16-AC-017	GW-11109613-DUP2-05-05-16-AC-019	GW-11109613-B-170-082216-KC-003						
Collection Depth (ft bgs)	1.46000038	1.5									
Sample Date	4/29/2021	4/12/2022									
Comments											
Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW						
Physical Parameters											
pH [SU]	--	--	--	--	--	NA	NA	NA	NA	NA	
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.0005)	0.005 (0.0005)	0.005 (0.0005)	0.003 (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.005)	ND (0.001)	0.006 (0.0005)	0.005 (0.0005)	0.005 (0.002)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.00002)	ND (0.000095)	ND (0.000096)	ND (0.000029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	ND (0.05)	ND (0.01)	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.0005)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	ND (0.002)	ND (0.0005)	ND (0.0005)	ND (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.002)	ND (0.0005)	ND (0.0005)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.006)	ND (0.001)	0.002 (0.0005)	0.001 (0.0005)	0.0007 J (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	ND (0.00055)	0.000089 (0.000077)	0.00036 (0.00001)	0.00037 (0.00001)	0.00026 (0.000057)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.00055)	0.0000391 (0.000038)	0.0001 (0.00001)	0.0001 (0.00001)	0.000065 (0.000057)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00055)	0.0000483 (0.000038)	0.00011 (0.00001)	0.00009 (0.00001)	0.000043 J (0.000057)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.00055)	0.000046 (0.000038)	0.00012 (0.00001)	0.000088 (0.00001)	0.000044 J (0.000057)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00055)	ND (0.000077)	0.000047 J (0.00001)	0.000043 J (0.00001)	0.00002 J (0.000057)
Chrysene	16	--	--	140000	--	1.3	ND (0.00055)	0.0000561 J (0.000077)	0.00011 (0.00001)	0.00011 (0.00001)	0.000069 (0.000057)
Fluorene	97	--	--	7800	--	7	ND (0.00055)	0.00019 (0.000077)	0.0025 (0.00001)	0.0023 (0.00001)	0.00061 (0.000057)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.00055)	0.0000644 J (0.000077)	0.0023 (0.000031)	0.0048 (0.000031)	ND (0.000068)
Phenanthrene	73	--	--	5800	--	1	ND (0.00055)	0.000431 (0.000077)	0.0013 (0.000031)	0.0018 (0.000031)	0.00099 (0.000068)
Pyrene	50	--	--	5800	--	3	ND (0.00055)	0.0000844 (0.000077)	0.00035 (0.00001)	0.00034 (0.00001)	0.00031 (0.000057)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	0.0016 (0.00052)	ND (0.001)	ND (0.00013)	ND (0.00013)	ND (0.001)

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-170 B-170_20190710 7/10/2019	B-170 B-170_20191104 11/4/2019	B-170 B-170_20210429 1.25999999 4/29/2021	B-170 B-170_20220412 1.129999995 4/12/2022	B-176 B-176-20200220-WG 2/20/2020
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	0.002 (0.001)	0.001 (0.001)	0.00089 J (0.001)	0.0013 (0.0005)	0.141 (0.001)
Cumene	37	9100	63	30	4	2.6	0.006 (0.005)	0.005 J (0.005)	0.0061 (0.005)	0.01 (0.001)	0.0007 J (0.001)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000028)	ND (0.000028)	ND (0.000029)	ND (0.00002)	ND (0.000041)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	0.0003 J (0.001)	0.0002 J (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.001)	0.0085 (0.001)	0.0014 (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	ND (0.05)	ND (0.01)	0.641 (0.005)
Toluene	25	100000	700	200	45	52	0.0004 J (0.001)	0.0004 J (0.001)	0.00039 J (0.001)	0.00068 J (0.001)	0.00072 J (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	0.001 J (0.005)	ND (0.005)	ND (0.002)	ND (0.001)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.001)
Xylenes (total)	3.7	1900	13	17	0.86	210	0.001 J (0.005)	0.001 J (0.003)	ND (0.006)	0.0023 (0.001)	ND (0.003)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0004 J (0.0005)	0.0003 J (0.0006)	0.00034 J (0.00056)	0.000289 (0.000074)	NA
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000509 (0.000037)	NA
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000415 (0.000037)	NA
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.000042 (0.000037)	NA
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000375 J (0.000074)	NA
Chrysene	16	--	--	140000	--	1.3	ND (0.0005)	ND (0.0006)	ND (0.00056)	0.0000412 J (0.000074)	NA
Fluorene	97	--	--	7800	--	7	0.004 (0.0005)	0.002 (0.0006)	0.0022 (0.00056)	0.00162 (0.000074)	NA
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.049 (0.0005)	0.015 (0.0006)	0.029 (0.00056)	0.0024 (0.00074)	NA
Phenanthrene	73	--	--	5800	--	1	0.004 (0.0005)	0.002 (0.0006)	0.0011 (0.00056)	0.000139 (0.000074)	NA
Pyrene	50	--	--	5800	--	3	0.0002 J (0.0005)	ND (0.0006)	ND (0.00056)	0.000127 (0.000074)	NA
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.003)	0.000092 J (0.0005)	ND (0.00052)	ND (0.001)	NA

- Notes:**
- All concentrations reported in mg/L; detection limits in parentheses.
 - Only compounds with at least one detection are shown.
 - Boldfaced concentrations exceed the Nonpotable GW Use.
 - No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
 - Underlined concentrations exceed the Routine Worker GW VI.
 - Italicized concentrations exceed the Construction Worker GW Direct Contact.
 - Grey shaded concentrations exceed the Off-Site Resident GW VI.
 - No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-176	B-176	B-176	B-43	B-43
							B-176_20200910	B-176_20201215	B-176_20220518 14.14000034	B-43-20160523	GW-11109613-B-43-082216-KC-005
							9/10/2020	12/15/2020	5/18/2022	5/23/2016	8/22/2016
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.001)	ND (0.0005)	ND (0.001)	ND (0.001)
Cumene	37	9100	63	30	4	2.6	ND (0.005)	ND (0.005)	ND (0.001)	0.004 (0.002)	0.006 (0.002)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000029)	ND (0.00002)	ND (0.000029)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	0.0016 (0.001)	0.0014 (0.001)	0.0016 (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	0.67 (0.05)	0.56 (0.05)	0.734 (0.01)	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.002)	ND (0.002)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.002)	ND (0.002)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.006)	ND (0.006)	ND (0.001)	ND (0.001)	0.0006 J (0.001)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.00036 J (0.00051)	0.00011 J,B (0.0005)	ND (0.00008)	0.0007 (0.0005)	0.00022 (0.000053)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.00072 (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00089 (0.000053)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00066 J (0.000053)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0005 J (0.00051)	ND (0.0005)	ND (0.00004)	0.002 (0.0005)	0.00075 J (0.000053)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00051)	ND (0.0005)	ND (0.00008)	0.001 (0.0005)	0.00032 J (0.000053)
Chrysene	16	--	--	140000	--	1.3	0.00024 J (0.00051)	ND (0.0005)	ND (0.00008)	0.003 (0.0005)	0.001 (0.000053)
Fluorene	97	--	--	7800	--	7	0.00065 (0.00051)	0.00023 J (0.0005)	ND (0.00008)	0.0009 (0.0005)	0.00034 (0.000053)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.00034 J (0.00051)	ND (0.0005)	0.0000613 J (0.00008)	ND (0.0005)	ND (0.000063)
Phenanthrene	73	--	--	5800	--	1	0.00064 (0.00051)	0.00011 J,B (0.0005)	ND (0.00008)	ND (0.0005)	0.00024 (0.000063)
Pyrene	50	--	--	5800	--	3	0.00099 (0.00051)	0.0001 J,B (0.0005)	ND (0.00008)	0.007 (0.0005)	0.0029 (0.000053)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.00052)	0.00018 J (0.00052)	ND (0.001)	ND (0.001)	0.0028 (0.001)

Notes:

- All concentrations reported in mg/L; detection limits in parentheses.
- Only compounds with at least one detection are shown.
- Boldfaced concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Underlined concentrations exceed the Routine Worker GW VI.
- Italicized concentrations exceed the Construction Worker GW Direct Contact.
- Grey shaded concentrations exceed the Off-Site Resident GW VI.
- No concentrations exceed the GW Migration to SW.

Abbreviations:

ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-43	B-43	B-43	B-43	B-43
							B-43-20170522	B-43_20180627	B-43_20190627	B-43_20191101	B-43_20210504 2.769999981 5/4/2021
							5/22/2017	6/27/2018	6/27/2019	11/1/2019	
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	ND (0.001)	0.008 (0.001)	ND (0.001)	0.00031 J (0.001)
Cumene	37	9100	63	30	4	2.6	0.007 (0.002)	0.00235 (0.001)	0.003 J (0.005)	0.006 (0.005)	0.0064 (0.005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.00001)	ND (0.000028)	ND (0.000028)	ND (0.000029)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.001)	ND (0.001)	0.001 J (0.001)	ND (0.001)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	ND (0.05)
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.001)	0.0005 J (0.001)	ND (0.001)	ND (0.001)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.0008 J (0.002)	ND (0.001)	ND (0.005)	0.0008 J (0.005)	ND (0.005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.005)
Xylenes (total)	3.7	1900	13	17	0.86	210	0.002 (0.001)	ND (0.003)	ND (0.005)	0.002 J (0.003)	ND (0.006)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0004 J (0.0005)	ND (0.00005)	ND (0.0005)	0.0007 (0.0005)	ND (0.00055)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0004 J (0.0005)	0.000327 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0003 J (0.0005)	0.000253 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0003 J (0.0005)	0.000311 (0.00005)	ND (0.0005)	0.0001 J (0.0005)	ND (0.00055)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.0001 J (0.0005)	0.00016 (0.00005)	ND (0.0005)	ND (0.0005)	ND (0.00055)
Chrysene	16	--	--	140000	--	1.3	0.0003 J (0.0005)	0.000326 (0.00005)	ND (0.0005)	0.0002 J (0.0005)	ND (0.00055)
Fluorene	97	--	--	7800	--	7	0.0003 J (0.0005)	ND (0.00005)	ND (0.0005)	0.0009 (0.0005)	ND (0.00055)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.001 (0.0005)	ND (0.00025)	ND (0.0005)	0.01 (0.0005)	ND (0.00055)
Phenanthrene	73	--	--	5800	--	1	0.001 (0.0005)	ND (0.00005)	ND (0.0005)	0.002 (0.0005)	ND (0.00055)
Pyrene	50	--	--	5800	--	3	0.002 (0.0005)	0.00152 (0.00005)	0.0006 (0.0005)	0.001 (0.0005)	0.00051 J (0.00055)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	ND (0.002)	ND (0.003)	0.00045 J (0.0005)	ND (0.00052)

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-43 B-43_20220412 2.920000076 4/12/2022	B-46 B46-052505 5/25/2005	B-46 B46-060706 6/7/2006	B-46 B46_010713 1/7/2013	B-95 B-95 GP U 677-MW 6/8/2011
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.0005)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)
Cumene	37	9100	63	30	4	2.6	0.0069 (0.001)	ND (0.005)	ND (0.005)	ND (0.002)	ND (0.0005)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000021)	ND (0.000029)	ND (0.000029)	ND (0.00002)	ND (0.000099)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	ND (0.005)	ND (0.005)	0.002 (0.001)	ND (0.0005)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)
tert Butyl alcohol	--	--	--	--	--	--	ND (0.01)	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	ND (0.005)	ND (0.005)	ND (0.001)	ND (0.0005)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	NA	NA	0.0037 (0.002)	ND (0.0005)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	NA	NA	ND (0.002)	ND (0.0005)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	ND (0.005)	ND (0.005)	0.0073 (0.001)	0.0005 J (0.0005)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.000102 (0.000083)	NA	NA	ND (0.0001)	NA
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.000042)	NA	NA	0.000175 (0.0001)	NA
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0000268 J (0.000042)	NA	NA	0.000177 (0.0001)	NA
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.000042)	NA	NA	0.000167 (0.0001)	NA
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.000083)	NA	NA	0.00012 (0.0001)	NA
Chrysene	16	--	--	140000	--	1.3	ND (0.000083)	ND (0.001)	ND (0.005)	0.00019 (0.0001)	0.00018 J (0.000079)
Fluorene	97	--	--	7800	--	7	0.0000754 J (0.000083)	ND (0.001)	ND (0.005)	0.000319 (0.0001)	NA
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.000083)	ND (0.001)	ND (0.005)	0.000914 (0.0001)	ND (0.001)
Phenanthrene	73	--	--	5800	--	1	ND (0.000083)	ND (0.001)	ND (0.005)	0.000219 (0.0001)	0.00018 J (0.000079)
Pyrene	50	--	--	5800	--	3	0.000308 (0.000083)	ND (0.001)	ND (0.005)	0.00053 (0.0001)	0.0012 (0.000099)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	NA	NA	0.0042 (0.003)	ND (0.000052)

- Notes:**
- All concentrations reported in mg/L; detection limits in parentheses.
 - Only compounds with at least one detection are shown.
 - Boldfaced concentrations exceed the Nonpotable GW Use.
 - No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
 - Underlined concentrations exceed the Routine Worker GW VI.
 - Italicized concentrations exceed the Construction Worker GW Direct Contact.
 - Grey shaded concentrations exceed the Off-Site Resident GW VI.
 - No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	B-95	URS-5	URS-5	URS-5	URS-5
							B-95-20160523	URS-5 URSS-060606	URS-5 GW-11109613-URSS-05-10-16-MM-040	URS-5 GW-11109613-URS-5-082416-AC-020	URS-5 GW-11109613-URS-5-082416-KC-021
							5/23/2016	6/6/2006	5/10/2016	8/24/2016	8/24/2016
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	ND (0.001)	<u>5.9 (0.25)</u>	<u>4 (0.013)</u>	<u>2.3 (0.1)</u>	<u>4.9 (0.2)</u>
Cumene	37	9100	63	30	4	2.6	ND (0.002)	0.037 (0.025)	0.022 J (0.013)	0.013 J (0.02)	0.031 J (0.04)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	ND (0.000029)	ND (0.000097)	0.000089 (0.000028)	ND (0.00004)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	<u>0.14 (0.025)</u>	ND (0.013)	ND (0.01)	ND (0.02)
Ethyl Benzene	2	22000	150	40	9.7	13	ND (0.001)	0.6 (0.025)	0.56 (0.013)	0.28 (0.01)	0.53 (0.02)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.025)	ND (0.013)	ND (0.01)	ND (0.02)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	ND (0.001)	4.9 (0.25)	8.6 (0.13)	1.5 (0.01)	6.5 (0.2)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	ND (0.002)	NA	0.19 (0.013)	0.092 (0.02)	0.23 (0.04)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	ND (0.002)	NA	0.056 (0.013)	0.027 (0.02)	0.072 (0.04)
Xylenes (total)	3.7	1900	13	17	0.86	210	ND (0.001)	<u>2.9 (0.25)</u>	<u>3 (0.013)</u>	<u>1.5 (0.01)</u>	<u>2.8 (0.02)</u>
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	ND (0.0005)	NA	0.0056 (0.0001)	0.0033 (0.000051)	0.0048 (0.00051)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.0002 J (0.0005)	NA	0.00096 (0.0001)	0.00023 (0.000051)	0.00046 J (0.00051)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	0.0003 J (0.0005)	NA	0.00027 J (0.0001)	0.000058 (0.000051)	0.00015 J (0.00051)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0002 J (0.0005)	NA	0.00024 J (0.0001)	0.000056 (0.000051)	0.00014 J (0.00051)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	0.0002 J (0.0005)	NA	ND (0.0001)	0.000017 J (0.000051)	ND (0.00051)
Chrysene	16	--	--	140000	--	1.3	0.0004 J (0.0005)	ND (0.005)	0.00053 (0.0001)	0.00011 (0.000051)	0.00025 J (0.00051)
Fluorene	97	--	--	7800	--	7	ND (0.0005)	0.017 (0.005)	0.014 (0.0001)	0.0015 (0.000051)	0.014 (0.00051)
Naphthalene	0.39	120	0.88	0.28	0.067	43	ND (0.0005)	<u>0.27 (0.024)</u>	<u>0.26 (0.003)</u>	<u>0.15 (0.0012)</u>	<u>0.22 (0.0061)</u>
Phenanthrene	73	--	--	5800	--	1	ND (0.0005)	0.025 (0.005)	0.02 (0.0003)	0.012 (0.0012)	0.021 (0.00061)
Pyrene	50	--	--	5800	--	3	0.0007 (0.0005)	ND (0.005)	0.0035 (0.0001)	0.0017 (0.000051)	0.0028 (0.00051)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.001)	NA	ND (0.00013)	ND (0.001)	0.00014 J (0.001)

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	URS-5	URS-5	URS-5	URS-5	URS-5
							URS-5_20180629	URS-5_HS_20180629	URS-5_DUP_20180629	URS-5_20190701	URS-5_20191114
							6/29/2018	6/29/2018	6/29/2018 FD	7/1/2019	11/14/2019
Physical Parameters											
pH [SU]	--	--	--	--	--	--	NA	NA	NA	NA	NA
Volatile Organic Compounds											
Benzene	0.3	550	3.8	4	0.25	130	3.26 (0.025)	3.43 (0.1)	3.98 (0.025)	3.3 (0.05)	3.5 (0.05)
Cumene	37	9100	63	30	4	2.6	0.0273 (0.001)	ND (0.1)	0.0254 (0.025)	0.026 (0.025)	0.021 J (0.025)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.00001)	ND (0.00001)	ND (0.00001)	ND (0.00029)	ND (0.000028)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.001)	ND (0.1)	ND (0.025)	ND (0.025)	ND (0.025)
Ethyl Benzene	2	22000	150	40	9.7	13	0.664 (0.025)	0.539 (0.1)	0.613 (0.025)	0.53 (0.005)	0.5 (0.005)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.001)	ND (0.1)	ND (0.025)	ND (0.005)	ND (0.005)
tert Butyl alcohol	--	--	--	--	--	--	NA	NA	NA	NA	NA
Toluene	25	100000	700	200	45	52	6.14 (0.05)	2.57 (0.1)	4.96 (0.025)	4.4 (0.05)	4.3 (0.05)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.212 (0.025)	0.186 (0.1)	0.219 (0.025)	0.24 (0.025)	0.21 (0.025)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	0.0649 (0.001)	ND (0.1)	0.065 (0.025)	0.073 (0.025)	0.058 (0.025)
Xylenes (total)	3.7	1900	13	17	0.86	210	3.05 (0.075)	2.36 (0.3)	2.77 (0.075)	2.3 (0.25)	2.4 (0.015)
Semivolatile Organic Compounds											
Anthracene	240	--	--	19000	--	40	0.0065 (0.00005)	0.00663 (0.00005)	0.00682 (0.00005)	0.004 (0.0005)	0.004 (0.0005)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	0.000174 (0.00005)	0.000168 (0.00005)	0.00018 (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00005)	ND (0.00005)	ND (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	0.0000716 (0.00005)	0.0000571 (0.00005)	0.0000693 (0.00005)	ND (0.0005)	ND (0.0005)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00005)	ND (0.00005)	ND (0.00005)	ND (0.0005)	ND (0.0005)
Chrysene	16	--	--	140000	--	1.3	0.00011 (0.00005)	0.000107 (0.00005)	0.000108 (0.00005)	ND (0.0005)	ND (0.0005)
Fluorene	97	--	--	7800	--	7	0.0243 (0.00005)	0.0213 (0.00005)	0.023 (0.00005)	0.014 (0.0005)	0.014 (0.0005)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.355 (0.0025)	0.414 (0.005)	0.359 (0.0025)	0.18 (0.003)	0.57 (0.003)
Phenanthrene	73	--	--	5800	--	1	0.0387 (0.00005)	0.0417 (0.00005)	0.0406 (0.00005)	0.025 (0.0005)	0.022 (0.0005)
Pyrene	50	--	--	5800	--	3	0.00321 (0.00005)	0.00354 (0.00005)	0.00346 (0.00005)	0.004 (0.0005)	0.003 (0.0005)
Perfluoroalkyl and Polyfluoroalkyl Substances											
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA	NA	NA
Metals											
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.003)	ND (0.0005)

- Notes:**
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 - Boldfaced concentrations exceed the Nonpotable GW Use.
 - No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
 - Underlined concentrations exceed the Routine Worker GW VI.
 - Italicized concentrations exceed the Construction Worker GW Direct Contact.
 - Grey shaded concentrations exceed the Off-Site Resident GW VI.
 - No concentrations exceed the GW Migration to SW.

Abbreviations:
 ND - Not Detected
 NA - Not Analyzed
 J - Estimated Concentration

Table D2
Historical Groundwater Sampling Results
Tank Group 07
Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location Field Sample ID Collection Depth (ft bgs) Sample Date Comments	Nonpotable GW Use	Routine Worker GW Vol to Outdoor Air	Routine Worker GW VI	Construction Worker GW Direct Contact	Off-Site Resident GW VI	GW Migration to SW	URS-5	URS-5	URS-5
							URS-5_20210506 5.25 5/6/2021	URS-5_20220414 5.170000076 4/14/2022	DUP-7_20220414 4/14/2022 FD
Physical Parameters									
pH [SU]	--	--	--	--	--	--	NA	NA	NA
Volatile Organic Compounds									
Benzene	0.3	550	3.8	4	0.25	130	3.9 (0.05)	4.85 (0.025)	4.68 (0.025)
Cumene	37	9100	63	30	4	2.6	0.026 (0.025)	0.0321 J (0.05)	0.0341 J (0.05)
1,2-Dibromoethane	0.017	16	0.11	0.91	0.16	--	ND (0.000029)	0.000066 (0.00002)	0.000051 (0.00002)
1,2-Dichloroethane	0.33	170	1.2	4.9	0.082	3100	ND (0.005)	ND (0.05)	ND (0.05)
Ethyl Benzene	2	22000	150	40	9.7	13	0.68 (0.005)	0.828 (0.05)	0.817 (0.05)
Methyl tert-butyl ether	21	29000	210	190	42	11000	ND (0.005)	ND (0.05)	ND (0.05)
tert Butyl alcohol	--	--	--	--	--	--	0.08 J (0.25)	ND (0.5)	ND (0.5)
Toluene	25	100000	700	200	45	52	8.7 (0.05)	7.95 (0.05)	7.77 (0.05)
1,2,4-Trimethylbenzene	8.7	1400	9.7	15	0.63	33	0.23 (0.025)	0.295 (0.1)	0.346 (0.1)
1,3,5-Trimethylbenzene	8.8	1300	9.1	15	0.59	71	0.068 (0.025)	0.0818 J (0.1)	0.0783 J (0.1)
Xylenes (total)	3.7	1900	13	17	0.86	210	3.3 (0.03)	3.91 (0.05)	3.88 (0.05)
Semivolatile Organic Compounds									
Anthracene	240	--	--	19000	--	40	0.0034 (0.00053)	0.00284 (0.000077)	0.00276 (0.000077)
Benzo(a)anthracene	0.1	--	--	1400	--	0.013	ND (0.00053)	0.000143 (0.000038)	0.0000935 (0.000038)
Benzo(a)pyrene	0.01	--	--	5.8	--	0.0013	ND (0.00053)	0.0000347 J (0.000038)	0.0000341 J (0.000038)
Benzo(b)fluoranthene	0.16	--	--	1400	--	0.013	ND (0.00053)	0.0000581 (0.000038)	0.0000416 (0.000038)
Benzo(g,h,i)perylene	44	--	--	5800	--	0.012	ND (0.00053)	ND (0.000077)	ND (0.000077)
Chrysene	16	--	--	140000	--	1.3	ND (0.00053)	0.0000564 J (0.000077)	0.0000447 J (0.000077)
Fluorene	97	--	--	7800	--	7	0.014 (0.00053)	0.0207 (0.015)	0.0153 (0.015)
Naphthalene	0.39	120	0.88	0.28	0.067	43	0.28 (0.0026)	0.261 (0.015)	0.207 (0.015)
Phenanthrene	73	--	--	5800	--	1	0.026 (0.00053)	0.03 (0.015)	0.0238 (0.015)
Pyrene	50	--	--	5800	--	3	0.0024 (0.00053)	0.00145 (0.000077)	0.00116 (0.000077)
Perfluoroalkyl and Polyfluoroalkyl Substances									
Perfluoroheptanoic acid	--	--	--	--	--	--	NA	NA	NA
Perfluorononanoic acid	--	--	--	--	--	--	NA	NA	NA
Perfluorooctane Sulfonic Acid	--	--	--	--	--	--	NA	NA	NA
Perfluorooctanoic Acid	--	--	--	--	--	--	NA	NA	NA
Metals									
Lead (Dissolved)	--	--	--	--	--	2.5	ND (0.00052)	ND (0.001)	ND (0.001)

Notes:
1 All concentrations reported in mg/L; detection limits in parentheses.
2 Only compounds with at least one detection are shown.
3 Boldfaced concentrations exceed the Nonpotable GW Use.
4 No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
5 Underlined concentrations exceed the Routine Worker GW VI.
6 Italicized concentrations exceed the Construction Worker GW Direct Contact.
7 Grey shaded concentrations exceed the Off-Site Resident GW VI.
8 No concentrations exceed the GW Migration to SW.

Abbreviations:
ND - Not Detected
NA - Not Analyzed
J - Estimated Concentration

Appendix E

Tank Registration Amendment Forms





2250 E. Adams Ave • Philadelphia, PA 19124
 Office: 215.533.8890 • Fax: 215.533.8897
 Website • www.NorthStar.com

July 21, 2022

Pennsylvania Department of Environmental Protection
 Southeast Regional Office
 Division of Storage Tanks
 2 East Main Street
 Norristown, Pennsylvania 19401

Via email: RA.storage@pa.gov, ra-tanks@pa.gov

**Re: Philadelphia Energy Solutions Refining and Marketing, LLC (PES)
 PADEP Storage Tanks Registration/Permitting Application Form
 PADEP Facility ID #51-33624 – Girard Process Area**

To whom it may concern:

Please find NorthStar Contracting Group, Inc.'s submittal of the Pennsylvania Department of Environmental Protection's (PA DEP's) Storage Tank Registration/Permitting Application Form(s) for the removal of the following Five (5) Aboveground storage tank(s) located at the Philadelphia Energy Solutions Refining and Marketing, LLC Girard Point Processing Area.

Removed					
Facility Name	PADEP Facility ID #	PADEP Tank ID #	Owner Tank ID #	AMS Tank ID #	Removal Date
Girard Point Proc Area	51-33624	011A	GP-1047	N/A	07/06/2022
Girard Point Proc Area	51-33624	047A	GP-1101	P-137 (GP)	07/07/2022
Girard point Proc Area	51-33624	046A	GP-767	P-135 (GP)	07/08/2022
Girard point Proc Area	51-33624	044A	GP-894	N/A	07/11/2022
Girard point Proc Area	51-33624	033A	GP-1088	N/A	07/08/2022

If you have any questions, please do not hesitate to contact me at 440-228-1524.
 Respectfully Submitted,

Robert Armstrong
 Sr. Project Manager
 NorthStar Contracting Group, Inc.

Enclosures: Storage Tank Registration/Permitting Application Form

cc:

Gary Bowman (NorthStar)
Dr. Kassahun Sellassie (AMS)
Thomas Bersley (AMS)
Charles Berkadale (Filer)
Edward Wiener (AMS)
Mike Leonardo (Hilco)

STORAGE TANKS REGISTRATION / PERMITTING APPLICATION FORM

Before completing this form, read the step-by-step instructions provided in this application package.

51-33624 Facility ID # Phila Ref Girard Point Facility Name	DEP USE ONLY <hr/> Client ID# <hr/> Site ID# <hr/> Account # <hr/> Auth ID# <hr/> APS ID# <hr/> Master Auth ID#
--	--

I. PURPOSE OF SUBMITTAL

INITIAL (Applies to First-Time Facility Registration)

- | | |
|---|--|
| <input type="checkbox"/> Register Tank(s) to be Used* | <input type="checkbox"/> Register Tank(s) to be Temporarily Out of Use |
| <input type="checkbox"/> Register Tank(s) to be Removed | <input type="checkbox"/> Register Tank(s) to be Closed in Place |

AMENDED (Applies to Currently Registered Tank(s) or Existing Facility)

- | | |
|--|---|
| <input type="checkbox"/> Changed Owner Information | <input type="checkbox"/> Changed Contact Information |
| <input type="checkbox"/> Changed Facility Information | <input type="checkbox"/> Changed Facility Operator Information |
| <input type="checkbox"/> Changed to Currently In Use Tank(s)* | <input type="checkbox"/> Added Tank(s) to Existing Facility* |
| <input type="checkbox"/> Changed to Temporarily Out of Use Tank(s) | <input checked="" type="checkbox"/> Changed to Permanently Closed Tank(s)/Removed |
| <input type="checkbox"/> Changed Product | <input type="checkbox"/> Changed to Exempt Tank(s) |

CHANGE OF OWNERSHIP

- Tanks Changed Ownership and Remain at Same Facility*

* For Underground Storage Tanks (UST), attach the UST Operator Training Documentation Form (2630-PM-BECB0514a) and copies of the Class A and Class B operator training certificates.

II. CURRENT OR NEW TANK OWNER / CLIENT INFORMATION

DEP Client ID#	Client Type/Code	Fee Kind (check one if applicable)		
296341		<input type="checkbox"/> Volunteer Fire Co/EMS Org	<input type="checkbox"/> State Govt	<input type="checkbox"/> Fed Govt
Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#	
Philadelphia Energy Solutions Refining and Marketing, LLC				
Individual Last Name	First Name	MI	Suffix	SSN
Bowman	Gary	P	Sr.	
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Line 1		Mailing Address Line 2		
3144 West Passyunk Avenue				
Address Last Line - City	State	ZIP+4	Country	
Philadelphia	PA	19145	USA	
Client Contact Last Name	First Name	MI	Suffix	
Bowman	Gary	P	Sr.	
Client Contact Title		Phone	Ext	
President		610-636-4574		
E-mail Address				FAX
gbowman@northstar.com				

III. SITE INFORMATION

DEP Site ID#	Site Name				
EPA ID#	Estimated Number of Employees to be Present at Site				
Description of Site					
County Name	Municipality	City	Boro	Twp	State
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
County Name	Municipality	City	Boro	Twp	State
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site Location Line 1			Site Location Line 2		
Site Location Last Line - City		State	ZIP+4		
Detailed Written Directions to Site					

Site Contact Last Name	First Name	MI	Suffix		
Site Contact Title		Site Contact Firm			
Mailing Address Line 1			Mailing Address Line 2		
Address Last Line - City		State	ZIP+4		
Phone	Ext	FAX	E-mail Address		
NAICS Codes (Two- & Three-Digit Codes - List All That Apply)				6-Digit Code (Optional)	
Site to Client Relationship					

IIIa. PROPERTY OWNER INFORMATION

Same as Tank Owner Identified in Section II. Different than Tank Owner Identified in Section II; identified below.

Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#		
Individual Last Name	First Name	MI	Suffix	SSN	
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1			Mailing Address Line 2		
Address Last Line - City		State	ZIP+4	Country	
Property Owner Contact Last Name	First Name	MI	Suffix		
Property Owner Contact Title		Phone	Ext		
E-mail Address			FAX		

IV. FACILITY INFORMATION

DEP Storage Tank Facility ID#	Facility Name	Facility Kind				
Facility Location Line 1 (if different than Site Location)		Facility Location Line 2				
Facility Location Last Line - City		State ZIP+4				
Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Horizontal Accuracy Measure	Feet	--or--	Meters			
Horizontal Reference Datum Code	<input type="checkbox"/> North American Datum of 1927 <input type="checkbox"/> North American Datum of 1983 <input type="checkbox"/> World Geodetic System of 1984					
Horizontal Collection Method Code						
Reference Point Code						
Altitude	Feet	--or--	Meters			
Altitude Datum Name	<input type="checkbox"/> The National Geodetic Vertical Datum of 1929 <input type="checkbox"/> The North American Vertical Datum of 1988 (NAVD88)					
Altitude (Vertical) Location Datum Collection Method Code						
Geometric Type Code						
Data Collection Date						
Source Map Scale Number		Inch(es)	▼	Feet		
	--or--	Centimeter(s)	◆	Meters		
Flammable & Combustible Liquid Permit # (if applicable)						
State or Municipality that issued the Permit						

FACILITY OPERATOR INFORMATION

<input type="checkbox"/> Same as Owner Identified in Section II.		<input type="checkbox"/> Different than Owner Identified in Section II; identified below.				
DEP Client ID#	Client Type / Code					
Organization Name or Registered Fictitious Name			Employer ID# (EIN)	Dun & Bradstreet ID#		
Individual Last Name	First Name	MI	Suffix	SSN		
Additional Individual Last Name	First Name	MI	Suffix	SSN		
Mailing Address Line 1		Mailing Address Line 2				
Address Last Line - City	State	ZIP+4	Country			
Client Contact Last Name	First Name	MI	Suffix			
Client Contact Title		Phone	Ext			
E-mail Address			FAX			

V. CHANGE OF OWNERSHIP INFORMATION

- All Tanks Changed Ownership at the Facility
 Some Tanks Changed Ownership at the Facility (List all applicable tank numbers in Section VI)

OWNERSHIP CHANGE TO - Client information is noted in Section II.

OWNERSHIP CHANGE FROM (previous owner information)

Name _____

Employer ID# (EIN) or SSN _____

Mailing Address Line 1 _____

Mailing Address Line 2 _____

Address Last Line - City _____

State _____

ZIP+4 _____

Previous Facility ID# _____

DATE OF SALE/TRANSFER	_____
-----------------------	-------

SIGNATURE & CERTIFICATION OF PREVIOUS OWNER

Previous owner's signature is not available. As required, the "new" owner has attached a deed of transfer or other proof of ownership to this application. Yes No N/A

I have reviewed this form for submission to the Department. I certify under penalty of law as provided in 18 PA, C.S.A. §4903 (relating to false swearing) and 18 PA, C.S.A. §4904 (relating to unsworn falsification to authorities), that I have the authority to sign this Section for the transfer of permit or registration for the storage tanks listed herein. Further, I certify that all information provided in Section V is true, accurate and complete to the best of my knowledge and belief.

Type or Print Previous Owner Name _____

Previous Owner Signature

Title

Date

Facility ID#

Facility Name

VII. ABOVEGROUND & UNDERGROUND NEW TANK INSTALLATION INFORMATION

The DEP Certified Installer should complete this section. New tanks listed in Section VI must also be listed in this Section. Write the Tank Number(s) and place an in the appropriate box for each component that was installed.

Tank Construction & Corrosion Protector (1)	Tank Manufacturer: Model:					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Unprotected Steel (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Cathodically Protected Steel (Impressed Current)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Unprotected Steel (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fiberglass (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Fiberglass (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Steel w/Plastic or Fiberglass Jacket or Double Wall Act 100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Steel With FRP Coating (Act 100 or Equivalent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Steel with Lined Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Cathodically Protected Double Wall Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Cathodically Protected Steel with Liner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M. Double Bottom (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. Molded Plastic Form (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P. Aluminum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Fire Protected Double Wall AST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Steel with Plastic or Fiberglass Jacket or Double Wall Act 100 with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Steel with FRP Coating (Act 100 or Equivalent) with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T. Molded Plastic Form (Double Wall) (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

Underground Piping Construction & Corrosion Protection – Single/Inner Wall (28)	Tank #					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Primary (Inner) Piping Manufacturer: Model:						
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Underground Piping Construction & Corrosion Protection – Outer Wall (29)	Tank #					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Secondary (Outer) Piping Manufacturer: Model:						
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L Poly-encased Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# Facility Name

Aboveground Piping Construction & Corrosion Protection (3)	Tank #					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Carbon Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Single Wall Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Single Wall Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. PVC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Double Wall - Metallic Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Double Wall - Rigid (FRP) Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Double Wall - Flexible Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Product Delivery System (4)	Tank #					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Suction: Check valve at pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Suction: Check valve at tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Gravity fed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spill Prevention (5)	Tank #					
	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
S. Permanently installed and liquid tight (single-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Permanently installed and liquid tight (double-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

Overfill Prevention (7)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	A. Overfill alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Drop tube shutoff device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (AST only) Type: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Emergency Containment (16) ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (includes double-walked tanks with required apertures)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Secondary Containment (17) Single Wall ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stage 1 Vapor Recovery (19) USTs and ASTs when applicable	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	A. Coaxial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. 2 Point	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None or incomplete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

Tank-top Containment Surpge Present (Product Piping Only) (21) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some penetrations and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. At all penetrations and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Under-dispenser Containment Present (22) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some dispensers and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. Under all dispensers and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Line Leak Detector Shuts Off Pump (23) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tank Supplies Emergency Generator (25)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

VIII. ABOVEGROUND & UNDERGROUND TANK INFORMATION FOR PERMANENT CLOSURE

Write the Tank Number(s) and place an in the appropriate box for each tank that was removed or closed in place.


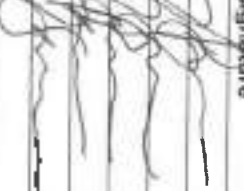

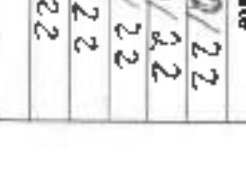

	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Items 2 & 3 below apply to large ASTs and all USTs	011A	47A	48A	44A		
1 Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Closure document submitted to the appropriate DEP regional office.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Closure document kept on file by owner	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. INSTALLER / REMOVER CERTIFICATION

This section must be completed by the certified tank handler(s) who is responsible for the installation or removal from service of the aboveground and underground storage tank systems listed in Section VI, Tank modification activity must be submitted on a "Tank Modification Report" form.

SIGNATURE & CERTIFICATION OF INSTALLER(S) / REMOVER(S)

As the certified tank handler responsible for the tank handling activities in the category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I also certify, under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Installer/Remover Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Installer/Remover Signature	Date
011A	Brian Garner	API 650	5341	AFMX	1631		7/20/22
47A	Brian Garner	API 650	5341	AFMX	1631		7/20/22
46A	Brian Garner	API 12C	5341	AFMX	1631		7/20/22
44A	Brian Garner	API 12C	5341	AFMX	1631		7/20/22
033A	Brian Garner	API 12C	5431	AFMX	1631		7/26/22

XI. INSPECTOR CERTIFICATION

This section must be completed by the DEP Certified Tank Inspector(s) who is responsible for verifying the installation standards for field constructed tanks and aboveground tanks greater than 21,000 gallons listed in Section VI, (Type or Prod legibly). A DEP Certified Inspector may also be responsible for inspecting existing ASTs which are entering regulated service for the first time with no tank handling activities.

SIGNATURE & CERTIFICATION OF INSPECTOR(S)

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications; that the tank(s) have been tested as required by industry standards; and that the tank(s) meet or exceed applicable design and operating standards; and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1989, and all applicable regulations. I also certify under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Inspector Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Inspector Signature	Date

XII. SITE SPECIFIC INSTALLATION PERMIT NUMBER

If a site-specific permit was required for a new tank installation, write the tank number(s) and permit number(s) in the appropriate box.

Site-Specific Installation Permit	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#



2250 E. Adams Ave • Philadelphia, PA 19124
 Office: 215.533.8890 • Fax: 215.533.8897
 Website • www.NorthStar.com

May 05, 2012

Pennsylvania Department of Environmental Protection
 Southeastern Regional Office
 Division of Storage Tanks
 2 East Main Street
 Norristown, Pennsylvania 19401
 Via email: PA-ASTStorageTanks@pa.gov; aststorage@pa.gov

Re: Philadelphia Energy Solutions Refining and Marketing, LLC (PES)
 PADEP Storage Tanks Registration/Permitting Application Form
 PADEP Facility ID #51-53624 - Girard Point Refinery

To whom it may concern:

Please find NorthStar Contracting Group, Inc.'s submittal of the Pennsylvania Department of Environmental Protection's (PADEP's) Storage Tank Registration/Permitting Application Form for the removal of the following one (1) aboveground storage tanks located at the Philadelphia Energy Solutions Refining and Marketing, LLC Girard Point site.

Removed					
Facility Name	PADEP Facility ID #	PADEP Tank ID #	Owner Tank ID #	AMS Tank ID #	Removal Date
Girard Point Refinery	51-53624	019A	GIP-494	P-039	04/14/2012

If you have any questions, please do not hesitate to contact me at 440-228-1524.

Respectfully Submitted,

Robert Armstrong
 Sr. Project Manager
 NorthStar Contracting Group, Inc.
 Enclosures: Storage Tank Registration/Permitting Application Form

cc:

Gary Bowman (NorthStar)
 Dr. Kathleen Sellasie (AMS)
 Thomas Barsley (AMS)
 Charles Backsdale (Hilco)

Edward Wiener (AMS)
 Mike Leonardo (Hilco)



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

STORAGE TANKS REGISTRATION / PERMITTING APPLICATION FORM

Before completing this form, read the step-by-step instructions provided in this application package.

	DEP USE ONLY
51-33624	Client ID#
Facility ID #	Site ID#
Phila Ref Grand Point	Account #
Facility Name	Auth ID#
	APS ID#
	Master Auth ID#

I. PURPOSE OF SUBMITTAL

INITIAL (Applies to First-Time Facility Registration)

- | | |
|---|--|
| <input type="checkbox"/> Register Tank(s) to be Used* | <input type="checkbox"/> Register Tank(s) to be Temporarily Out of Use |
| <input type="checkbox"/> Register Tank(s) to be Removed | <input type="checkbox"/> Register Tank(s) to be Closed in Place |

AMENDED (Applies to Currently Registered Tank(s) or Existing Facility)

- | | |
|--|---|
| <input type="checkbox"/> Changed Owner Information | <input type="checkbox"/> Changed Contact Information |
| <input type="checkbox"/> Changed Facility Information | <input type="checkbox"/> Changed Facility Operator Information |
| <input type="checkbox"/> Changed to Currently In Use Tank(s)* | <input type="checkbox"/> Added Tank(s) to Existing Facility* |
| <input type="checkbox"/> Changed to Temporarily Out of Use Tank(s) | <input checked="" type="checkbox"/> Changed to Permanently Closed Tank(s)/Removed |
| <input type="checkbox"/> Changed Product | <input type="checkbox"/> Changed to Exempt Tank(s) |

CHANGE OF OWNERSHIP

- Tanks Changed Ownership and Remain at Same Facility*

* For Underground Storage Tanks (UST), attach the UST Operator Training Documentation Form (2630-PM-BECB0514a) and copies of the Class A and Class B operator training certificates.

II. CURRENT OR NEW TANK OWNER / CLIENT INFORMATION

DEP Client ID#	Client Type/Code	Fee Kind (check one if applicable)		
298341		<input type="checkbox"/> Volunteer Fire Co/EMS Org	<input type="checkbox"/> State Govt	<input type="checkbox"/> Fed Govt
Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#	
Philadelphia Energy Solutions Refining and Marketing, LLC				
Individual Last Name	First Name	MI	Suffix	SSN
Bowman	Gary	P	Sr.	
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Line 1		Mailing Address Line 2		
3144 West Passyunk Avenue				
Address Last Line - City		State	ZIP+4	Country
Philadelphia		PA	19145	USA
Client Contact Last Name	First Name	MI	Suffix	
Bowman	Gary	P	Sr.	
Client Contact Title	Phone		Ext	
President	610-636-4574			
E-mail Address				FAX
gbowman@northstar.com				

III. SITE INFORMATION

DEP Site ID#	Site Name					
EPA ID#	Estimated Number of Employees to be Present at Site					
Description of Site						
County Name	Municipality	City	Boro	Twp	State	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
County Name	Municipality	City	Boro	Twp	State	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Site Location Line 1			Site Location Line 2			
Site Location Last Line - City			State	ZIP+4		
Detailed Written Directions to Site						

Site Contact Last Name	First Name	MI	Suffix			
Site Contact Title		Site Contact Firm				
Mailing Address Line 1			Mailing Address Line 2			
Address Last Line - City			State	ZIP+4		
Phone	Ext	FAX	E-mail Address			
NAICS Codes (Two- & Three-Digit Codes - List All That Apply)					5-Digit Code (Optional)	
Site to Client Relationship						

IIIa. PROPERTY OWNER INFORMATION

Same as Tank Owner Identified in Section II. Different than Tank Owner Identified in Section II; Identified below.

Organization Name or Registered Fictitious Name			Employer ID# (EIN)	Dun & Bradstreet ID#	
Individual Last Name	First Name	MI	Suffix	SSN	
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1			Mailing Address Line 2		
Address Last Line - City			State	ZIP+4	Country
Property Owner Contact Last Name	First Name	MI	Suffix		
Property Owner Contact Title			Phone	Ext	
E-mail Address				FAX	

IV. FACILITY INFORMATION

DEP Storage Tank Facility ID#	Facility Name	Facility Kind				
Facility Location Line 1 (if different than Site Location)		Facility Location Line 2				
Facility Location Last Line - City		State ZIP+4				
Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degree	Minutes	Seconds	Degree	Minutes	Seconds
Horizontal Accuracy Measure	Feet	-or-	Meters			
Horizontal Reference Datum Code	<input type="checkbox"/> North American Datum of 1927 <input type="checkbox"/> North American Datum of 1983 <input type="checkbox"/> World Geodetic System of 1984					
Horizontal Collection Method Code						
Reference Point Code						
Altitude	Feet	-or-	Meters			
Altitude Datum Name	<input type="checkbox"/> The National Geodetic Vertical Datum of 1929 <input type="checkbox"/> The North American Vertical Datum of 1988 (NAVD88)					
Altitude (Vertical) Location Datum Collection Method Code						
Geometric Type Code						
Data Collection Date						
Source Map Scale Number		Inch(es)	=	Feet		
	-or-	Centimeter(s)	=	Meters		
Flammable & Combustible Liquid Permit # (if applicable)						
State or Municipality that issued the Permit						

FACILITY OPERATOR INFORMATION

<input type="checkbox"/> Same as Owner Identified in Section II.		<input type="checkbox"/> Different than Owner Identified in Section II; identified below.				
DEP Client ID#	Client Type / Code					
Organization Name or Registered Fictitious Name	Employer ID# (EIN)		Dun & Bradstreet ID#			
Individual Last Name	First Name	MI	Suffix	SSN		
Additional Individual Last Name	First Name	MI	Suffix	SSN		
Mailing Address Line 1	Mailing Address Line 2					
Address Last Line - City	State	ZIP+4	Country			
Client Contact Last Name	First Name	MI	Suffix			
Client Contact Title	Phone		Ext			
E-mail Address	FAX					

V. CHANGE OF OWNERSHIP INFORMATION

- All Tanks Changed Ownership at the Facility
 Some Tanks Changed Ownership at the Facility (List all applicable tank numbers in Section VI.)

OWNERSHIP CHANGE TO - Client information is noted in Section II.

OWNERSHIP CHANGE FROM (previous owner information):

Name _____
Employer ID# (EIN) or SSN _____
Mailing Address Line 1 _____
Mailing Address Line 2 _____
Address Last Line - City _____ State _____ ZIP+4 _____
Previous Facility ID# _____

DATE OF SALE/TRANSFER _____

SIGNATURE & CERTIFICATION OF PREVIOUS OWNER

Previous owner's signature is not available. As required, the "new" owner has attached a deed of transfer or other proof of ownership to this application. Yes No N/A

I have reviewed this form for submission to the Department. I certify under penalty of law as provided in 18 PA. C.S.A. §4903 (relating to false swearing) and 18 PA. C.S.A. §4904 (relating to unsworn falsification to authorities), that I have the authority to sign this Section for the transfer of permit or registration for the storage tanks listed herein. Further, I certify that all information provided in Section V is true, accurate and complete to the best of my knowledge and belief.

Type or Print Previous Owner Name _____

Previous Owner Signature _____ Title _____ Date _____

Facility ID#

Facility Name

VI. STORAGE DESCRIPTION

Type or print legibly each regulated storage tank at this facility under your ownership.

Status Codes: C-Currently in Use
Type Codes: M-Manufactured

T-Temporarily Out of Use
F-Field Constructed

E-Exempt

R-Removed

P-Closed In Place

A. ABOVEGROUND TANKS. List all new tanks if amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum Based Mixture)	CAS# (If Hazardous Substance)	Exempt Reference Code
029A	T	R	F	1965	04/14/2022	1,260,000		Mean Frac Bottoms		

B. UNDERGROUND TANKS. List all new tanks if amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name (If Hazardous Substance) Substance Name (If Other Petroleum Substance or Petroleum Based Mixture)	CAS# (If Hazardous Substance)	Exempt Reference Code

Facility ID#

Facility Name

VII. ABOVEGROUND & UNDERGROUND NEW TANK INSTALLATION INFORMATION

The DEP Certified Installer should complete this section. New tanks listed in Section VI must also be listed in this Section. Write the Tank Number(s) and place an in the appropriate box for each component that was installed.

Tank Construction & Corrosion Protection (1)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Tank Manufacturer: Model:							
A. Unprotected Steel (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Cathodically Protected Steel (Impressed Current)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Unprotected Steel (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fiberglass (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Fiberglass (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Steel w/Plastic or Fiberglass Jacket or Double Wall Act 100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Steel With FRP Coating (Act 100 or Equivalent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Steel with Lined Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O. Cathodically Protected Double Wall Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P. Cathodically Protected Steel with Liner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Double Bottom (ASTs Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Molded Plastic Form (ASTs Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T. Aluminum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
U. Fire Protected Double Wall AST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Steel with Plastic or Fiberglass Jacket or Double Wall Act 100 with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
W. Steel with FRP Coating (Act 100 or Equivalent) with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
X. Molded Plastic Form (Double Wall) (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility Name

Underground Piping Construction & Corrosion Protection – Single/Inner Wall (28)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Primary (Inner) Piping Manufacturer: Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Underground Piping Construction & Corrosion Protection – Outer Wall (29)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Secondary (Outer) Piping Manufacturer: Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Poly-encased Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# _____ Facility Name _____

Aboveground Piping Construction & Corrosion Protection (3)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Carbon Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Single Wall Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Single Wall Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. PVC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Double Wall - Metallic Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Double Wall - Rigid (FRP) Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Double Wall - Flexible Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Product Delivery System (4)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Suction: Check valve at pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Suction: Check valve at tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Gravity fed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spill Prevention (6)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
S. Permanently installed and liquid tight (single-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Permanently installed and liquid tight (double-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# _____ Facility Name _____

Overfill Prevention (7)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Overfill alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Drop tube shutoff device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (AST only) Type: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Emergency Containment (16) ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (includes double-walled tanks with required appurtenances)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Secondary Containment (17) Single Wall ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N, No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stage Vapor Recovery (18) USTs and ASTs when applicable	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Coaxial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B 2 Point	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None or incomplete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

Tank-top Containment Sumps Present (Product Piping Only) (21) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. All some penetrations and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. All penetrations and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Under-dispenser Containment Present (22) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. All some dispensers and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. Under all dispensers and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Line Leak Detector Shuts Off Pump (23) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tank Supplies Emergency Generator (25)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

VIII. ABOVEGROUND & UNDERGROUND TANK INFORMATION FOR PERMANENT CLOSURE

Write the Tank Number(s) and place an in the appropriate box for each tank that was removed or closed in place.

Items 2 & 3 below apply to large ASTs and all USTs	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	029A					
1 Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Closure document submitted to the appropriate DEP regional office.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Closure document kept on file by owner.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. This registration is conditioned upon compliance with provisions of the Storage Tank and Spill Prevention Act of 1989, all applicable regulations, and with the requirements for obtaining and maintaining a permit required under this Act. I certify my responsibility for assuring the following permit requirements:

- Storage tank systems are in compliance with applicable administrative, technical and operational requirements as specified in Subchapter E for underground tanks or Subchapter F or G for aboveground tanks
- Tank handling and inspection activities are performed by an individual possessing DEP certification in the appropriate category as required in Subchapters A and B.
- Underground storage tanks meet the applicable financial responsibility requirements of Subchapter H (relating to financial responsibility requirements).
- A Spill Prevention Response (SPR) Plan must be submitted to the appropriate DEP regional office for facilities that have aboveground storage tanks where the total capacity of all aboveground tanks is greater than 21,000 gallons.
- Other state and local permits required for operation of the tank system have been attained

My signature represents to the Department that I own the storage tank(s) and am aware of the responsibilities and potential liabilities as an "owner" arising under the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I am also advised that statements made on this registration is made subject to the penalties of 18 P.S. Section 4904 relating to unsworn falsification to authorities.

Type or Print Owner Name : Gary Bowman

 Owner Signature	President Title	05/06/2022 Date
---	--------------------	--------------------

Information & Invoices should be sent to:


- Tank Owner Contact
- Site Contact
- Facility Operator
- Other Responsible Party Identified Below

Organization Name or Registered Fictitious Name		Employer ID# (EIN)		Dun & Bradstreet ID#	
NorthStar Contracting Group, Inc.					
Individual Last Name	First Name	MI	Suffix	SSN	
Bowman	Gary	P	Sr.		
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1		Mailing Address Line 2			
2250 East Adams Ave.					
Address Last Line - City		State	ZIP+4	Country	
Philadelphia		PA	19124	USA	
Contact Title		Phone		Ext.	
President		610-636-4574			
E-mail Address					
gbowman@northstar.com					
Client to Site (Facility) Relationship					

X. INSTALLER / REMOVER CERTIFICATION

This section must be completed by the certified tank handler(s) who is responsible for the installation or removal from service of the aboveground and underground storage tank systems listed in Section VI. Tank modification activity must be submitted on a "Tank Modification Report" form.

SIGNATURE & CERTIFICATION OF INSTALLER(S)/REMOVER(S)
As the certified tank handler responsible for the tank handling activities in the category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1995 and all applicable regulations. I also certify under penalty of law as provided in 18 PA.C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided therein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Installer/Remover Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Installer/Remover Signature	Date
029A	Brian Gomer	API 650	5341	AFMX	1631		5/5/2020

XI. INSPECTOR CERTIFICATION

This section must be completed by the DEP Certified Tank Inspector(s) who is responsible for verifying the installation standards for field constructed tanks and aboveground tanks greater than 21,000 gallons listed in Section VI. (Type or Print Legibly) A DEP Certified Inspector may also be responsible for inspecting existing ASTs which are entering regulated service for the first time with no tank handling activities.

SIGNATURE & CERTIFICATION OF INSPECTOR(S)

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications, that the tank(s) have been leased as required by industry standards, and that the tank(s) meet or exceed applicable design and operating standards and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1995, and all applicable regulations. I also certify under penalty of law as provided in 18 PA.C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided therein is true accurate and complete to the best of my knowledge and belief.

Tank#	Inspector Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Inspector Signature	Date

XII. SITE SPECIFIC INSTALLATION PERMIT NUMBER

If a site-specific permit was required for a new tank installation, write the tank number(s) and permit number(s) in the appropriate box.

Site-Specific Installation Permit#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#



October 28, 2021

VIA EMAIL (ELECTRONIC SUBMISSION)

Pennsylvania Department of Environmental Protection
Central Office - Division of Storage Tanks
Rachel Carson State Office Building
400 Market Street
Harrisburg, Pennsylvania 17101

**Subject: Philadelphia Energy Solutions Refining and Marketing, L.L.C (PES)
PADEP Storage Tanks Registration/Permitting Application Form
PADEP Facility ID #51-33624 - Girard Point Refinery**

Dear PADEP:

On behalf of our client, JD2 Environmental, Inc. (JD2) is attaching the Pennsylvania Department of Environmental Protection's (PADEP's) Storage Tanks Registration/Permitting Application Form for the removal of the following aboveground storage tanks (ASTs):

Facility Name	PADEP Facility ID #	PADEP Tank ID #	Owner Tank ID #	AMS Tank ID #	Removal Date
Girard Point Refinery	51-33624	005A	GP 1117	P-024	10/4/2021
Girard Point Refinery	51-33624	030A	GP 1116	P-001	10/4/2021

If you have any questions regarding this submittal, please do not hesitate to contact me at (610) 430-8151.

Sincerely yours,

JD2 ENVIRONMENTAL, INC.

Kristian Satterthwaite
Environmental Scientist
PADEP Inspector #5081

KS:wc
Attachment

cc: REPSG



STORAGE TANKS REGISTRATION / PERMITTING APPLICATION FORM

Before completing this form, read the step-by-step instructions provided in this application package.

51-33624 Facility ID # Phila Ref Girard Point Facility Name	DEP USE ONLY
	Client ID#
	Site ID#
	Account #
	Auth ID#
	APS ID#
	Master Auth ID#

I. PURPOSE OF SUBMITTAL

INITIAL (Applies to First-Time Facility Registration)

- | | |
|---|--|
| <input type="checkbox"/> Register Tank(s) to be Used* | <input type="checkbox"/> Register Tank(s) to be Temporarily Out of Use |
| <input type="checkbox"/> Register Tank(s) to be Removed | <input type="checkbox"/> Register Tank(s) to be Closed In Place |

AMENDED (Applies to Currently Registered Tank(s) or Existing Facility)

- | | |
|--|---|
| <input type="checkbox"/> Changed Owner Information | <input type="checkbox"/> Changed Contact Information |
| <input type="checkbox"/> Changed Facility Information | <input type="checkbox"/> Changed Facility Operator Information |
| <input type="checkbox"/> Changed to Currently In Use Tank(s)* | <input type="checkbox"/> Added Tank(s) to Existing Facility* |
| <input type="checkbox"/> Changed to Temporarily Out of Use Tank(s) | <input checked="" type="checkbox"/> Changed to Permanently Closed Tank(s)/Removed |
| <input type="checkbox"/> Changed Product | <input type="checkbox"/> Changed to Exempt Tank(s) |

CHANGE OF OWNERSHIP

- Tanks Changed Ownership and Remain at Same Facility*

* For Underground Storage Tanks (UST), attach the UST Operator Training Documentation Form (2530-PM-BECB0514a) and copies of the Class A and Class B operator training certificates.

II. CURRENT OR NEW TANK OWNER / CLIENT INFORMATION

DEP Client ID#	Client Type/Code	Fee Kind (check one if applicable)			
29B341		<input type="checkbox"/> Volunteer Fire Co/EMS Org	<input type="checkbox"/> State Govt	<input type="checkbox"/> Fed Govt	
Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#		
Philadelphia Energy Solutions Refining and Marketing, LLC					
Individual Last Name	First Name	MI	Suffix	SSN	
Bowman	Gary	P	Sr.		
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1		Mailing Address Line 2			
3144 West Passyunk Avenue					
Address Last Line - City		State	ZIP+4	Country	
Philadelphia		PA	19145	USA	
Client Contact Last Name	First Name	MI	Suffix		
Bowman	Gary	P.	Sr.		
Client Contact Title		Phone	Ext		
President		610-638-4574			
E-mail Address			FAX		
Gbowman@northstar.com					

III. SITE INFORMATION

DEP Site ID#	Site Name				
EPA ID#	Estimated Number of Employees to be Present at Site				
Description of Site					
County Name	Municipality	City	Boro	Twp	State
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
County Name	Municipality	City	Boro	Twp	State
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site Location Line 1		Site Location Line 2			
Site Location Last Line - City		State	ZIP+4		
Detailed Written Directions to Site					

Site Contact Last Name	First Name	MI	Suffix		
Site Contact Title		Site Contact Firm			
Mailing Address Line 1		Mailing Address Line 2			
Address Last Line - City		State	ZIP+4		
Phone	Ext	FAX	E-mail Address		
NAICS Codes (Two- & Three-Digit Codes - List All That Apply)				6-Digit Code (Optional)	
Site to Client Relationship					

III(a). PROPERTY OWNER INFORMATION

Same as Tank Owner identified in Section II. Different than Tank Owner identified in Section II; identified below.

Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#		
Individual Last Name	First Name	MI	Suffix	SSN	
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1		Mailing Address Line 2			
Address Last Line - City		State	ZIP+4	Country	
Property Owner Contact Last Name	First Name	MI	Suffix		
Property Owner Contact Title		Phone	Ext		
E-mail Address			FAX		

IV. FACILITY INFORMATION

DEP Storage Tank Facility ID#	Facility Name	Facility Kind				
Facility Location Line 1 (if different than Site Location)		Facility Location Line 2				
Facility Location Last Line - City		State ZIP+4				
Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degree	Minutes	Seconds	Degree	Minutes	Seconds
Horizontal Accuracy Measure	Feet	-or-	Meters			
Horizontal Reference Datum Code	<input type="checkbox"/> North American Datum of 1927 <input type="checkbox"/> North American Datum of 1983 <input type="checkbox"/> World Geodetic System of 1984					
Horizontal Collection Method Code						
Reference Point Code						
Altitude	Feet	-or-	Meters			
Altitude Datum Name	<input type="checkbox"/> The National Geodetic Vertical Datum of 1929 <input type="checkbox"/> The North American Vertical Datum of 1985 (NAVD85)					
Altitude (Vertical) Location Datum Collection Method Code						
Geometric Type Code						
Data Collection Date						
Source Map Scale Number		Inch(es)	=	Feet		
	-or-	Centimeter(s)	=	Meters		
Flammable & Combustible Liquid Permit # (if applicable)						
State or Municipality that issued the Permit						

FACILITY OPERATOR INFORMATION

<input type="checkbox"/> Same as Owner Identified in Section II		<input type="checkbox"/> Different than Owner Identified in Section II: identified below.				
DEP Client ID#	Client Type / Code					
Organization Name or Registered Fictitious Name			Employer ID# (EIN)	Dun & Bradstreet ID#		
Individual Last Name	First Name	MI	Suffix	SSN		
Additional Individual Last Name	First Name	MI	Suffix	SSN		
Mailing Address Line 1		Mailing Address Line 2				
Address Last Line - City		State	ZIP+4	Country		
Client Contact Last Name		First Name	MI	Suffix		
Client Contact Title			Phone	Ext		
E-mail Address				FAX		

V. CHANGE OF OWNERSHIP INFORMATION

- All Tanks Changed Ownership at the Facility
- Some Tanks Changed Ownership at the Facility (List all applicable tank numbers in Section VI.)

OWNERSHIP CHANGE TO - Client information is noted in Section II.
OWNERSHIP CHANGE FROM (previous owner information)

Name _____
Employer ID# (EIN) or SSN _____
Mailing Address Line 1 _____
Mailing Address Line 2 _____
Address Last Line - City _____ State _____ ZIP+4 _____
Previous Facility ID# _____

DATE OF SALE/TRANSFER

SIGNATURE & CERTIFICATION OF PREVIOUS OWNER

Previous owner's signature is not available. As required, the "new" owner has attached a deed of transfer or other proof of ownership to this application. Yes No N/A

I have reviewed this form for submission to the Department. I certify under penalty of law as provided in 18 PA. C.S.A. §4903 (relating to false swearing) and 18 PA. C.S.A. §4904 (relating to unsworn falsification to authorities), that I have the authority to sign this Section for the transfer of permit or registration for the storage tanks listed herein. Further, I certify that all information provided in Section V is true, accurate and complete to the best of my knowledge and belief.

Type or Print Previous Owner Name _____

Previous Owner Signature _____ Title _____ Date _____

Facility ID# 51-33624

Facility Name Phula Ref Girard Point

VI. STORAGE DESCRIPTION

Type or print legibly each regulated storage tank at this facility under your ownership.

Status Codes: C-Currently in Use T-Temporarily Out of Use E-Exempt
Type Codes: M-Manufactured F-Field Constructed P-Closed In Place

A. ABOVEGROUND TANKS. List all new tanks. If amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name		Exempt Reference Code
								(If Hazardous Substance)	(If Other Petroleum Substance or Petroleum Based Mixture)	
D05A	T	R	F	01/01/1953	10/04/2021	1,016,400		Udex Feed		
030A	T	R	F	01/01/1953	10/04/2021	1,016,400		Udex Feed		
A										
A										
A										
A										
A										
A										
A										

B. UNDERGROUND TANKS. List all new tanks. If amending information, list only those tanks being amended. Copy this page if more lines are needed.

Tank#	Prev Status	New Status	Type	Install Date (Mo/Day/Yr)	Change of Status Date (Mo/Day/Yr)	Capacity (Gallons)	Substance Code (Currently or Last Stored)	CERCLA Name		Exempt Reference Code
								(If Hazardous Substance)	(If Other Petroleum Substance or Petroleum Based Mixture)	

Facility ID# 51-33624

Facility Name Phila Ref Girard Point

VII. ABOVEGROUND & UNDERGROUND NEW TANK INSTALLATION INFORMATION

The DEP Certified Installer should complete this section. New tanks listed in Section VI must also be listed in this Section. Write the Tank Number(s) and place an in the appropriate box for each component that was installed.

Tank Construction & Corrosion Protection (1)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Tank Manufacturer: Model:							
A. Unprotected Steel (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Cathodically Protected Steel (Impressed Current)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Unprotected Steel (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fiberglass (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Fiberglass (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Steel w/Plastic or Fiberglass Jacket or Double Wall Act 100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Steel With FRP Coating (Act 100 or Equivalent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Steel with Lined Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Cathodically Protected Double Wall Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P. Cathodically Protected Steel with Liner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Double Bottom (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Molded Plastic Form (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T. Aluminum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
U. Fire Protected Double Wall AST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Steel with Plastic or Fiberglass Jacket or Double Wall Act 100 with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
W. Steel with FRP Coating (Act 100 or Equivalent) with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
X. Molded Plastic Form (Double Wall) (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# 51-33624

Facility Name Phila Ref Girard Point

Underground Piping Construction & Corrosion Protection – Single/Inner Wall (28)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Primary (Inner) Piping Manufacturer:							
Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Underground Piping Construction & Corrosion Protection – Outer Wall (29)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Secondary (Outer) Piping Manufacturer:							
Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Poly-encased Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# 51-33624 Facility Name Phila Ref Girard Point

Aboveground Piping Construction & Corrosion Protection (3)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Carbon Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Single Wall Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Single Wall Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. PVC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Double Wall - Metallic Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Double Wall - Rigid (FRP) Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Double Wall - Flexible Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Product Delivery System (4)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Suction Check valve at pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Suction Check valve at tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Gravity fed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spill Prevention (5)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
S. Permanently installed and liquid tight (single-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Permanently installed and liquid tight (double-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# 51-33624

Facility Name Phila Ref Gerard Point

Overflow Prevention (7)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Overflow alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fall in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Drop tube shutoff device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (AST only) Type _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Emergency Containment (16) ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (includes double-walled tanks with required appurtenances)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Secondary Containment (17) Single Wall ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stage I Vapor Recovery (19) USTs and ASTs when applicable	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Coaxial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. 2 Point	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None or incomplete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# 51-33624

Facility Name Phila Ref Girard Point

Tank-top Containment Sumps Present (Product Piping Only) (21) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some penetrations and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. At all penetrations and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Under-dispenser Containment Present (22) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some dispensers and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. Under all dispensers and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Line Leak Detector Shut-Off Pump (23) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tank Supplies Emergency Generator (25)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# 51-33624

Facility Name Phila Ref Girard Point

VIII. ABOVEGROUND & UNDERGROUND TANK INFORMATION FOR PERMANENT CLOSURE

Write the Tank Number(s) and place an in the appropriate box for each tank that was removed or closed in place.

Items 2 & 3 below apply to large ASTs and all USTs	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	005A	030A				
1. Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Closure document submitted to the appropriate DEP regional office.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Closure document kept on file by owner.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. This registration is conditioned upon compliance with provisions of the Storage Tank and Spill Prevention Act of 1980, all applicable regulations, and with the requirements for obtaining and maintaining a permit required under this Act. I certify my responsibility for assuring the following permit requirements:

- Storage tank systems are in compliance with applicable administrative, technical and operational requirements as specified in Subchapter E for underground tanks or Subchapter F or G for aboveground tanks.
- Tank handling and inspection activities are performed by an individual possessing DEP certification in the appropriate category as required in Subchapters A and B.
- Underground storage tanks meet the applicable financial responsibility requirements of Subchapter H (relating to financial responsibility requirements).
- A Spill Prevention Response (SPR) Plan must be submitted to the appropriate DEP regional office for facilities that have aboveground storage tanks where the total capacity of all aboveground tanks is greater than 21,000 gallons.
- Other state and local permits required for operation of the tank system have been obtained.

My signature represents to the Department that I own the storage tank(s) and am aware of the responsibilities and potential liabilities as an "owner" arising under the Storage Tank and Spill Prevention Act of 1980 and all applicable regulations. I am also advised that statements made on this registration is made subject to the penalties of 18 PA. C.S.A. Section 4904 relating to unsworn falsification to authorities.

Type or Print Owner Name Gary Bowman

	President Title	11/01/2021 Date
Owner Signature		

Information & Invoices should be sent to:

- Tank Owner Contact
- Site Contact
- Facility Operator
- Other Responsible Party Identified Below

Organization Name or Registered Fictitious Name		Employer ID# (EIN)		Dun & Bradstreet ID#
NorthStar Contracting Group, Inc.				
Individual Last Name	First Name	MI	Suffix	SSN
Bowman	Gary	P.	Sr.	
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Line 1	Mailing Address Line 2			
2250 East Adams Avenue				
Address Last Line - City	State	ZIP+4	Country	
Philadelphia	PA	19124	USA	
Contact Title	Phone		Ext.	
President	610-636-4574			
E-mail Address				
Gbowman@northstar.com				
Client to Site (Facility) Relationship				

X. INSTALLER / REMOVER CERTIFICATION

This section must be completed by the certified tank handler(s) who is responsible for the installation or removal of the aboveground and underground storage tank systems listed in Section VI. Tank modification activity must be submitted on a "Tank Modification Report" form.

SIGNATURE & CERTIFICATION OF INSTALLER(S) / REMOVER(S)

As the certified tank handler responsible for the tank handling activities in this category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I also certify, under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Installer/Remover Name	Construction Standard	Individual Certifications	Certification Category	Company Certifications	Installer/Remover Signature	Date
005A	Kristian Sutherthwaite		588f	AFR	1567	<i>Kristian Sutherthwaite</i>	11/28/21
030A	Kristian Sutherthwaite		588f	AFR	1567	<i>Kristian Sutherthwaite</i>	11/29/21

XI. INSPECTOR CERTIFICATION

This section must be completed by the DEP Certified Tank Inspector(s) who is responsible for verifying the installation standards for field constructed tanks and aboveground tanks greater than 21,000 gallons listed in Section VI. (Type or Print legibly) A DEP Certified Inspector may also be responsible for inspecting existing ASTs which are entering regulated service for the first time with no tank handling activities.

SIGNATURE & CERTIFICATION OF INSPECTOR(S)

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications; that the tank(s) have been tested as required by industry standards; and that this tank(s) meet or exceed applicable design and operating standards; and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1989, and all applicable regulations. I also certify under penalty of law as provided in 18 PA C.S.A. 4904 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Inspector Name	Construction Standard	Individual Certifications	Certification Category	Company Certifications	Inspector Signature	Date

XII. SITE SPECIFIC INSTALLATION PERMIT NUMBER

If a site-specific permit was required for a new tank installation, write the tank number(s) and permit number(s) in the appropriate box.

Site-Specific Installation Permit	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#



2250 E Adams Ave • Philadelphia, PA 19124
Office: 215.533.8890 • Fax: 215.533.8897
Website • www.NorthStar.com

February 28, 2022

Pennsylvania Department of Environmental Protection
Southeast Regional Office
Division of Storage Tanks
2 East Main Street
Norristown, Pennsylvania 19401

Via email: RA.sestoranks@pa.gov, ra-ranks@pa.gov

Re: Philadelphia Energy Solutions Refining and Marketing, LLC (PES)
PADEP Storage Tanks Registration/Permitting Application Form
PADEP Facility ID #51-33624 - Girard Point Refinery

To whom it may concern:

Please find NorthStar Contracting Group, Inc.'s submittal of the Pennsylvania Department of Environmental Protection's (PA DEP's) Storage Tank Registration/Permitting Application Forms for the removal of the following nine (9) Aboveground storage tanks located at the Philadelphia Energy Solutions Refining and Marketing, LLC Girard Point Processing Area.

Removed					
Facility Name	PADEP Facility ID #	PADEP Tank ID #	Owner Tank ID #	AMS Tank ID #	Removal Date
Girard Point Refinery	51-33624	034A	GP-790	P-017	02/21/2022
Girard Point Refinery	51-33624	006A	GP-791	P-018	02/21/2022
Girard Point Refinery	51-33624	035A	GP-792	P-019	02/21/2022
Girard Point Refinery	51-33624	036A	GP-793	P-020	02/21/2022
Girard Point Refinery	51-33624	037A	GP-794	P-155	02/21/2022
Girard Point Refinery	51-33624	007A	GP-798	P-022	02/21/2022
Girard Point Refinery	51-33624	039A	GP-799	P-023	02/21/2022
Girard Point Refinery	51-33624	041A	GP-1091	NA	02/28/2022
Girard Point Refinery	51-33624	042A	GP-2982	NA	02/28/2022

If you have any questions, please do not hesitate to contact me at 480-228-1524.
Respectfully Submitted,

Robert Armstrong
Sr. Project Manager
NorthStar Contracting Group, Inc.

Enclosures Storage Tank Registration/Permitting Application Form

cc:

Gary Bowman (NorthStar)
Dr. Kassahun Selassie (AMS)
Thomas Darsley (AMS)
Clades Barksdale (Hilco)
Edward Wiener (AMS)
Mike Leonardo (Hilco)

STORAGE TANKS REGISTRATION / PERMITTING APPLICATION FORM

Before completing this form, read the step-by-step instructions provided in this application package.

61-33624 Facility ID # Philadelphia Ref Girard Point Facility Name	DEP USE ONLY Client ID# Site ID# Account # Auth ID# APB ID# Master Auth ID#
---	--

I. PURPOSE OF SUBMITTAL

INITIAL (Applies to First-Time Facility Registration)

- | | |
|--|---|
| <input type="checkbox"/> Register Tank(s) to be Used*
<input type="checkbox"/> Register Tank(s) to be Removed | <input type="checkbox"/> Register Tank(s) to be Temporarily Out of Use
<input type="checkbox"/> Register Tank(s) to be Closed in Place |
|--|---|

AMENDED (Applies to Currently Registered Tank(s) or Existing Facility)

- | | |
|--|---|
| <input type="checkbox"/> Changed Owner Information
<input type="checkbox"/> Changed Facility Information
<input type="checkbox"/> Changed to Currently In Use Tank(s)*
<input type="checkbox"/> Changed to Temporarily Out of Use Tank(s)
<input type="checkbox"/> Changed Product | <input type="checkbox"/> Changed Contact Information
<input type="checkbox"/> Changed Facility Operator Information
<input type="checkbox"/> Added Tank(s) to Existing Facility*
<input checked="" type="checkbox"/> Changed to Permanently Closed Tank(s)/Removed
<input type="checkbox"/> Changed to Exempt Tank(s) |
|--|---|

CHANGE OF OWNERSHIP

- Tanks Changed Ownership and Remain at Same Facility*

* For Underground Storage Tanks (UST), attach the UST Operator Training Documentation Form (2630-PM-BECB0514a) and copies of the Class A and Class B operator training certificates.

II. CURRENT OR NEW TANK OWNER / CLIENT INFORMATION

DEP Client ID#	Client Type/Code	Fee Kind (check one if applicable)		
298341		<input checked="" type="checkbox"/> Volunteer Fire Co/EMS Org	<input type="checkbox"/> State Govt	<input type="checkbox"/> Fed Govt
Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Dun & Bradstreet ID#	
Philadelphia Energy Solutions Refining and Marketing LLC				
Individual Last Name	First Name	MI	Suffix	SSN
Bowman	Gary	P	Sr.	
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Line 1		Mailing Address Line 2		
3144 West Passyunk Avenue				
Address Last Line - City	State	ZIP+4	Country	
Philadelphia	PA	19145	USA	
Client Contact Last Name	First Name	MI	Suffix	
Bowman	Gary	P	Sr.	
Client Contact Title		Phone	Ext	
President		810-638-4574		
E-mail Address			FAX	
gbowman@northeter.com				

III. SITE INFORMATION

DEP Site ID# _____ Site Name _____

EPA ID# _____ Estimated Number of Employees to be Present at Site _____

Description of Site _____

County Name _____ Municipality _____ City _____ Boro _____ Twp _____ State _____

County Name _____ Municipality _____ City _____ Boro _____ Twp _____ State _____

Site Location Line 1 _____ Site Location Line 2 _____

Site Location Last Line - City _____ State _____ ZIP+4 _____

Detailed Written Directions to Site _____

Site Contact Last Name _____ First Name _____ MI _____ Suffix _____

Site Contact Title _____ Site Contact Firm _____

Mailing Address Line 1 _____ Mailing Address Line 2 _____

Address Last Line - City _____ State _____ ZIP+4 _____

Phone _____ Ext _____ FAX _____ E-mail Address _____

NALC9 Codes (Two- & Three-Digit Codes - List All That Apply) _____ 6-Digit Code (Optional) _____

Site to Client Relationship _____

IIIa. PROPERTY OWNER INFORMATION

Same as Tank Owner Identified in Section II. Different than Tank Owner Identified in Section II; Identified below.

Organization Name or Registered Fictitious Name _____ Employer ID# (EIN) _____ Dun & Bradstreet ID# _____

Individual Last Name _____ First Name _____ MI _____ Suffix _____ SSN _____

Additional Individual Last Name _____ First Name _____ MI _____ Suffix _____ SSN _____

Mailing Address Line 1 _____ Mailing Address Line 2 _____

Address Last Line - City _____ State _____ ZIP+4 _____ Country _____

Property Owner Contact Last Name _____ First Name _____ MI _____ Suffix _____

Property Owner Contact Title _____ Phone _____ Ext _____

E-mail Address _____ FAX _____

IV. FACILITY INFORMATION

DEP Storage Tank Facility ID#	Facility Name	Facility Kind				
Facility Location Line 1 (if different than Site Location)		Facility Location Line 2				
Facility Location Last Line - City		State ZIP+4				
Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Horizontal Accuracy Measure	Feet	-or-	Meters			
Horizontal Reference Datum Code	<input type="checkbox"/> North American Datum of 1927 <input type="checkbox"/> North American Datum of 1983 <input type="checkbox"/> World Geodetic System of 1984					
Horizontal Collection Method Code						
Reference Point Code						
Altitude	Feet	-or-	Meters			
Altitude Datum Name	<input type="checkbox"/> The National Geodetic Vertical Datum of 1929 <input type="checkbox"/> The North American Vertical Datum of 1988 (NAVD88)					
Altitude (Vertical) Location Datum Collection Method Code						
Geometric Type Code						
Date Collection Date						
Source Map Scale Number		Inch(es)	=	Feet		
	-or-	Centimeter(s)	=	Meters		
Flammable & Combustible Liquid Permit # (if applicable)						
State or Municipality that issued the Permit						

FACILITY OPERATOR INFORMATION

Same as Owner Identified in Section II. Different than Owner Identified in Section II; Identified below.

DEP Client ID#	Client Type / Code				
Organization Name or Registered Fictitious Name	Employer ID# (EIN)	Dun & Bradstreet ID#			
Individual Last Name	First Name	MI	Suffix	SSN	
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Line 1	Mailing Address Line 2				
Address Last Line - City	State	ZIP+4	Country		
Client Contact Last Name	First Name	MI	Suffix		
Client Contact Title	Phone	Ext			
E-mail Address	FAX				

V. CHANGE OF OWNERSHIP INFORMATION

- All Tanks Changed Ownership at the Facility
 Some Tanks Changed Ownership at the Facility (List all applicable tank numbers in Section VI.)

OWNERSHIP CHANGE TO - Client information is noted in Section II.
OWNERSHIP CHANGE FROM (previous owner information)

Name _____
Employer ID# (EIN) or SSN _____
Mailing Address Line 1 _____
Mailing Address Line 2 _____
Address Last Line - City _____ State _____ ZIP+4 _____
Previous Facility ID# _____

DATE OF SALE/TRANSFER _____

SIGNATURE & CERTIFICATION OF PREVIOUS OWNER

Previous owner's signature is not available. As required, the "new" owner has attached a deed of transfer or other proof of ownership to this application. Yes No N/A

I have reviewed this form for submission to the Department. I certify under penalty of law as provided in 18 PA. C.S.A. 54903 (relating to false swearing) and 18 PA. C.S.A. 54904 (relating to unsworn falsification to authorities), that I have the authority to sign this Section for the transfer of permit or registration for the storage tanks listed herein. Further, I certify that all information provided in Section V is true, accurate and complete to the best of my knowledge and belief.

Type or Print Previous Owner Name _____

Previous Owner Signature _____ Title _____ Date _____

Facility ID#

Facility Name

VII. ABOVEGROUND & UNDERGROUND NEW TANK INSTALLATION INFORMATION

The DEP Certified installer should complete this section. New tanks listed in Section VI must also be listed in this Section. Write the Tank Number(s) and place an in the appropriate box for each component that was installed.

Tank Construction & Corrosion Protection (1)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Unprotected Steel (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Cathodically Protected Steel (Impressed Current)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Unprotected Steel (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fiberglass (Single Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Fiberglass (Double Wall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Steel w/Plastic or Fiberglass Jacket or Double Wall Act 100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Steel With FRP Coating (Act 100 or Equivalent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Steel with Lined Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O. Cathodically Protected Double Wall Steel (Galvanic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P. Cathodically Protected Steel with Liner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q. Double Bottom (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R. Molded Plastic Form (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T. Aluminum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
U. Fire Protected Double Wall AST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Steel with Plastic or Fiberglass Jacket or Double Wall Act 100 with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
W. Steel with FRP Coating (Act 100 or Equivalent) with Anodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
X. Molded Plastic Form (Double Wall) (AST's Only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

Underground Piping Construction & Corrosion Protection – Single/Inner Wall (28)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Primary (Inner) Piping Manufacturer Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Underground Piping Construction & Corrosion Protection – Outer Wall (29)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
Secondary (Outer) Piping Manufacturer Model:							
A. Bare Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. No Dispensing Piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Poly-encased Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID# _____ Facility Name _____

Aboveground Piping Construction & Corrosion Protection (3)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Carbon Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cathodically Protected Metallic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Copper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Single Wall Fiberglass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Single Wall Flexible (Non-Metallic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. PVC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Double Wall - Metallic Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J. Double Wall - Rigid (FRP) Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K. Double Wall - Flexible Primary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L. Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Product Delivery System (4)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Suction: Check valve at pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Suction: Check valve at tank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Gravity fed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Spill Prevention (6)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
S. Permanently installed and liquid tight (single-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Permanently installed and liquid tight (double-walled)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility Name _____

Overfill Prevention (7)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Overfill alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Fill in less than 25 gallons (exempt)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None (AST only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. Drop tube shutoff device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (AST only) Type: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Emergency Containment (18) ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes (includes double-walled tanks with required appurtenances)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Secondary Containment (17) Single Wall ASTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Underground vault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stage I Vapor Recovery (19) USTs and ASTs when applicable	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
A. Coaxial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. 2 Point	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N. None or incomplete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility Name

Tank-top Containment Sumps Present (Product Piping Only) (21) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some penetrations and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. At all penetrations and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Under-dispenser Containment Present (22) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. None - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S. At some dispensers and liquid tight - Explain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A. Under all dispensers and liquid tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Line Leak Detector Shut Off Pump (23) USTs only	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Tank Supplies Emergency Generator (25)	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
N. No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Y. Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility ID#

Facility Name

VIII. ABOVEGROUND & UNDERGROUND TANK INFORMATION FOR PERMANENT CLOSURE

Write the Tank Number(s) and place an in the appropriate box for each tank that was removed or closed in place.

Items 2 & 3 below apply to large ASTs and all USTs	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	034A	006A	035A	036A	037A	007A
1. Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Closure document submitted to the appropriate DEP regional office.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. Closure document kept on file by owner.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Write the Tank Number(s) and place an in the appropriate box for each tank that was removed or closed in place.

Items 2 & 3 below apply to large ASTs and all USTs	Tank #	Tank #	Tank #	Tank #	Tank #	Tank #
	038A	41A	42A			
1. Contamination suspected or observed and notification of contamination form was submitted to the appropriate DEP regional office.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Closure document submitted to the appropriate DEP regional office.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Closure document kept on file by owner.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. This registration is conditioned upon compliance with provisions of the Storage Tank and Spill Prevention Act of 1989, all applicable regulations, and with the requirements for obtaining and maintaining a permit required under this Act. I certify my responsibility for assuring the following permit requirements:

- Storage tank systems are in compliance with applicable administrative, technical and operational requirements as specified in Subchapter E for underground tanks or Subchapter F or G for aboveground tanks.
- Tank handling and inspection activities are performed by an individual possessing DEP certification in the appropriate category as required in Subchapters A and B.
- Underground storage tanks meet the applicable financial responsibility requirements of Subchapter H (relating to financial responsibility requirements).
- A Spill Prevention Response (SPR) Plan must be submitted to the appropriate DEP regional office for facilities that have aboveground storage tanks where the total capacity of all aboveground tanks is greater than 21,000 gallons.
- Other state and local permits required for operation of the tank system have been obtained.

My signature represents to the Department that I own the storage tank(s) and am aware of the responsibilities and potential liabilities as an "owner" arising under the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I am also advised that statements made on this registration is made subject to the penalties of 18 PA. C.S.A. Section 4904 relating to unsworn falsification to authorities.

Type or Print Owner Name : Gary Bowman

 Owner Signature	President Title	02-28-2022 Date
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Information & Invoices should be sent to:

- Tank Owner Contact
- Site Contact
- Facility Operator
- Other Responsible Party Identified Below

Organization Name or Registered Fictitious Name		Employer ID# (EIN)		Dun & Bradstreet ID#
NorthStar Contracting Group, Inc.				
Individual Last Name	First Name	MI	Suffix	SSN
Bowman	Gary	P	Sr.	
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Line 1	Mailing Address Line 2			
2250 East Adams Ave.				
Address Last Line - City	State	ZIP+4	Country	
Philadelphia	PA	19124	USA	
Contact Title	Phone		Ext.	
President	610-638-4574			
E-mail Address				
gbowman@northstar.com				
Client to Site (Facility) Relationship				

X. INSTALLER / REMOVER CERTIFICATION

This section must be completed by the certified tank handler(s) who is responsible for the installation or removal from service of the aboveground and underground storage tank systems listed in Section VI. Tank modification activity must be submitted on a "Tank Modification Report" form.

SIGNATURE & CERTIFICATION OF INSTALLER(S) / REMOVER(S)

As the certified tank handler responsible for the tank handling activities in the category or categories listed, I certify that all tank handling activities were conducted in compliance with the design, installation and operation standards of the Storage Tank and Spill Prevention Act of 1989 and all applicable regulations. I also certify, under penalty of law as provided in 18 PA C.S.A. 4304 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Installer/Remover Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Installer/Remover Signature	Date
034A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
008A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
035A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
036A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
037A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
007A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
039A	Brian Garner	API 12C	5341	AFMX	1631	<i>[Signature]</i>	2/28/22
41A	Brian Garner	UL 142	5341	AMR	1631	<i>[Signature]</i>	2/28/22
42A	Brian Garner	UL 142	5341	AMR	1631	<i>[Signature]</i>	2/28/22

XI. INSPECTOR CERTIFICATION

This section must be completed by the DEP Certified Tank Inspector(s) who is responsible for verifying the installer standards for both constructed tanks and aboveground tanks greater than 21,000 gallons listed in Section VI. (Type or Print legibly) A DEP Certified Inspector may also be responsible for inspecting existing ASTs which are entering regulated service for the first time with no tank handling activities.

SIGNATURE & CERTIFICATION OF INSPECTOR(S)

As the certified tank inspector responsible for verifying tank handling activities and construction standards, I certify that the tank(s) listed below are constructed to appropriate industry standards and, if applicable, to manufacturer's specifications; that the tank(s) have been tested as required by industry standards; and that the tank(s) meet or exceed applicable design and operating standards; and are in compliance with the requirements of the Storage Tank and Spill Prevention Act of 1989, and all applicable regulations. I also certify under penalty of law as provided in 18 PA C.S.A. 4304 (relating to unsworn falsification to authorities), that the information provided herein is true, accurate and complete to the best of my knowledge and belief.

Tank#	Inspector Name	Construction Standard	Individual Certification#	Certification Category	Company Certification#	Inspector Signature	Date

XII. SITE SPECIFIC INSTALLATION PERMIT NUMBER

If a site-specific permit was required for a new tank installation, write the tank number(s) and permit number(s) in the appropriate box.

Site-Specific Installation Permit	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#	Tank#

Appendix F

Tank Closure Reports





ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

51-33624
Facility I.D.

Former Philadelphia Refinery Point Breeze - Tank Group 7
Facility Name

Philadelphia Philadelphia
Municipality County

January 17, 2023
Date Prepared

Kevin L. Long
Name of Person Submitting Report
(Please Print)

Terraphase Engineering
Company Name
(If Applicable)

Principal Consultant
Title

Closure Method (Check all that apply):

- AST Removal
- AST Closure-In-Place
- AST Change-In-Service

Site Assessment Results (Check all that apply):

- No Obvious Contamination - Sample Results Meet Standards/Levels
- No Obvious Contamination - Sample Results Do Not Meet Standards/Levels
- Obvious, Localized Contamination - Sample Results Meet Standards/Levels
- Obvious, Localized Contamination - Sample Results Do Not Meet Standards/Levels
- Obvious, Extensive Contamination

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

DATE RECEIVED: _____

**ABOVEGROUND STORAGE TANK SYSTEM
CLOSURE REPORT FORM**

Owners who are permanently closing aboveground storage tank systems may use this form to demonstrate that a storage tank system closure was performed in accordance with technical guidance document 263-4200-001 "Closure Requirements for Aboveground Storage Tank Systems". PLEASE PRINT OR TYPE. COMPLETE ALL QUESTIONS.

SECTION I. Owner/Facility/Tank/Waste Management and Disposal Information

1. Facility ID Number 51-33624
2. Facility Name Former Philadelphia Refinery Point Breeze - Tank Group 7
3. Facility County Philadelphia
4. Facility Municipality Philadelphia
5. Facility Address 3144 West Passyunk Avenue
6. Facility Contact Person Anne R. Garr
7. Facility Telephone Number (312) 796-6564
8. Owner Name Philadelphia Energy Solutions Refining and Marketing LLC
9. Owner Mailing Address 111 S. Wacker Dr., Ste 3000
10. Description of Aboveground Storage Tank Systems (Complete for each tank system closed)

DATE OF TANK SYSTEM CLOSURE (Month/Day/Year)		-	-	-	-
Description of Aboveground Storage Tank System (Complete for each tank system undergoing closure)					
DEP Tank ID Number	See attached Table				
Total Capacity (Gallons)					
Substance(s) Stored Throughout Operating Life of Tank System (Check All That Apply)	a. Petroleum Unleaded Gasoline <input type="checkbox"/> Leaded Gasoline <input type="checkbox"/> Aviation Gasoline <input type="checkbox"/> Pure Ethanol <input type="checkbox"/> Blended Ethanol _____% <input type="checkbox"/> Kerosene <input type="checkbox"/> Jet Fuel <input type="checkbox"/> Diesel Fuel <input type="checkbox"/> Biodiesel _____% <input type="checkbox"/> Fuel Oil No. 1 <input type="checkbox"/> Fuel Oil No. 2 <input type="checkbox"/> Fuel Oil No. 4 <input type="checkbox"/> Fuel Oil No. 5 <input type="checkbox"/> Fuel Oil No. 6 <input type="checkbox"/> New Motor Oil <input type="checkbox"/> Used Motor Oil <input type="checkbox"/> Nonpetroleum Oil, Specify Other, Specify _____ <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTE: If Hazardous Substance Block is Checked, Attach Safety Data Sheets (SDS)	b. Hazardous Substance Name of Principal CERCLA Substance AND Chemical Abstract Service (CAS) No. _____ <input type="checkbox"/> c. Unknown <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CLOSURE METHOD(s):		DEP Tank ID Number:				
Partial Storage Tank System Closure			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tank <input type="checkbox"/> N/A	a. Removal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. Closure-in-Place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c. Change-in-Service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piping <input type="checkbox"/> N/A	a. Removal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. Closure-in-Place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c. Change-in-Service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dispenser <input type="checkbox"/> N/A	a. Removal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. Closure-in-Place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c. Change-in-Service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	a. Removal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b. Closure-in-Place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c. Change-in-Service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe Closure Activities:

The tanks were drained via the in-place piping systems. Associated piping was also drained. Residual product was retained for use in other areas of the Former Philadelphia Refinery Complex. The interiors of tanks were cleaned. The tanks and piping were dismantled and removed from the site for disposal. When encountered, double bottoms were excavated and removed at a later date.

Yes N/A

11. Briefly describe the storage tank facility and the nature of the operations which were conducted at the facility (both historical and present) **including use of the storage tank systems:**

Tank Group 07 was located in the south-central portion of the Former Philadelphia Refinery Complex.

The tanks in the group held a variety of materials associated with the petroleum refining process.

12. A site location and sampling map of the site, drawn to scale, is attached. See page 11 of 11.
13. Original, color photographs of the closure process involving any excavation are attached (i.e., inside of excavation/piping runs, pit water, containment structure and foundation showing condition).
14. An amended "Storage Tanks Registration/Permitting Application" Form was submitted to the DEP, Bureau of Environmental Cleanup and Brownfields, Division of Storage Tanks, P.O. Box 8762, Harrisburg, PA 17105-8762.

Date: 10 / 4 / 2021

15. If a release was confirmed, the appropriate regional office of DEP was notified by the owner or operator.

Date: 8 / 10 / 2022

Office: Southeast

Yes N/A

16. If tanks were cleaned on-site:
- a. Briefly describe the disposition of usable product: Usable product was drained from the tanks prior to cleaning. Any residual product was discharged to the on-site process sewer and wastewater treatment system.
- b. Briefly describe the disposal of unusable product, sludges, sediments, and wastewater generated during cleaning. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
Tank Bottoms were stabilized prior to being transported offsite for disposal as hazardous secondary materials and shipped via railcar to Chemical Waster Management Inc at 7170 John Brannon Road, Sulphur, LA 70665. Remaining waste was discharged to the facility process sewer and wastewater treatment system.
- c. If tank contents were determined/deemed to be hazardous waste, provide:
- (1) Generator ID Number: PAD 04979109
- (2) Licensed Hazardous Waste Transporter Name and ID Number: LA 0000777201, LA 000147272
17. If tanks were removed from the site for cleaning:
- a. Provide the name and permit number of the processing, treatment, storage or disposal facility performing the tank cleaning:
- b. If tank contents were determined/deemed to be hazardous waste, provide:
- (1) Generator ID Number: _____
- (2) Licensed Hazardous Waste Transporter Name and ID Number: _____
18. Briefly describe the disposition of tanks/piping (Attach documentation of proper disposal):
All tanks, associated piping were cleaned, demolished and recycled for scrap value.
19. If contaminated soil is excavated:
- a. Briefly describe the disposition and amount _____ (tons) of contaminated soil. Provide the name and permit number of the processing, treatment, storage or disposal facility. (Attach documentation of proper disposal):
- _____
- _____
- _____

- b. If contaminated soil is determined/deemed to be hazardous waste, provide:
- (1) Generator ID Number: _____
 - (2) Licensed Hazardous Waste Transporter Name and ID Number: _____

Yes N/A

 20. Briefly describe the disposition of and amount _____ (tons) of uncontaminated soil and debris (attach analyses):

21. If the tanks were "Closed-in-Place" provide information below:
- a. Briefly describe the tank cleaning process: _____

 - b. If subcontracted, name and address of company that performed the tank cleaning:

 - c. How were tanks marked/labeled with permanent closure date: _____

I, Anne R. Garr, Assistant Secretary, hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the owner of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section I) is true, accurate and complete to the best of my knowledge and belief.



Signature of Tank Owner

02 / 03 / 2023

Date

Philadelphia Energy Solutions Refining and Marketing LLC
Company Name
(If applicable)

Assistant Secretary
Title

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION II. Tank Handling Information

Facility ID Number 51 - 33624

DEP Tank ID Number(s) 005A, 006A, 007A, 029A, 030A, 033A, 034A, 035A, 036A, 037A, 039A, 046A

Yes N/A

1. Briefly describe the excavation and initial on-site staging of uncontaminated/contaminated soil and debris:
Removed tank and piping debris was segregated and loaded into roll-off containers during demolition.

2. Briefly describe the method of piping system closure and the closure of the piping systems including the quantity and condition of the piping:

3. Briefly describe the condition of the tanks and any problems encountered during tank handling or tank removal activities:

4. Briefly describe the method used to purge the tanks of and monitor for hazardous or explosive vapors:

5. If tanks were cleaned on-site:
a. Briefly describe the tank cleaning process: Tanks were drained, cut open, rinsed and scrubbed clean of any residuals before demolition.

b. If subcontracted, name and address of company that performed the tank cleaning:
NorthStar Contracting Group, Inc., 2250 East Adams Avenue, Philadelphia, PA 19124

6. If tanks were "Closed-in-Place", briefly describe how tanks were rendered inoperative, marked permanently closed with date, vented and secured to prevent unauthorized entry: _____

7. If contamination was suspected or observed, the "Notification of Contamination" form was submitted.

I, KRISTIAN SATTERTHWAITE hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to
(Print Name)
unsworn falsification to authorities) that I am the certified remover who performed the tank handling activities associated
with the closure of the above referenced storage tank(s) and that the information provided by me in this closure report
(Section I) is true, accurate and complete to the best of my knowledge and belief.

Kristian Satterthwaite
Signature of Certified Remover

1 127, 2023
Date

5081
Remover Certification Number

1557
Company Certification Number

JOZ ENVIRONMENTAL, INC.
Company Name

800 E. WASHINGTON STREET
Street

WEST CHESTER, PA 19380
City/Town, State, Zip

(610) 430-9151
Phone

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 029A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

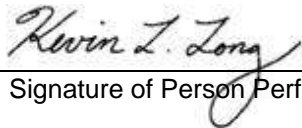
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn (Print Name) falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

Sample/Analysis Information (Attachment for Section III.)

Facility ID Number 51 - 33624

Sample I.D. (See diagram)	Parameter	Analytical Method ¹	Media	Result (units)	Detection Limit (units)	Date Sample Taken	Date Sample Analyzed
See attached summary table						/ /	/ /
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¹ Where EPA Method 5035 is used, indicate sample collection option in the right-hand box of this column using the following codes:

- P - Samples placed in a soil sample vial with a preservative present.
- E - Samples collected and stored in a soil collection device which is airtight and affords little to no headspace.

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 4 - 029A (GP R 494)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR494-01	GPR494-01-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	9.7	1.1	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	7.7	1.4	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	3.7	1.1	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	2.5	1.4	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Chrysene	SW8270D	Soil	13	1.1	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Fluorene	SW8270D	Soil	5.2	1.8	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Naphthalene	SW8270D	Soil	1.3	1.8	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Lead	SW6010D	Soil	517	2.11	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Pyrene	SW8270D	Soil	11	1.1	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Toluene	SW8260C	Soil	ND	0.049	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Phenanthrene	SW8270D	Soil	30	1.1	8/2/2022	8/9/2022
GPR494-01	GPR494-01-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.099	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.022	0.049	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Cumene	SW8260C	Soil	ND	0.049	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Benzene	SW8260C	Soil	ND	0.025	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.06	0.099	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.049	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.025	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.22	0.099	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.116	0.099	8/2/2022	8/5/2022
GPR494-01	GPR494-01-SS01	4.5	5	Anthracene	SW8270D	Soil	4.8	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Anthracene	SW8270D	Soil	7.1	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Benzo(a)anthracene	SW8270D	Soil	20	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Benzo(a)pyrene	SW8270D	Soil	18	1.5	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Benzo(b)fluoranthene	SW8270D	Soil	8.4	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Benzo(g,h,i)perylene	SW8270D	Soil	7	1.5	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Chrysene	SW8270D	Soil	34	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Fluorene	SW8270D	Soil	9	1.9	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Naphthalene	SW8270D	Soil	1.4	1.9	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Phenanthrene	SW8270D	Soil	71	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Pyrene	SW8270D	Soil	39	1.1	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Lead	SW6010D	Soil	90.3	2.21	8/2/2022	8/9/2022
GPR494-02	GPR494-02-SS01	1.5	2	Xylenes (total)	SW8260C	Soil	0.218	0.14	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	1,2-Dibromoethane	SW8260C	Soil	ND	0.036	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	1,2-Dichloroethane	SW8260C	Soil	ND	0.072	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.14	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	Cumene	SW8260C	Soil	0.63	0.072	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	Ethyl Benzene	SW8260C	Soil	0.064	0.072	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	Methyl tert-butyl ether	SW8260C	Soil	ND	0.14	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	Toluene	SW8260C	Soil	0.047	0.072	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	Benzene	SW8260C	Soil	0.037	0.036	8/2/2022	8/5/2022
GPR494-02	GPR494-02-SS01	1.5	2	1,2,4-Trimethylbenzene	SW8260C	Soil	0.061	0.14	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Pyrene	SW8270D	Soil	20	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Benzo(a)pyrene	SW8270D	Soil	7.4	0.72	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Benzo(b)fluoranthene	SW8270D	Soil	3.6	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Benzo(g,h,i)perylene	SW8270D	Soil	2.4	0.72	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Chrysene	SW8270D	Soil	14	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Fluorene	SW8270D	Soil	4.8	0.91	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Phenanthrene	SW8270D	Soil	29	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Benzo(a)anthracene	SW8270D	Soil	7.8	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	Toluene	SW8260C	Soil	0.00082	0.00096	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Naphthalene	SW8270D	Soil	ND	0.91	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00048	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Anthracene	SW8270D	Soil	4	0.54	8/2/2022	8/9/2022
GPR494-03	GPR494-03-SS01	4	4.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0017	0.0019	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Xylenes (total)	SW8260C	Soil	0.0132	0.0019	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.00096	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0004	0.0019	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Benzene	SW8260C	Soil	0.0004	0.00048	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Cumene	SW8260C	Soil	0.034	0.00096	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Ethyl Benzene	SW8260C	Soil	0.0012	0.00096	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0019	8/2/2022	8/5/2022
GPR494-03	GPR494-03-SS01	4	4.5	Lead	SW6010D	Soil	12.9	2.12	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Toluene	SW8260C	Soil	0.0011	0.0012	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Benzo(a)anthracene	SW8270D	Soil	3.9	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Pyrene	SW8270D	Soil	8.6	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Phenanthrene	SW8270D	Soil	1.1	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Naphthalene	SW8270D	Soil	0.36	0.93	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Fluorene	SW8270D	Soil	0.57	0.93	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Chrysene	SW8270D	Soil	9.7	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Benzo(g,h,i)perylene	SW8270D	Soil	3.5	0.75	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Benzo(b)fluoranthene	SW8270D	Soil	4.6	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Benzo(a)pyrene	SW8270D	Soil	7.4	0.75	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00061	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Anthracene	SW8270D	Soil	0.59	0.56	8/2/2022	8/9/2022
GPR494-04	GPR494-04-SS01	2	2.5	Xylenes (total)	SW8260C	Soil	0.0068	0.0024	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.001	0.0024	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0012	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0074	0.0024	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Benzene	SW8260C	Soil	0.00036	0.00061	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Cumene	SW8260C	Soil	0.0072	0.0012	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Ethyl Benzene	SW8260C	Soil	0.001	0.0012	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0024	8/2/2022	8/5/2022
GPR494-04	GPR494-04-SS01	2	2.5	Lead	SW6010D	Soil	238	2.14	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Toluene	SW8260C	Soil	0.089	0.14	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	Pyrene	SW8270D	Soil	15	1.2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.94	2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Fluorene	SW8270D	Soil	8.1	2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Chrysene	SW8270D	Soil	16	1.2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	2.7	1.6	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	3.9	1.2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	8.7	1.6	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	11	1.2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Phenanthrene	SW8270D	Soil	36	1.2	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Lead	SW6010D	Soil	32	2.37	8/2/2022	8/9/2022
GPR494-05	GPR494-05-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.27	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.046	0.14	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	Cumene	SW8260C	Soil	2.1	0.14	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	Benzene	SW8260C	Soil	ND	0.068	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.27	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.14	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.068	8/2/2022	8/5/2022
GPR494-05	GPR494-05-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C					

Table 4 - 029A (GP R 494)

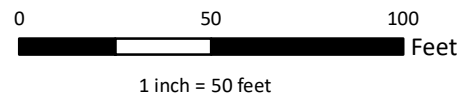
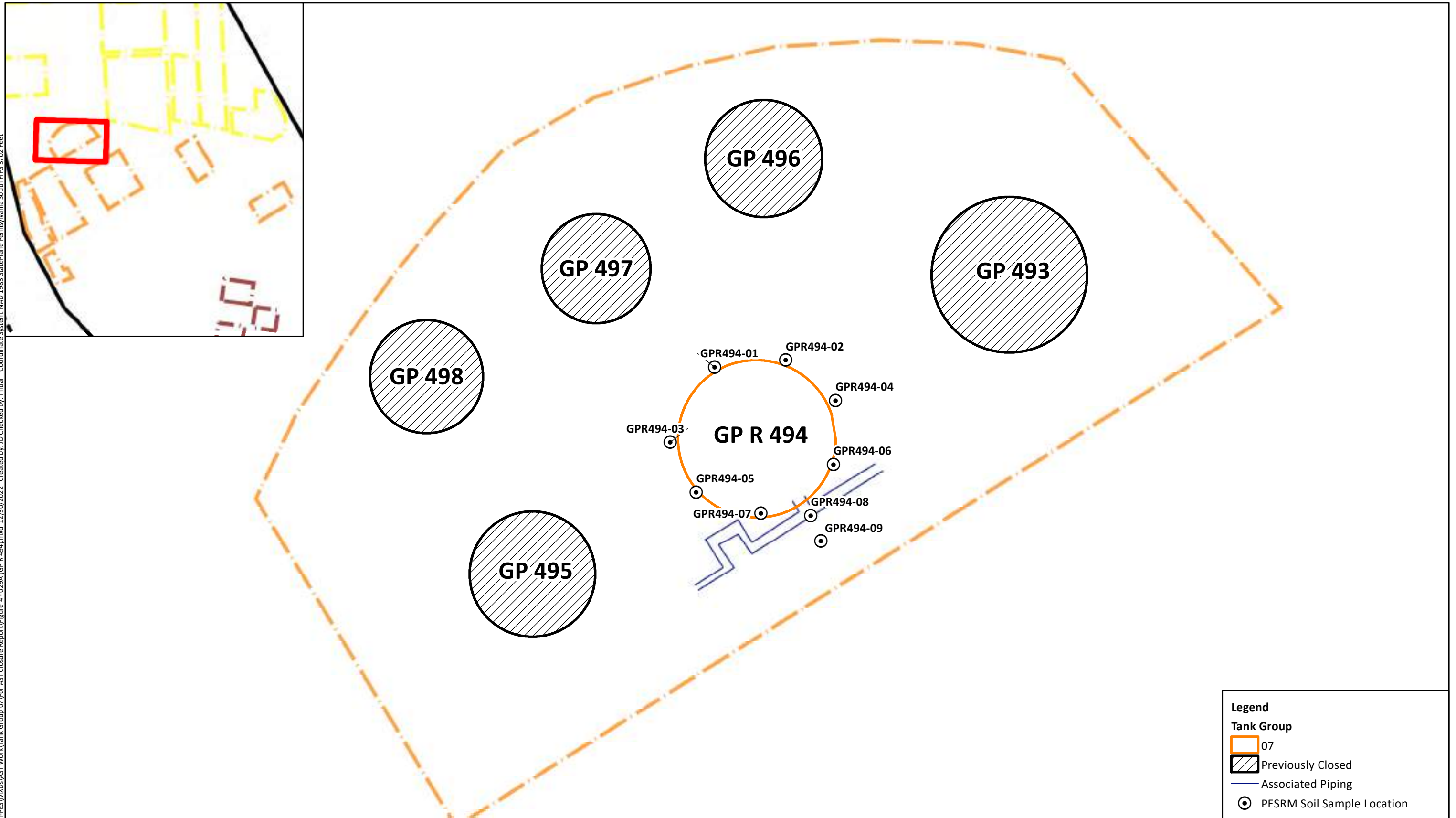
Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR494-06	GPR494-06-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	2.8	1.1	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	2.1	1.4	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	1.2	1.1	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Pyrene	SW8270D	Soil	2.3	1.1	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Chrysene	SW8270D	Soil	3.1	1.1	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.0084	0.0022	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.42	1.8	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.75	1.4	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Phenanthrene	SW8270D	Soil	7.6	1.1	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Lead	SW6010D	Soil	78.1	2.06	8/2/2022	8/9/2022
GPR494-06	GPR494-06-SS01	4.5	5	Toluene	SW8260C	Soil	0.0012	0.0011	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.002	0.0022	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00056	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0011	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Benzene	SW8260C	Soil	0.00059	0.00056	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Cumene	SW8260C	Soil	0.0091	0.0011	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.00067	0.0011	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0022	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0022	8/2/2022	8/8/2022
GPR494-06	GPR494-06-SS01	4.5	5	Fluorene	SW8270D	Soil	1.4	1.8	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Pyrene	SW8270D	Soil	7.8	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	2.7	0.78	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	1.1	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.7	0.78	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Chrysene	SW8270D	Soil	7	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Fluorene	SW8270D	Soil	6.6	0.98	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Phenanthrene	SW8270D	Soil	30	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	3.5	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Toluene	SW8260C	Soil	0.0043	0.0012	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Naphthalene	SW8270D	Soil	ND	0.98	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00059	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Lead	SW6010D	Soil	19.3	2.28	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	Anthracene	SW8270D	Soil	2.8	0.58	8/2/2022	8/9/2022
GPR494-07	GPR494-07-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.018	0.0024	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.061	0.0024	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0012	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0025	0.0024	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Benzene	SW8260C	Soil	0.0005	0.00059	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Cumene	SW8260C	Soil	0.14	0.0012	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.0028	0.0012	8/2/2022	8/5/2022
GPR494-07	GPR494-07-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0024	8/2/2022	8/5/2022
GPR494-08	GPR494-08-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	18	5.4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Naphthalene	SW8270D	Soil	4.8	6.7	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.0203	0.0024	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Chrysene	SW8270D	Soil	170	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Pyrene	SW8270D	Soil	130	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	28	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	54	5.4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	71	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Anthracene	SW8270D	Soil	23	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	Phenanthrene	SW8270D	Soil	110	4	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.0006	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Toluene	SW8260C	Soil	0.0057	0.0012	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Fluorene	SW8270D	Soil	11	6.7	8/2/2022	8/9/2022
GPR494-08	GPR494-08-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.012	0.0028	8/2/2022	8/5/2022
GPR494-08	GPR494-08-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0012	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0039	0.0028	8/2/2022	8/5/2022
GPR494-08	GPR494-08-SS01	3	3.5	Benzene	SW8260C	Soil	0.016	0.0006	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Cumene	SW8260C	Soil	0.0029	0.0014	8/2/2022	8/5/2022
GPR494-08	GPR494-08-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.0036	0.0012	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0024	8/2/2022	8/8/2022
GPR494-08	GPR494-08-SS01	3	3.5	Lead	SW6010D	Soil	114	2.26	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Fluorene	SW8270D	Soil	0.03	0.2	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.73	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	1.1	0.16	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Pyrene	SW8270D	Soil	0.84	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	1.2	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Chrysene	SW8270D	Soil	0.7	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.00069	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	Naphthalene	SW8270D	Soil	0.059	0.2	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.45	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Anthracene	SW8270D	Soil	0.13	0.12	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.51	0.16	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.0014	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0028	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	Cumene	SW8260C	Soil	ND	0.0014	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0028	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0014	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00069	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0028	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	Lead	SW6010D	Soil	70.9	2.36	8/2/2022	8/9/2022
GPR494-09	GPR494-09-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	ND	0.0014	8/2/2022	8/8/2022
GPR494-09	GPR494-09-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	ND	0.0028	8/2/2022	8/8/2022

Notes:

SS -- Soil Sample.

File: N:\GIS\Prj\PO44_001_PESRM-PES\MXDS\AST\Work\Tank_Group_07\Fer_AST Closure Report\Figure 4_029A (GP R 494).mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 029A (GP R 494)
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002		

Legend
Tank Group
07
Previously Closed
Associated Piping
PESRM Soil Sample Location

Figure 4



Photograph 1:
View of Tank 029A
(GP R 494) prior
to demolition.



Photograph 2:
View of Tank 029A
(GP R 494) during
demolition.



Photograph 3:

View of Tank 029A (GP R 494) during demolition.

Product Movement and Waste Disposal Documentation (Tank 029A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004 - D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 45540 lbs

Tare Weight: 40190 lbs

Net Weight: 23010 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

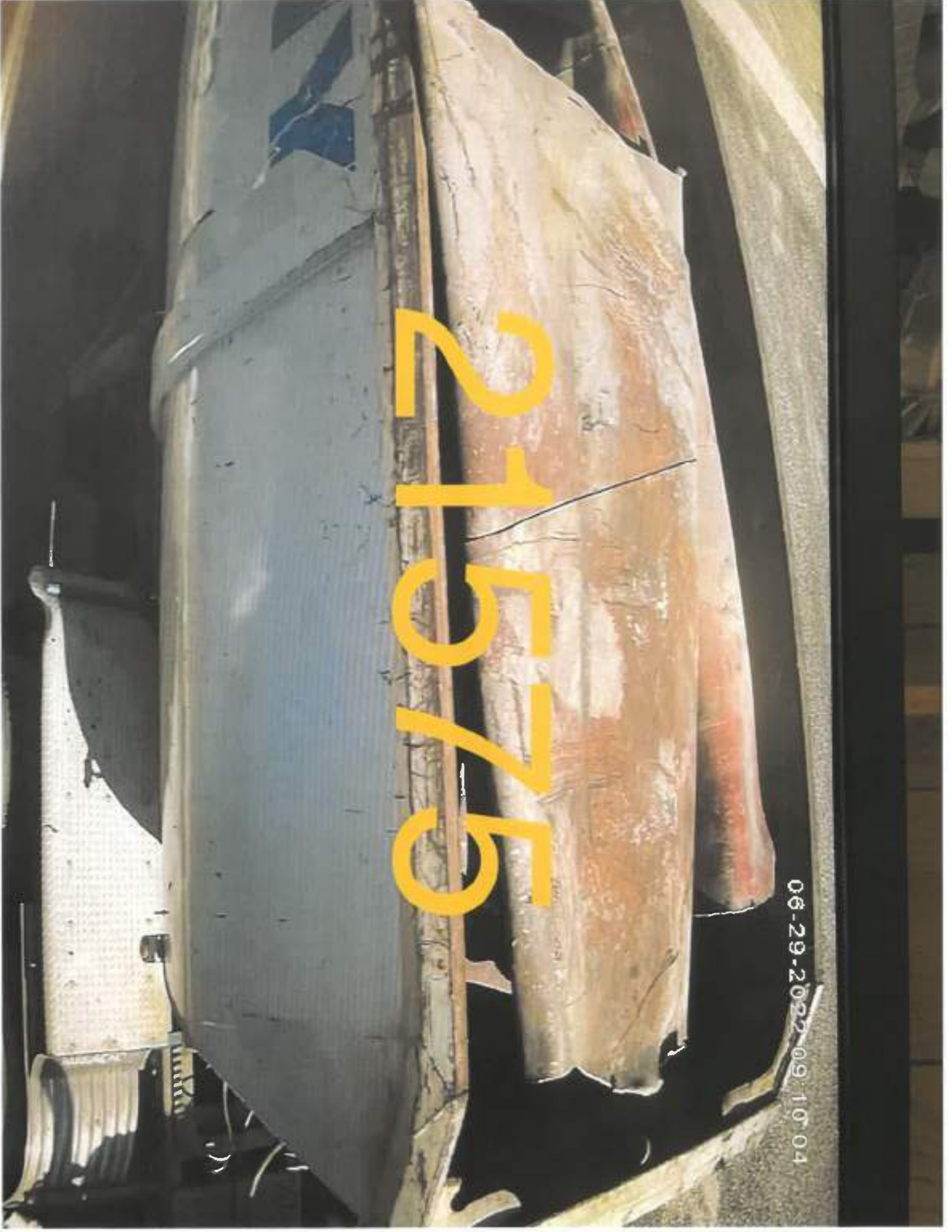
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 046A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

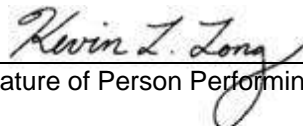
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn (Print Name) falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 12 - 046A (GP U 767)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPU767-01	GPU767-01-SS01	3	3.5	Phenanthrene	SW8270D	Soil	ND	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.044	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.07	0.15	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.1	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.076	0.15	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Chrysene	SW8270D	Soil	0.046	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Fluorene	SW8270D	Soil	ND	0.19	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Naphthalene	SW8270D	Soil	ND	0.19	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Pyrene	SW8270D	Soil	0.032	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0028	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	0.077	0.15	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0014	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	ND	0.0028	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Anthracene	SW8270D	Soil	ND	0.11	8/15/2022	8/20/2022
GPU767-01	GPU767-01-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00069	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Lead	SW6010D	Soil	380	2.2	8/15/2022	8/22/2022
GPU767-01	GPU767-01-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0028	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.00069	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Cumene	SW8260C	Soil	0.0011	0.0014	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	ND	0.0014	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.0014	8/15/2022	8/17/2022
GPU767-01	GPU767-01-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0028	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Chrysene	SW8270D	Soil	0.12	0.12	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.14	0.16	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.15	0.12	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Benzene	SW8260C	Soil	0.00007	0.00008	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.077	0.16	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Fluorene	SW8270D	Soil	0.085	0.2	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	0.091	0.16	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.048	0.2	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Pyrene	SW8270D	Soil	0.18	0.12	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.12	0.12	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.24	0.12	8/15/2022	8/20/2022
GPU767-02	GPU767-02-SS01	4.5	5	Lead	SW6010D	Soil	115	2.3	8/15/2022	8/22/2022
GPU767-02	GPU767-02-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.00037	0.00035	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Toluene	SW8260C	Soil	0.00018	0.00018	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.00035	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Cumene	SW8260C	Soil	0.0093	0.00018	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.00016	0.00018	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0001	0.00035	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.00018	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00008	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.00027	0.00035	8/15/2022	8/17/2022
GPU767-02	GPU767-02-SS01	4.5	5	Anthracene	SW8270D	Soil	0.058	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	0.16	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.16	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Chrysene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Fluorene	SW8270D	Soil	ND	0.2	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	ND	0.16	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Naphthalene	SW8270D	Soil	ND	0.2	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Pyrene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.071	0.13	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	Phenanthrene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.00095	8/15/2022	8/17/2022
GPU767-03	GPU767-03-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-03	GPU767-03-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00048	8/15/2022	8/17/2022
GPU767-03	GPU767-03-SS01	4.5	5	Lead	SW6010D	Soil	72	2.3	8/15/2022	8/22/2022
GPU767-03	GPU767-03-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.016	0.13	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	Benzene	SW8260C	Soil	0.071	0.034	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	Cumene	SW8260C	Soil	1.6	0.067	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.03	0.067	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0019	8/15/2022	8/17/2022
GPU767-03	GPU767-03-SS01	4.5	5	Toluene	SW8260C	Soil	0.052	0.067	8/15/2022	8/18/2022
GPU767-03	GPU767-03-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.032	0.13	8/15/2022	8/18/2022
GPU767-04	GPU767-04-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.064	0.16	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Pyrene	SW8270D	Soil	0.09	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.049	0.16	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.054	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Chrysene	SW8270D	Soil	0.093	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Fluorene	SW8270D	Soil	ND	0.19	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	ND	0.16	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Phenanthrene	SW8270D	Soil	ND	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.1755	0.14	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Naphthalene	SW8270D	Soil	ND	0.19	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.036	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Toluene	SW8260C	Soil	0.17	0.071	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.037	0.12	8/15/2022	8/20/2022
GPU767-04	GPU767-04-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.037	0.14	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.071	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.14	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Benzene	SW8260C	Soil	0.021	0.036	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Cumene	SW8260C	Soil	4.8	0.071	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.047	0.071	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.14	8/15/2022	8/17/2022
GPU767-04	GPU767-04-SS01	4.5	5	Lead	SW6010D	Soil	121	2.22	8/15/2022	8/22/2022
GPU767-05	GPU767-05-SS01	4	4.5	Pyrene	SW8270D	Soil	0.022	0.11	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.025	0.15	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Anthracene	SW8270D	Soil	ND	0.11	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Benzo(a)pyrene	SW8270D	Soil	ND	0.15	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Benzo(b)fluoranthene	SW8270D	Soil	ND	0.11	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Chrysene	SW8270D	Soil	0.024	0.11	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Fluorene	SW8270D	Soil	ND	0.18	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	ND	0.15	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Phenanthrene	SW8270D	Soil	ND	0.11	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	Xylenes (total)	SW8260C	Soil	0.211	0.12	8/15/2022	8/17/2022
GPU767-05	GPU767-05-SS01	4	4.5	Naphthalene	SW8270D	Soil	ND	0.18	8/15/2022	8/20/2022
GPU767-05	GPU767-05-SS01	4	4.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.029	8/15/2022	8/17/2022
GPU767-05	GPU767-05-SS01	4	4.5	Ben						

Table 12 - 046A (GP U 767)

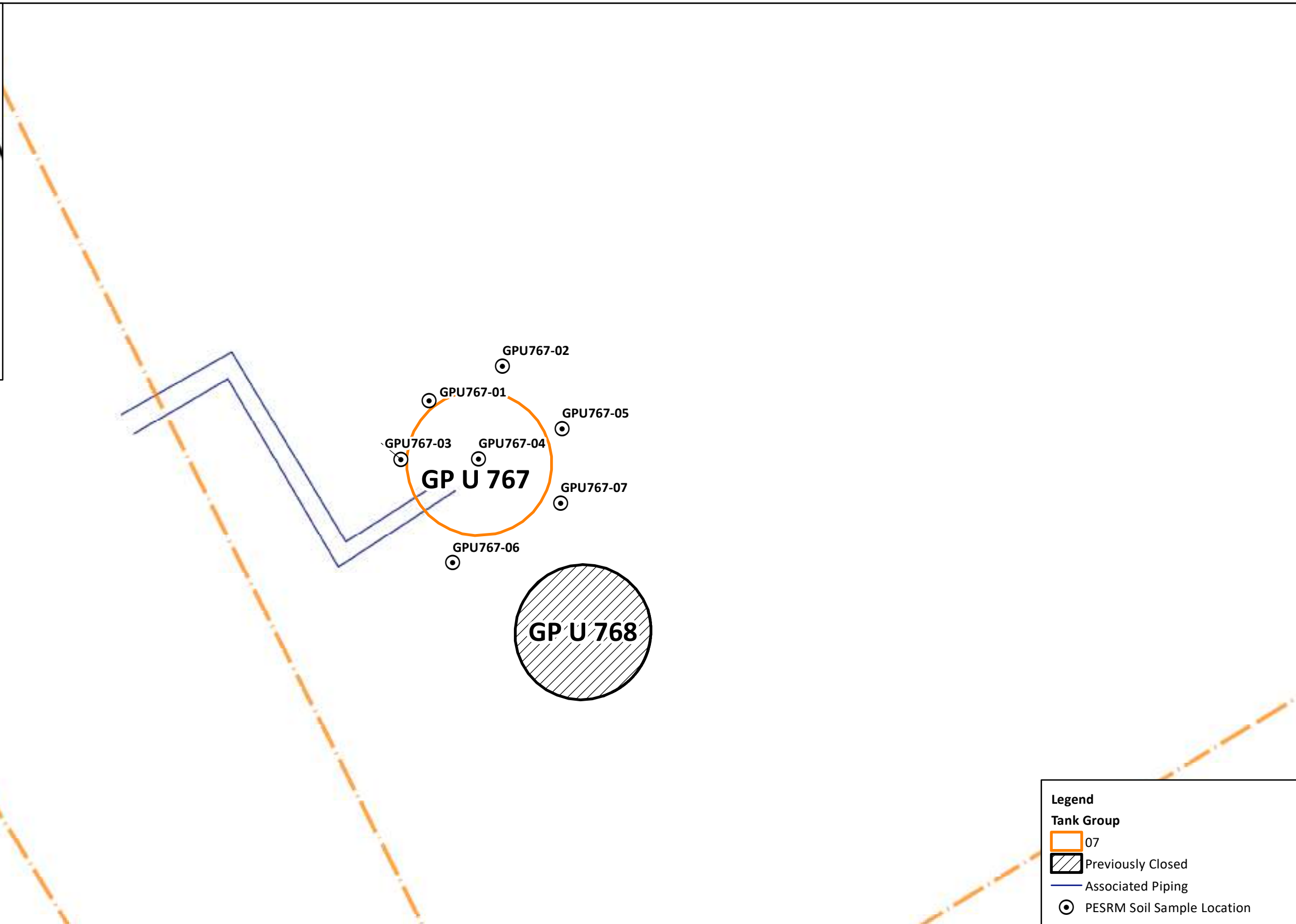
Sample/Analysis Information (Attachment for Section III.)





Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPU767-05	GPU767-05-SS01	4	4.5	Cumene	SW8260C	Soil	24	0.24	8/15/2022	8/18/2022
GPU767-05	GPU767-05-SS01	4	4.5	Ethyl Benzene	SW8260C	Soil	0.12	0.059	8/15/2022	8/17/2022
GPU767-05	GPU767-05-SS01	4	4.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.12	8/15/2022	8/17/2022
GPU767-05	GPU767-05-SS01	4	4.5	Lead	SW6010D	Soil	12.5	2.23	8/15/2022	8/22/2022
GPU767-06	GPU767-06-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	ND	0.0019	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.56	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Anthracene	SW8270D	Soil	0.053	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Pyrene	SW8270D	Soil	0.34	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.42	0.14	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.29	0.14	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Chrysene	SW8270D	Soil	0.38	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Fluorene	SW8270D	Soil	0.03	0.18	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	0.35	0.14	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.19	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Naphthalene	SW8270D	Soil	0.068	0.18	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.00094	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.33	0.1	8/15/2022	8/20/2022
GPU767-06	GPU767-06-SS01	3	3.5	Lead	SW6010D	Soil	688	2.05	8/15/2022	8/22/2022
GPU767-06	GPU767-06-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0019	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00047	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.00094	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.00047	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Cumene	SW8260C	Soil	0.001	0.00094	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	ND	0.00094	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0019	8/15/2022	8/17/2022
GPU767-06	GPU767-06-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0019	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Phenanthrene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	ND	0.14	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.14	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Chrysene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Fluorene	SW8270D	Soil	ND	0.17	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Pyrene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Naphthalene	SW8270D	Soil	ND	0.17	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Anthracene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	ND	0.004	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Indeno(1,2,3-cd)pyrene	SW8270D	Soil	ND	0.14	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.004	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	ND	0.1	8/15/2022	8/20/2022
GPU767-07	GPU767-07-SS01	3	3.5	Lead	SW6010D	Soil	87	2.01	8/15/2022	8/22/2022
GPU767-07	GPU767-07-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.001	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.002	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.004	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Cumene	SW8260C	Soil	0.00049	0.002	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	ND	0.002	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.004	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.002	8/15/2022	8/17/2022
GPU767-07	GPU767-07-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.001	8/15/2022	8/17/2022

Notes:

SS -- Soil Sample.

File: N:\GIS\Project\044_001_PESRM-PES\MapDocs\AST\Work\Tank_Group_07\For_AST_Closure_Report\Figure_12_046A_GP_U_767.mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
	07
	Previously Closed
	Associated Piping
	PESRM Soil Sample Location

0 15 30
Feet
1 inch = 15 feet




SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 046A (GP U 767)
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002		

Figure 12

Product Movement and Waste Disposal Documentation (Tank 046A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004 - D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 45540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.526

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

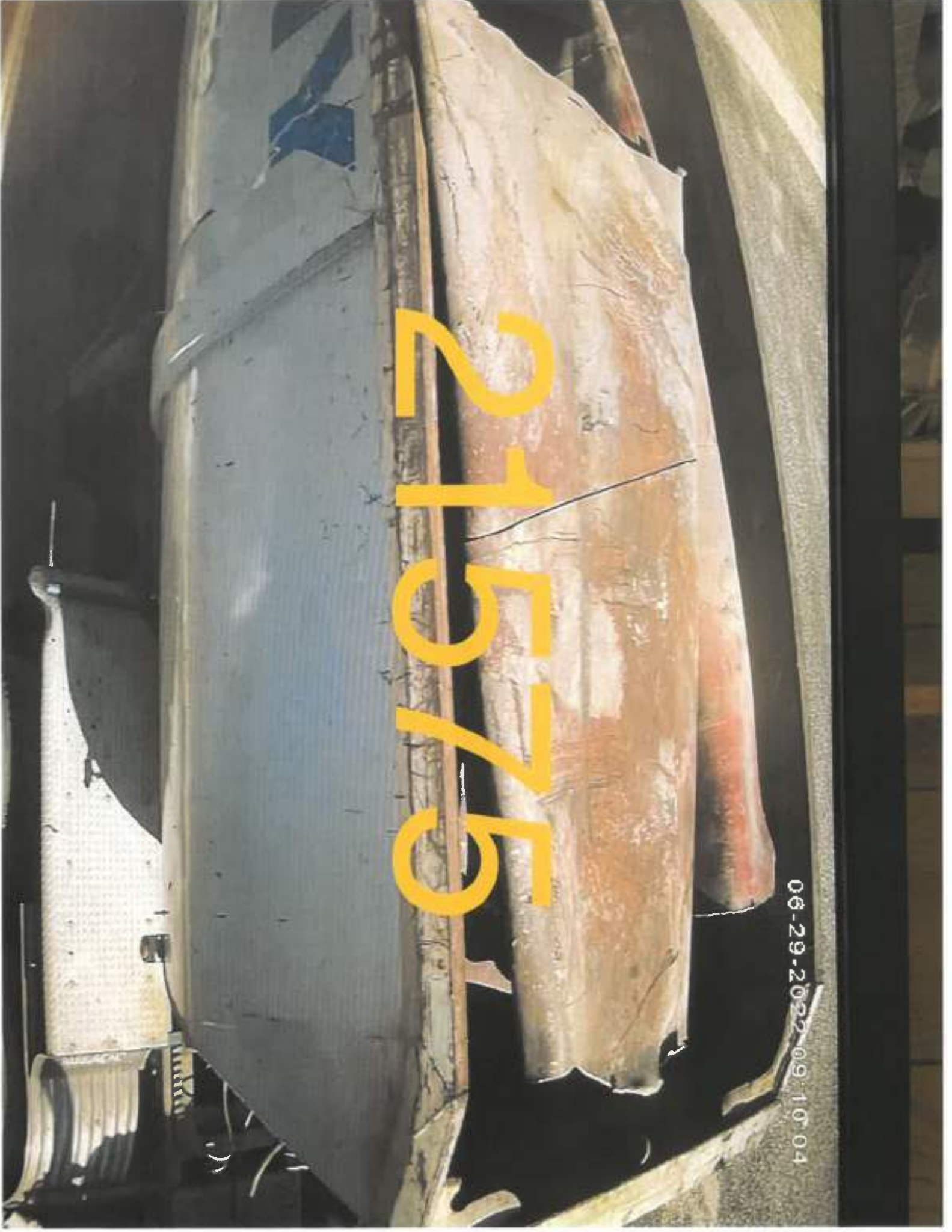
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11 53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 034A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 006A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

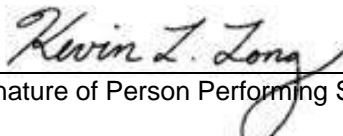
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023
Date

Principal Consultant
Title of Person Performing Site Assessment

Terraphase Engineering, Inc.
Name of Company Performing Site Assessment

609-236-8171 x93
Telephone Number of Person Performing Site Assessment

Section III

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 7 - 034A (GP R 790)

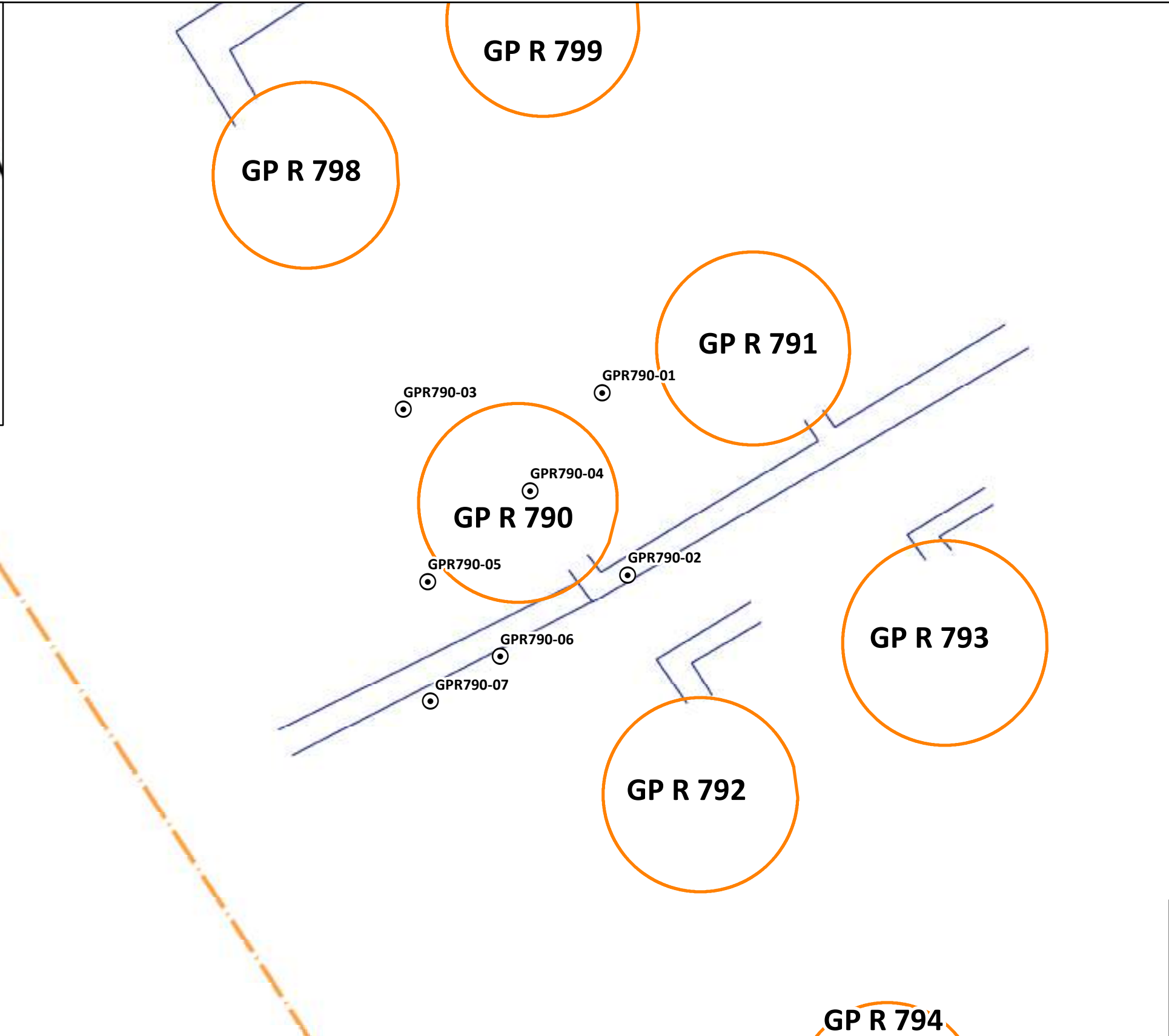
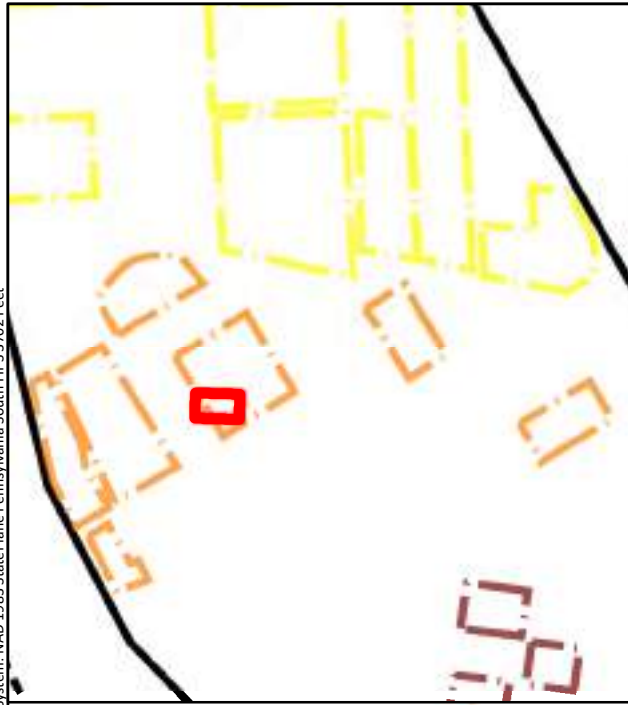
Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR790-01	GPR790-01-SS01	4.5	5	Benzene	SW8260C	Soil	520	3.4	8/1/2022	8/3/2022
GPR790-02	GPR790-02-SS01	4.5	5	Benzene	SW8260C	Soil	130	0.3	8/1/2022	8/3/2022
GPR790-03	GPR790-03-SS01	4.5	5	Benzene	SW8260C	Soil	2.8	0.26	8/1/2022	8/3/2022
GPR790-04	GPR790-04-SS01	3	3.5	Benzene	SW8260C	Soil	0.2	0.59	8/1/2022	8/3/2022
GPR790-05	GPR790-05-SS01	4.5	5	Benzene	SW8260C	Soil	3000	26	8/1/2022	8/3/2022
GPR790-06	GPR790-06-SS01	4.5	5	Benzene	SW8260C	Soil	4.6	0.42	8/1/2022	8/3/2022
GPR790-07	GPR790-07-SS01	4.5	5	Benzene	SW8260C	Soil	34	6.5	8/1/2022	8/3/2022

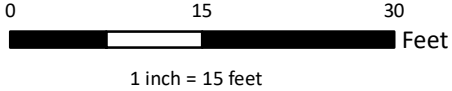
Notes:

SS -- Soil Sample.

File: N:\GIS\Prj\PO44_001_PESRM-PES\MXDS\AST\Work\Tank Group 07\For AST Closure Report\Figure 7_034A (GP R 790).mxd 1/13/2023 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend
Tank Group
07
Associated Piping
PESRM Soil Sample Location



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Site Location and Sampling Map 034A (GP R 790)
Figure 7



Photograph 1:

View of Tank 034A (GP R 790) prior to demolition.

Product Movement and Waste Disposal Documentation (Tank 034A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 45540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

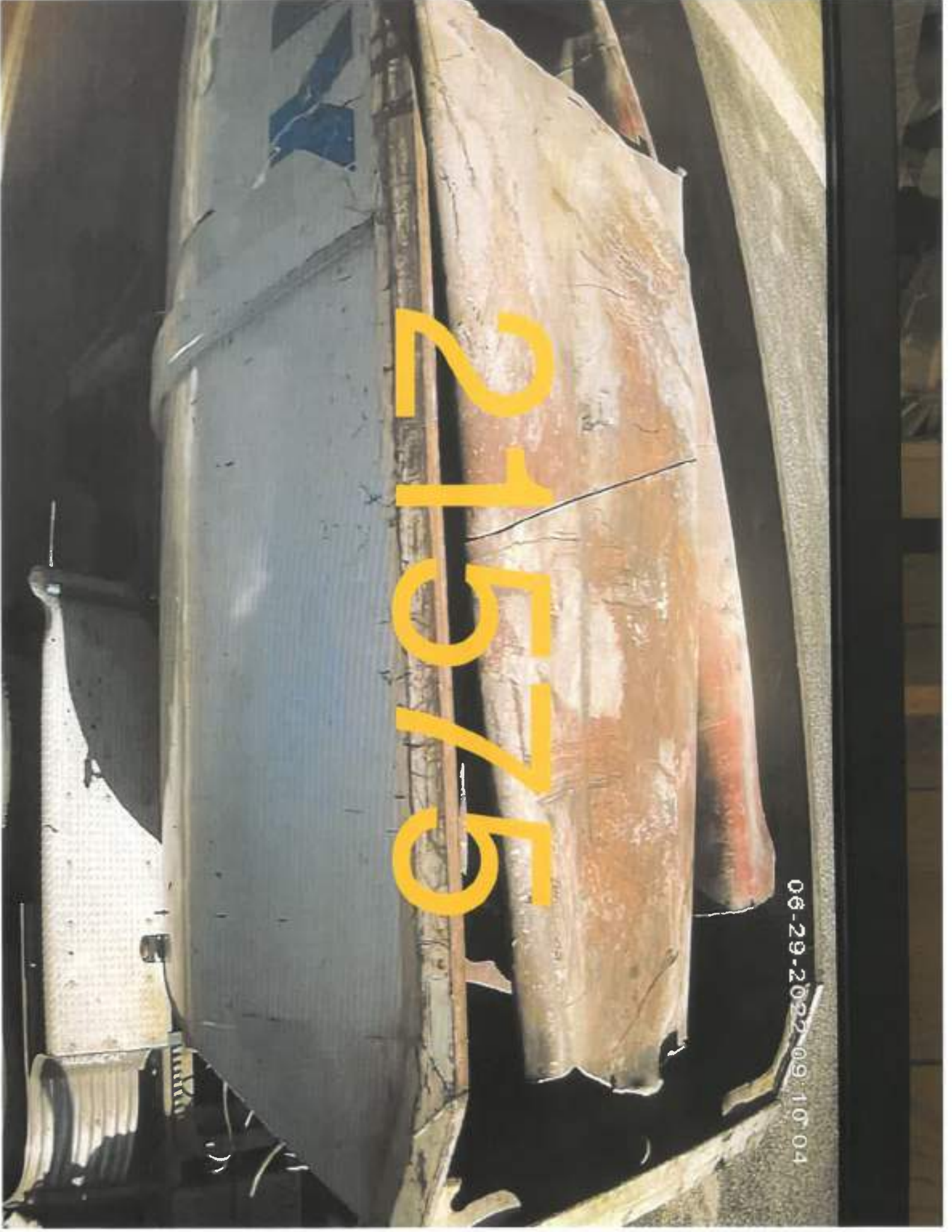
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11 53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 035A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

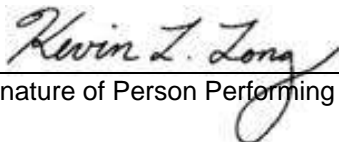
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2/ 1 /2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 8 - 035A (GP R 792)

Sample/Analysis Information (Attachment for Section III.)

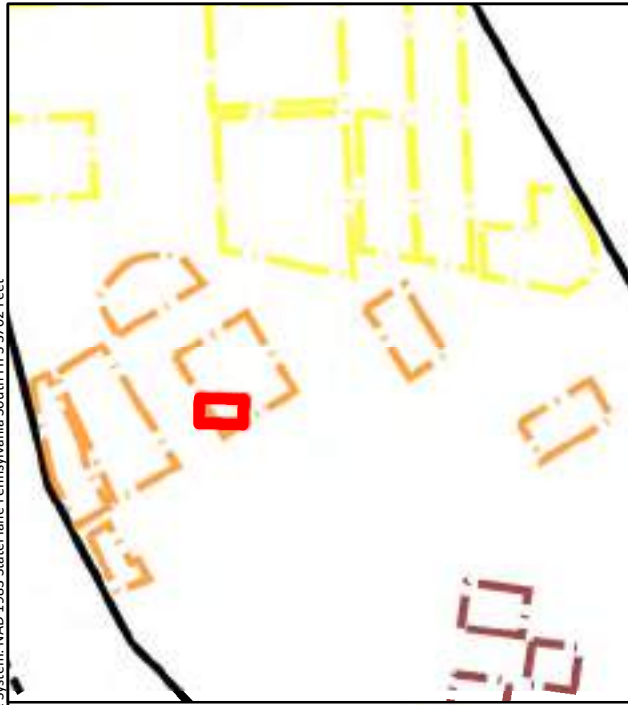
Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR792-01	GPR792-01-SS01	4	4.5	Cumene	SW8260C	Soil	2400	15	8/2/2022	8/5/2022
GPR792-02	DUP-49	4.5	5	Cumene	SW8260C	Soil	4700	59	8/2/2022	8/5/2022
GPR792-02	GPR792-02-SS01	4.5	5	Cumene	SW8260C	Soil	4700	49	8/2/2022	8/5/2022
GPR792-03	GPR792-03-SS01	4.5	5	Cumene	SW8260C	Soil	12000	88	8/2/2022	8/5/2022
GPR792-04	GPR792-04-SS01	4.5	5	Cumene	SW8260C	Soil	5000	54	8/2/2022	8/5/2022
GPR792-05	GPR792-05-SS01	4.5	5	Cumene	SW8260C	Soil	8900	65	8/2/2022	8/5/2022
GPR792-06	GPR792-06-SS01	4.5	5	Cumene	SW8260C	Soil	4600	70	8/2/2022	8/5/2022
GPR792-07	GPR792-07-SS01	3.5	4	Cumene	SW8260C	Soil	1400	12	8/2/2022	8/5/2022

Notes:

SS -- Soil Sample.

DUP-49 is a field duplicate associated with sample GPR792-02-SS01.

File: N:\GIS\Project\044_001_PESRM-PES\MapDocs\AST\Work\Tank Group 07\For AST Closure Report\Figure 8 - 035A (GP R 792).mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



GP R 798

GP R 791

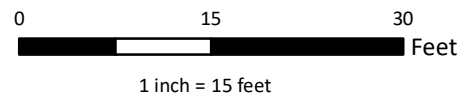
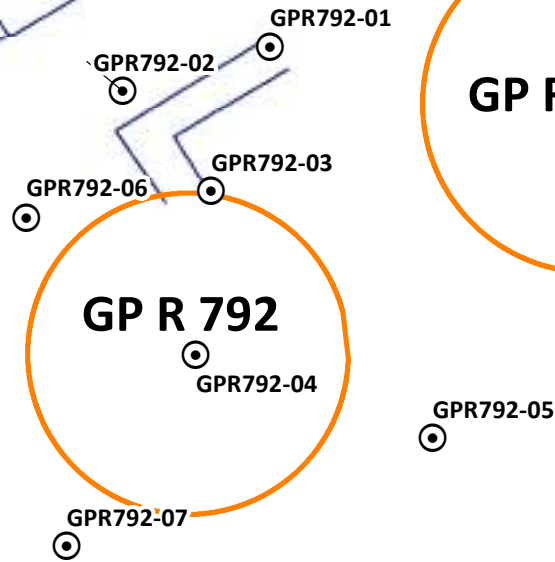
GP R 790

GP R 793

GP R 792

GP R 794

GP C2 797



- Legend**
- Tank Group**
 - 07
 - Previously Closed
 - Associated Piping
 - PESRM Soil Sample Location

	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 035A (GP R 792)
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002	Figure 8	



Photograph 1:
View of Tank 035A (GP R 792) prior to demolition.



Photograph 2:
View of Tank 035A (GP R 792) during demolition.

Product Movement and Waste Disposal Documentation (Tank 035A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 43540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

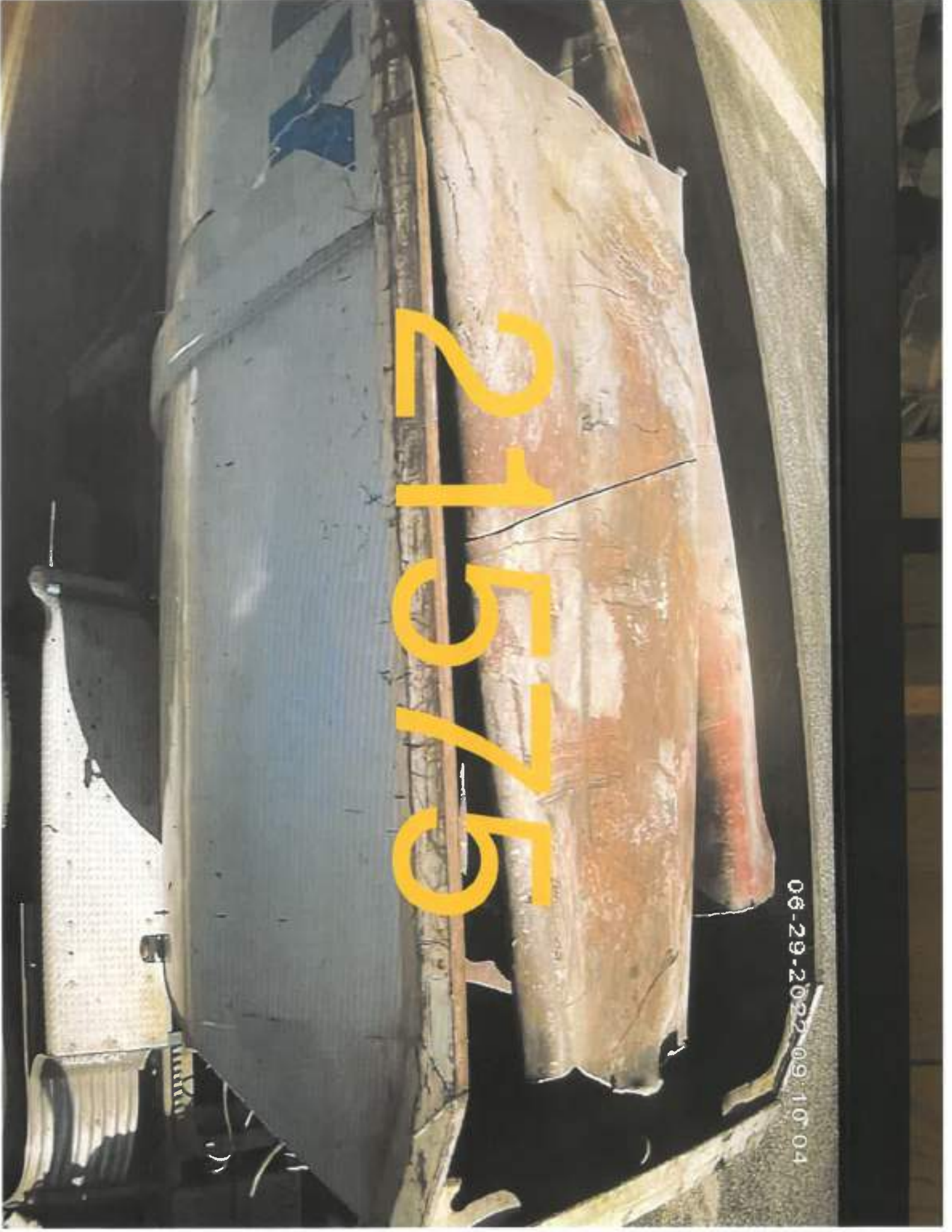
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 036A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

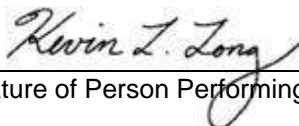
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 9 - 036A (GP R 793)

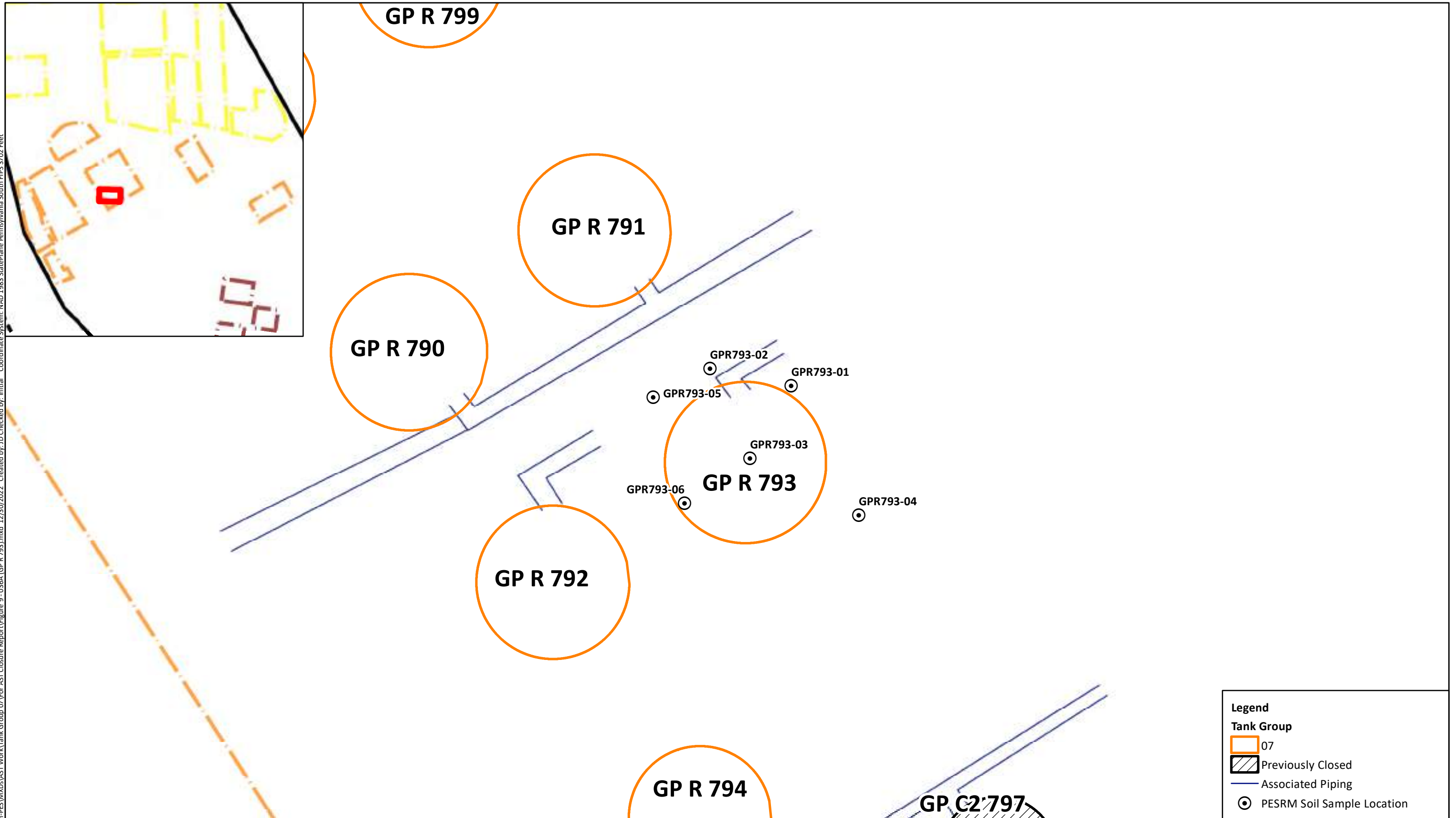
Sample/Analysis Information (Attachment for Section III.)





Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR793-01	GPR793-01-SS01	4	4.5	Cumene	SW8260C	Soil	5500	92	8/2/2022	8/6/2022
GPR793-02	GPR793-02-SS01	4	4.5	Cumene	SW8260C	Soil	11000	100	8/2/2022	8/5/2022
GPR793-03	GPR793-03-SS01	4.5	5	Cumene	SW8260C	Soil	15000	120	8/2/2022	8/5/2022
GPR793-04	GPR793-04-SS01	4.5	5	Cumene	SW8260C	Soil	14000	110	8/2/2022	8/5/2022
GPR793-05	GPR793-05-SS01	4.5	5	Cumene	SW8260C	Soil	1900	9.2	8/2/2022	8/5/2022
GPR793-06	GPR793-06-SS01	3.5	5	Cumene	SW8260C	Soil	1800	11	8/2/2022	8/5/2022

Notes:

SS -- Soil Sample.

File: N:\GIS\Project\044_001_PESRM-PES\MapDocs\AST\Work\Tank_Group_07\Fer_AST_Closure_Report\Figure_9_036A_GPR793.mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
Tank Group	
 07	
	Previously Closed
	Associated Piping
	PESRM Soil Sample Location

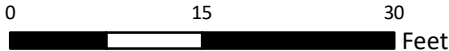


 1 inch = 15 feet		SAFETY FIRST	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 036A (GP R 793)
			PROJECT: Aboveground Storage Tank Closure	
		PROJECT NUMBER: P044.001.002		

Figure 9

Product Movement and Waste Disposal Documentation (Tank 036A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 43540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

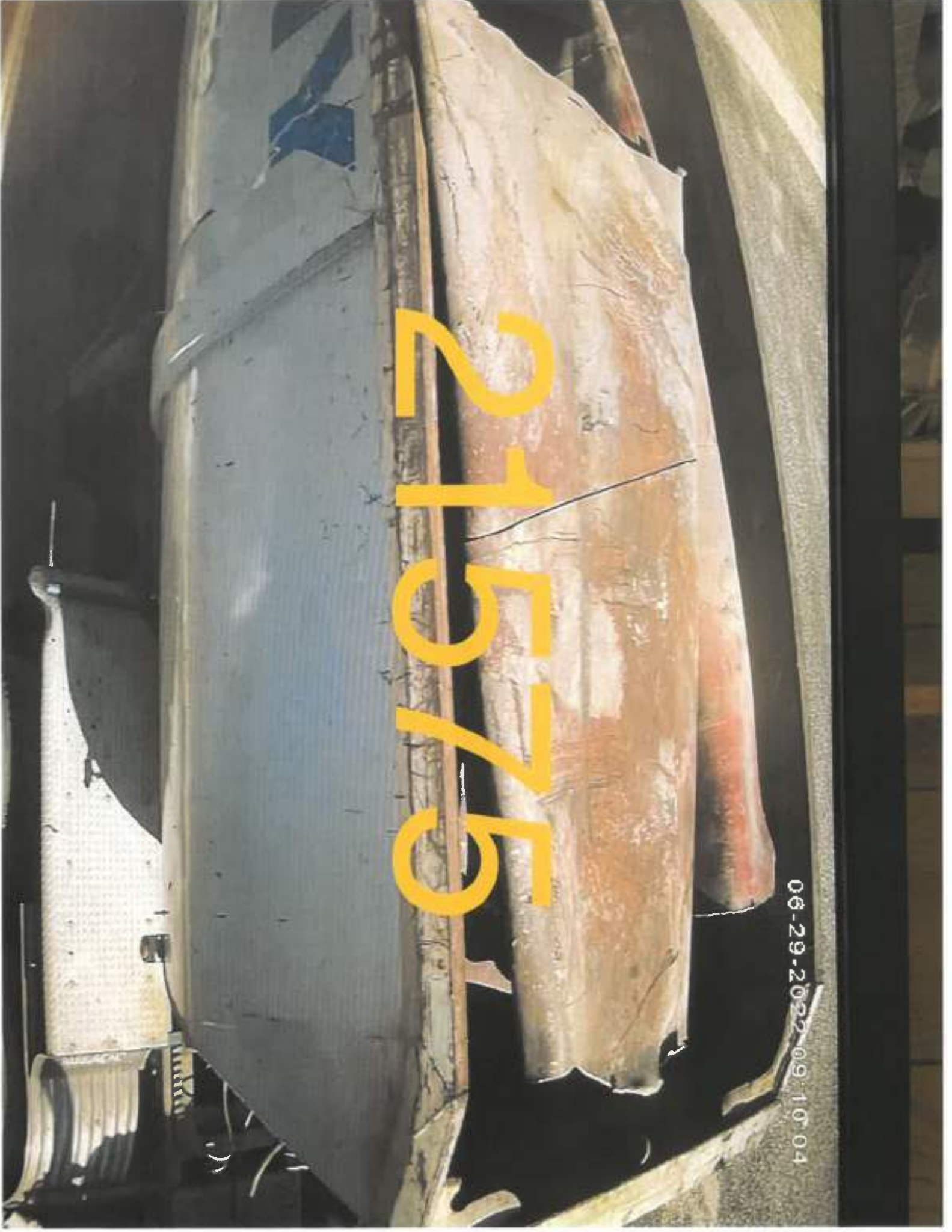
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 037A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

- A.** Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).
Bedrock N/A feet below land surface Water 15 feet below land surface
- B.** Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).
Length of piping N/A feet
- C. TANK SYSTEM REMOVED FROM THE GROUND/SITE**
- 1). Was obvious contamination observed while excavating, sampling or removing the tank system?
 NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.
 YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.
- 2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?
 YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.
 NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.
- D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE**
- Was obvious contamination observed during sampling, boring or assessing water depths?
 NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.
 YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> See end of this section for options on submission and maintenance of closure records.
- E.** If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

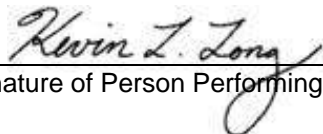
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

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I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn (Print Name) falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2/ 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 10 - 037A (GP R 794)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR794-01	GPR794-01R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.5	10/21/2022	11/4/2022
GPR794-01	GPR794-01-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.27	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	1.5	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	ND	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	1.5	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Chrysene	SW8270D	Soil	0.35	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Fluorene	SW8270D	Soil	2	1.9	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Naphthalene	SW8270D	Soil	3.5	1.9	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Pyrene	SW8270D	Soil	0.71	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	74	2.3	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	Anthracene	SW8270D	Soil	0.51	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Phenanthrene	SW8270D	Soil	8.7	1.2	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Lead	SW6010D	Soil	408	2.32	8/3/2022	8/9/2022
GPR794-01	GPR794-01-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	4.6	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	Toluene	SW8260C	Soil	3400	29	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Cumene	SW8260C	Soil	4000	29	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	Benzene	SW8260C	Soil	2200	14	8/3/2022	8/10/2022
GPR794-01	GPR794-01-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	16	4.6	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	2.3	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	1.2	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	32	4.6	8/3/2022	8/8/2022
GPR794-01	GPR794-01-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	295	4.6	8/3/2022	8/10/2022
GPR794-02	GPR794-02R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.9	10/21/2022	11/4/2022
GPR794-02	GPR794-02-SS01	4.5	5	Toluene	SW8260C	Soil	1200	4.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Naphthalene	SW8270D	Soil	1	2.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Fluorene	SW8270D	Soil	0.47	2.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Chrysene	SW8270D	Soil	0.44	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	1.7	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.47	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	1.7	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.46	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Pyrene	SW8270D	Soil	0.86	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Phenanthrene	SW8270D	Soil	2.9	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	2.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	1.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	111	8.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	8.4	8.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	4.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	3.9	8.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Benzene	SW8260C	Soil	2800	8.3	8/3/2022	8/8/2022
GPR794-02	GPR794-02-SS01	4.5	5	Cumene	SW8260C	Soil	3000	16	8/3/2022	8/8/2022
GPR794-02	GPR794-02-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	26	4.1	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	8.3	8/3/2022	8/10/2022
GPR794-02	GPR794-02-SS01	4.5	5	Lead	SW6010D	Soil	347	2.56	8/3/2022	8/9/2022
GPR794-03	GPR794-03R-SS01	3	3.5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.9	10/21/2022	11/4/2022
GPR794-03	GPR794-03-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.073	0.0018	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Anthracene	SW8270D	Soil	ND	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.038	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.065	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Chrysene	SW8270D	Soil	0.038	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Fluorene	SW8270D	Soil	ND	0.18	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Naphthalene	SW8270D	Soil	ND	0.18	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.037	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.049	0.14	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Pyrene	SW8270D	Soil	0.049	0.11	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Lead	SW6010D	Soil	24.2	2.2	8/3/2022	8/9/2022
GPR794-03	GPR794-03-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.03	0.14	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.004	0.0018	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00045	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0009	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0024	0.0018	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	Cumene	SW8260C	Soil	0.38	0.055	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Toluene	SW8260C	Soil	0.21	0.055	8/3/2022	8/10/2022
GPR794-03	GPR794-03-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.02	0.0009	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0018	8/3/2022	8/8/2022
GPR794-03	GPR794-03-SS01	3	3.5	Benzene	SW8260C	Soil	0.41	0.028	8/3/2022	8/10/2022
GPR794-04	GPR794-04R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.9	10/21/2022	11/4/2022
GPR794-04	GPR794-04-SS01	4.5	5	Pyrene	SW8270D	Soil	2	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.48	1.5	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.78	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.41	1.5	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Chrysene	SW8270D	Soil	1.4	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Fluorene	SW8270D	Soil	1	1.9	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Phenanthrene	SW8270D	Soil	1.9	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.64	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Toluene	SW8260C	Soil	6100	87	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Naphthalene	SW8270D	Soil	3.1	1.9	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	79	35	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Anthracene	SW8270D	Soil	0.46	1.2	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Lead	SW6010D	Soil	63.8	2.34	8/3/2022	8/9/2022
GPR794-04	GPR794-04-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	525	35	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	8.7	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	17	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	35	35	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Benzene	SW8260C	Soil	7800	43	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Cumene	SW8260C	Soil	12000	87	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	120	17	8/3/2022	8/10/2022
GPR794-04	GPR794-04-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	35	8/3/2022	8/10/2022
GPR794-05	GPR794-05R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.3	10/21/2022	11/4/2022
GPR794-05	GPR794-05-SS01	4.5	5	Toluene	SW8260C	Soil	1800	27	8/3/2022	8/8/2022
GPR794-05	GPR794-05-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.035	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Pyrene	SW8270D	Soil	0.058	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.43	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Naphthalene	SW8270D	Soil	1.7	0.2	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Fluorene	SW8270D	Soil	0.17	0.2	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Chrysene	SW8270D	Soil	0.033	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.16	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	ND	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	0.16	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	7.7	6.7	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Lead	SW6010D	Soil	23.6	2.35	8/3/2022	8/9/2022
GPR794-05	GPR794-05-SS01	4.5	5	Anthracene	SW8270D	Soil	0.07	0.12	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	6.7	8/3/2022	

Table 10 - 037A (GP R 794)

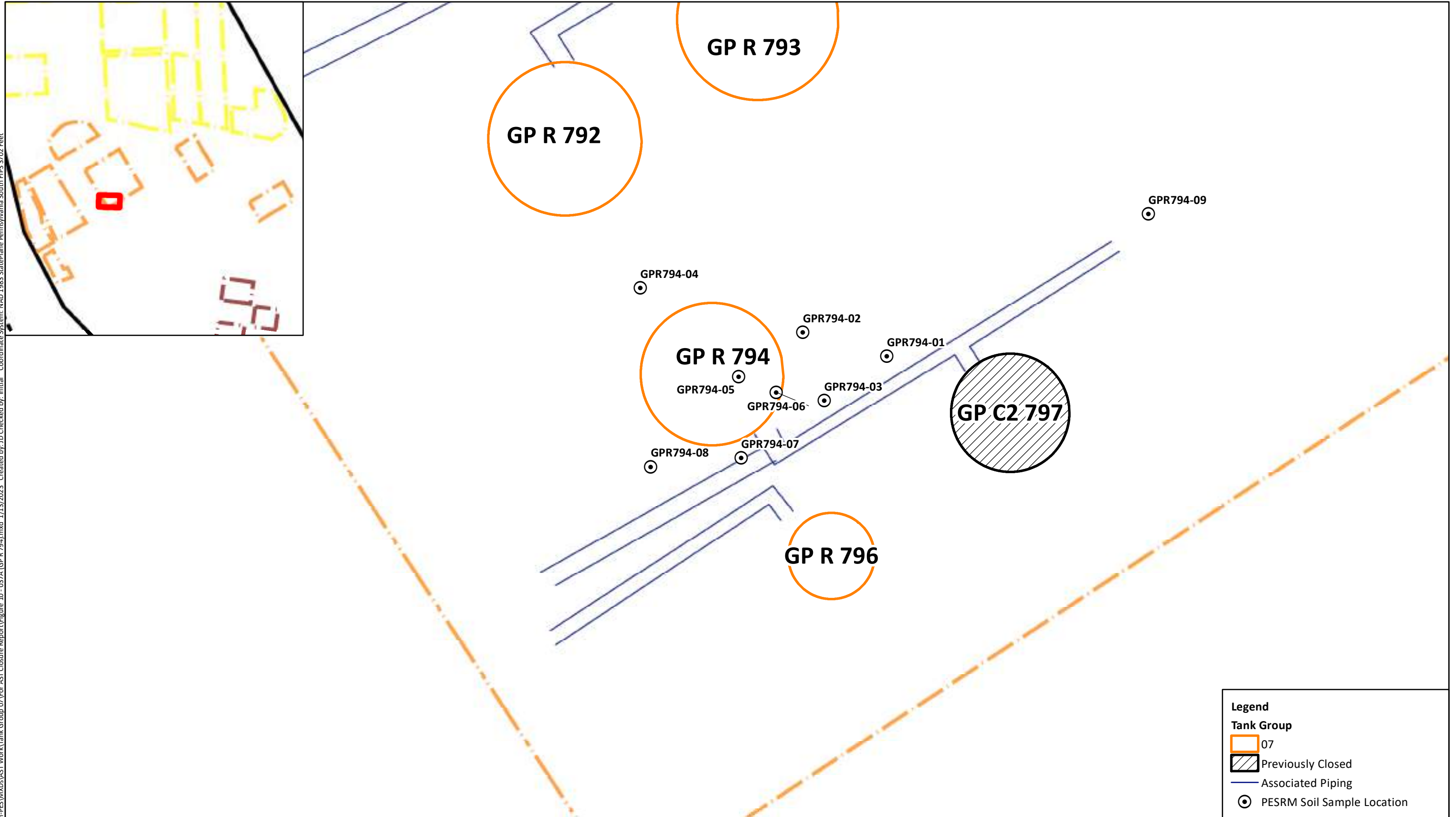
Sample/Analysis Information (Attachment for Section III.)





Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR794-05	GPR794-05-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	3.5	6.7	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	3.4	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	1.7	8/3/2022	8/10/2022
GPR794-05	GPR794-05-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	135	6.7	8/3/2022	8/8/2022
GPR794-06	GPR794-06R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.1	10/21/2022	11/4/2022
GPR794-06	GPR794-06-SS01	4.5	5	Toluene	SW8260C	Soil	4300	59	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Naphthalene	SW8270D	Soil	6.3	1.9	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Fluorene	SW8270D	Soil	1.4	1.9	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Chrysene	SW8270D	Soil	0.35	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	1.5	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.36	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	1.5	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.41	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Pyrene	SW8270D	Soil	0.94	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Phenanthrene	SW8270D	Soil	3	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	5.9	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	Anthracene	SW8270D	Soil	0.67	1.1	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	490	24	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	48	24	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	12	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	23	24	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	Benzene	SW8260C	Soil	2000	5.9	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	Cumene	SW8260C	Soil	4800	59	8/3/2022	8/10/2022
GPR794-06	GPR794-06-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	110	12	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	24	8/3/2022	8/8/2022
GPR794-06	GPR794-06-SS01	4.5	5	Lead	SW6010D	Soil	429	2.2	8/3/2022	8/9/2022
GPR794-07	GPR794-07R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.7	10/21/2022	11/4/2022
GPR794-07	GPR794-07-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.034	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.027	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	0.15	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.15	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Pyrene	SW8270D	Soil	0.077	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Fluorene	SW8270D	Soil	ND	0.18	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	3.325	0.89	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Chrysene	SW8270D	Soil	0.041	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.19	0.11	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.054	0.18	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Toluene	SW8260C	Soil	8.7	0.45	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Lead	SW6010D	Soil	3.73	2.21	8/3/2022	8/9/2022
GPR794-07	GPR794-07-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.81	0.89	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.22	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.45	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Benzene	SW8260C	Soil	130	0.22	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Cumene	SW8260C	Soil	330	2.2	8/3/2022	8/8/2022
GPR794-07	GPR794-07-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	1.5	0.45	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.89	8/3/2022	8/10/2022
GPR794-07	GPR794-07-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.2	0.89	8/3/2022	8/10/2022
GPR794-08	GPR794-08R-SS01	4.5	5	Tetraethylene Glycol	SW8015D(M)	Soil	ND	9.3	10/21/2022	11/4/2022
GPR794-08	GPR794-08-SS01	4.5	5	Pyrene	SW8270D	Soil	0.28	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	1.6	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	ND	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	1.6	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Chrysene	SW8270D	Soil	ND	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Fluorene	SW8270D	Soil	0.75	2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Phenanthrene	SW8270D	Soil	2.3	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	476	3	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Naphthalene	SW8270D	Soil	8.7	2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	15	3	8/3/2022	8/8/2022
GPR794-08	GPR794-08-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	ND	1.2	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	35	3	8/3/2022	8/8/2022
GPR794-08	GPR794-08-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	1.5	8/3/2022	8/8/2022
GPR794-08	GPR794-08-SS01	4.5	5	Benzene	SW8260C	Soil	12000	30	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Cumene	SW8260C	Soil	7600	60	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	120	1.5	8/3/2022	8/8/2022
GPR794-08	GPR794-08-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	3	8/3/2022	8/8/2022
GPR794-08	GPR794-08-SS01	4.5	5	Lead	SW6010D	Soil	132	2.4	8/3/2022	8/9/2022
GPR794-08	GPR794-08-SS01	4.5	5	Toluene	SW8260C	Soil	6200	60	8/3/2022	8/10/2022
GPR794-08	GPR794-08-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.76	8/3/2022	8/8/2022

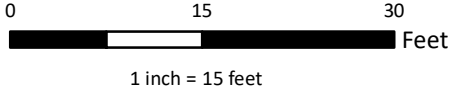
Notes:


SS -- Soil Sample.

File: N:\GIS\Prj\PO44_001_PESRM-PES\MXDS\AST_Work\Tank_Group_07\Fer_AST_Closure_Report\Figure_10_037A (GP R 794).mxd 1/13/2023 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
	07 Tank Group
	Previously Closed
	Associated Piping
	PESRM Soil Sample Location



 SAFETY FIRST	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Site Location and Sampling Map 037A (GP R 794)
Figure 10



Photograph 1:

View of Tank 037A (GP R 794) prior to demolition.

Product Movement and Waste Disposal Documentation (Tank 037A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 45540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

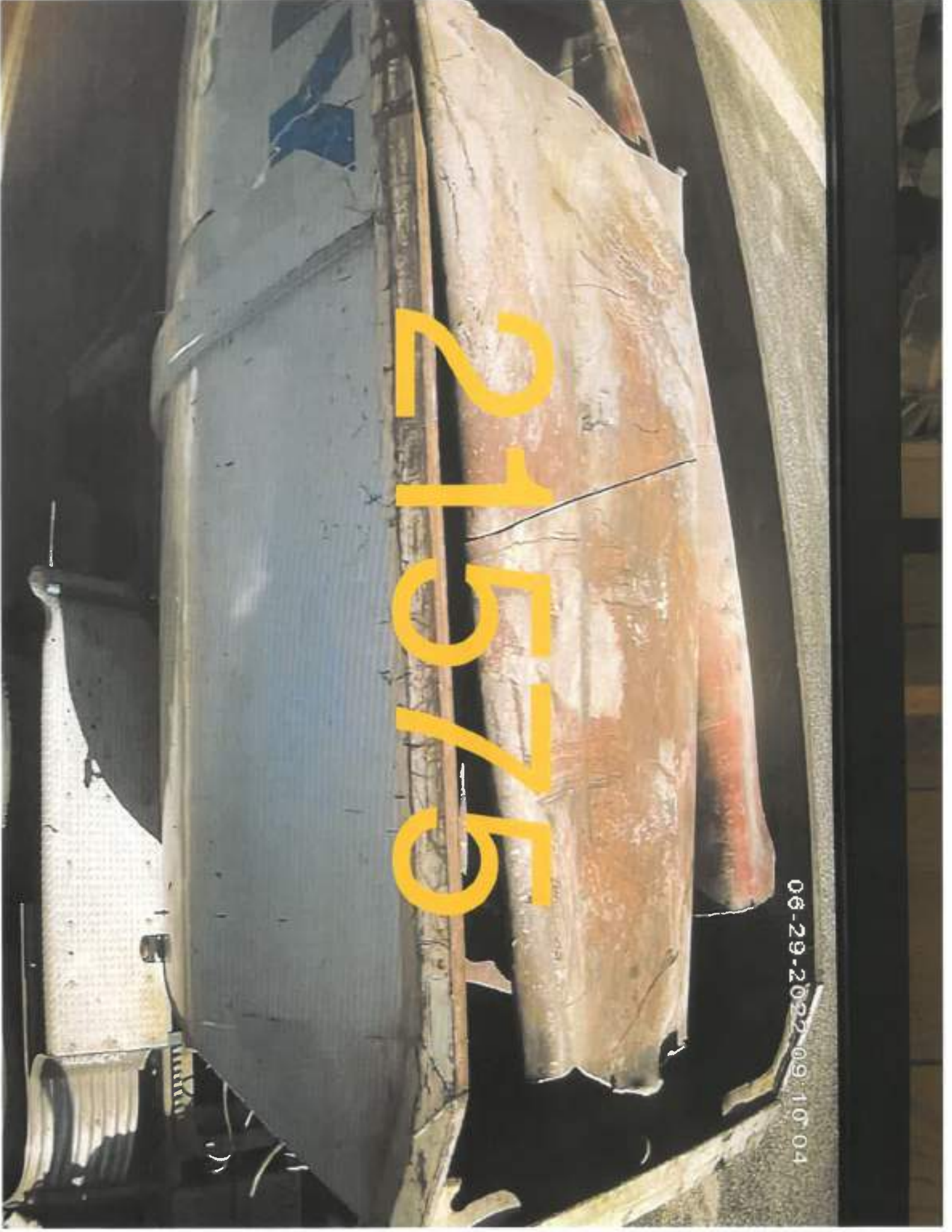
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 007A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

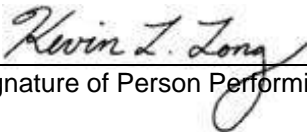
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 3 - 007A (GP R 798)

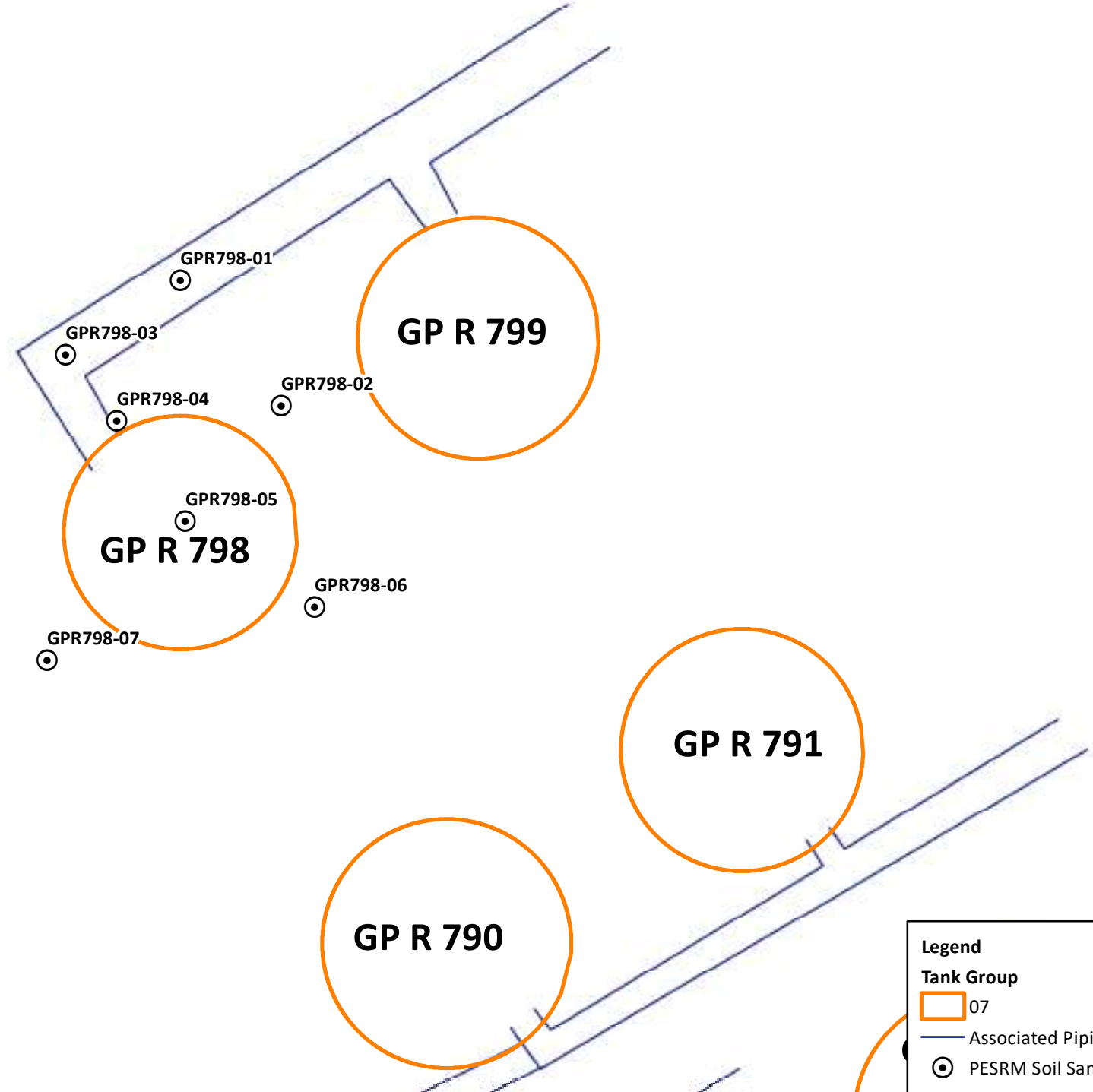
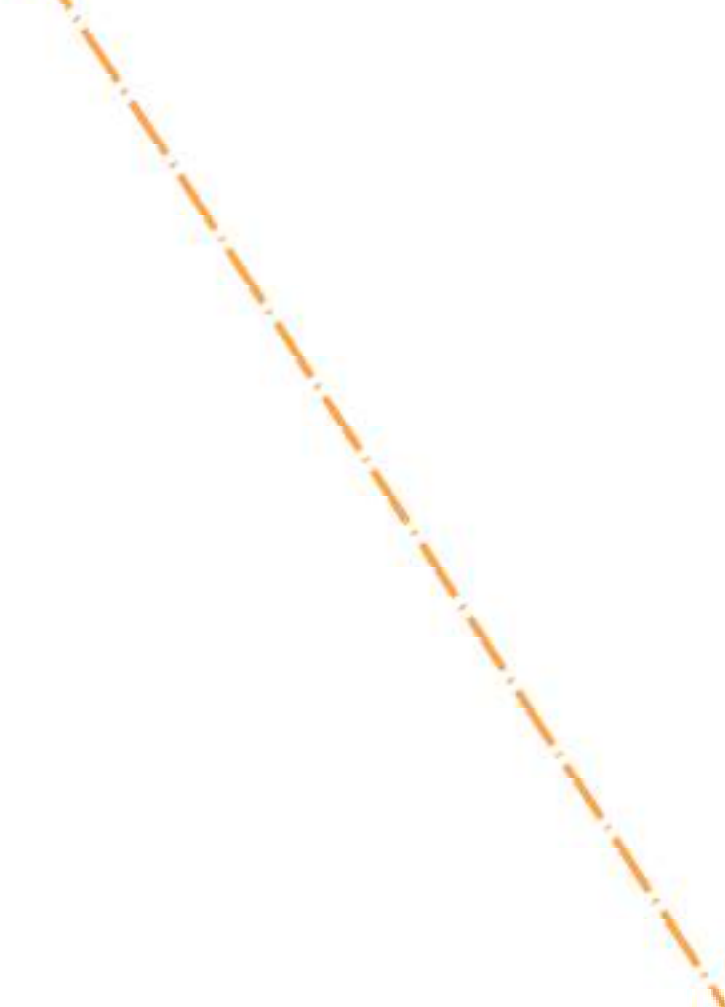
Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR798-01	GPR798-01-SS01	4.5	5	Benzene	SW8260C	Soil	3.4	0.094	7/18/2022	7/19/2022
GPR798-02	GPR798-02-SS01	4.5	5	Benzene	SW8260C	Soil	6.2	0.12	7/18/2022	7/19/2022
GPR798-03	GPR798-03-SS01	4	4.5	Benzene	SW8260C	Soil	0.4	0.069	7/18/2022	7/19/2022
GPR798-04	DUP-47	4.5	5	Benzene	SW8260C	Soil	5900	58	7/18/2022	7/20/2022
GPR798-04	GPR798-04-SS01	4.5	5	Benzene	SW8260C	Soil	14	0.43	7/18/2022	7/20/2022
GPR798-05	GPR798-05-SS01	4.5	5	Benzene	SW8260C	Soil	1.4	0.052	7/18/2022	7/19/2022
GPR798-06	GPR798-06-SS01	4	4.5	Benzene	SW8260C	Soil	2.2	0.13	7/18/2022	7/20/2022
GPR798-07	GPR798-07-SS01	4	4.5	Benzene	SW8260C	Soil	7.8	0.1	7/18/2022	7/19/2022

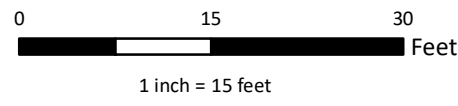
Notes:

SS -- Soil Sample.

File: N:\GIS\Project\044_001_PESRM-PES\MapDocs\AST\Work\Tank_Group_07\Fer_AST_Closure_Report\Figure_3_007A_GPR_798.mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
07	Tank Group
	Associated Piping
	PESRM Soil Sample Location



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 007A (GP R 798)
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002		

Figure 3



Photograph 1:

View of Tank 007A (GP R 798) prior to demolition.

Product Movement and Waste Disposal Documentation (Tank 007A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 43540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.526

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

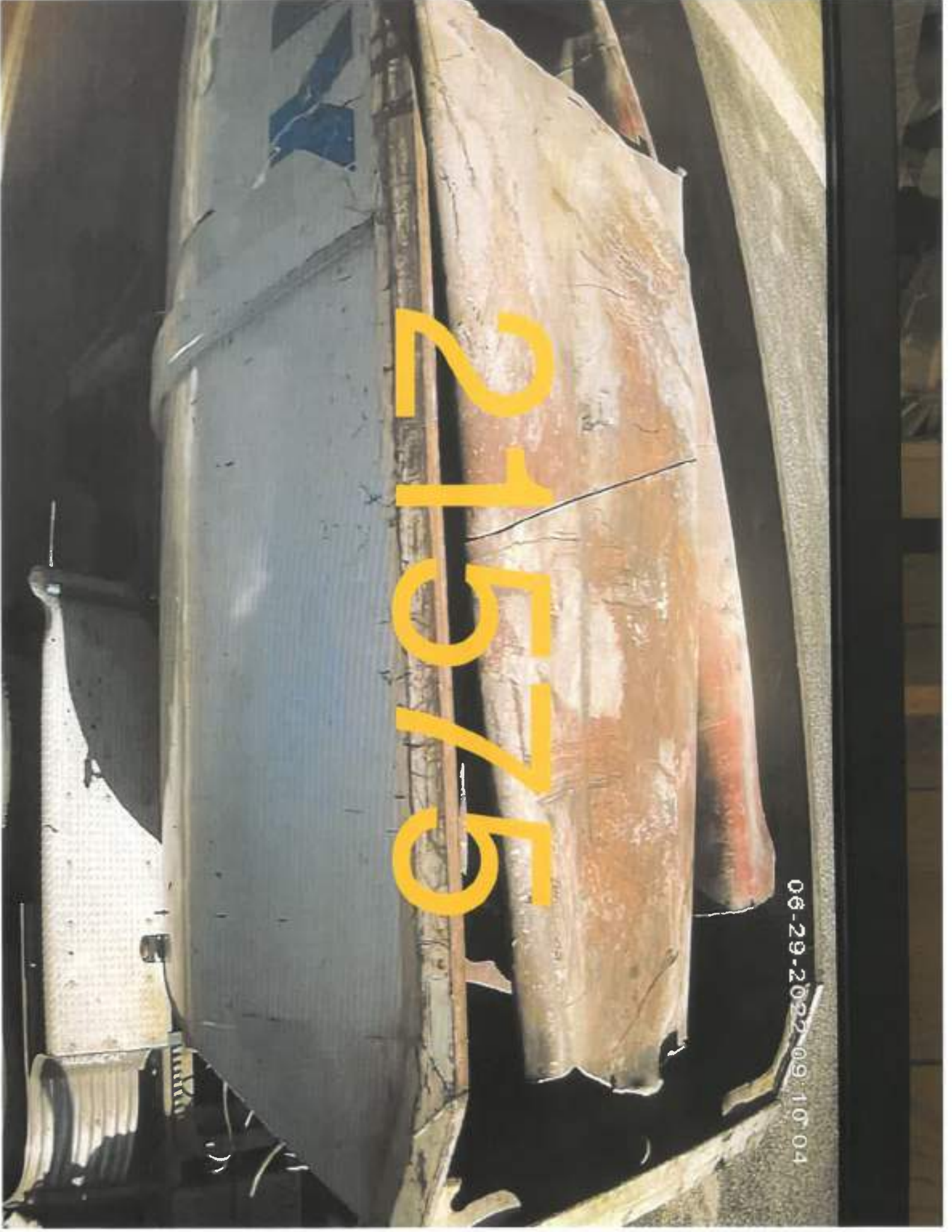
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 039A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

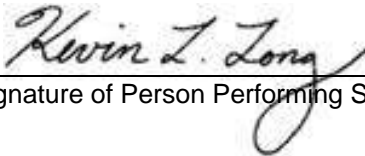
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn (Print Name) falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 11 - 039A (GP R 799)

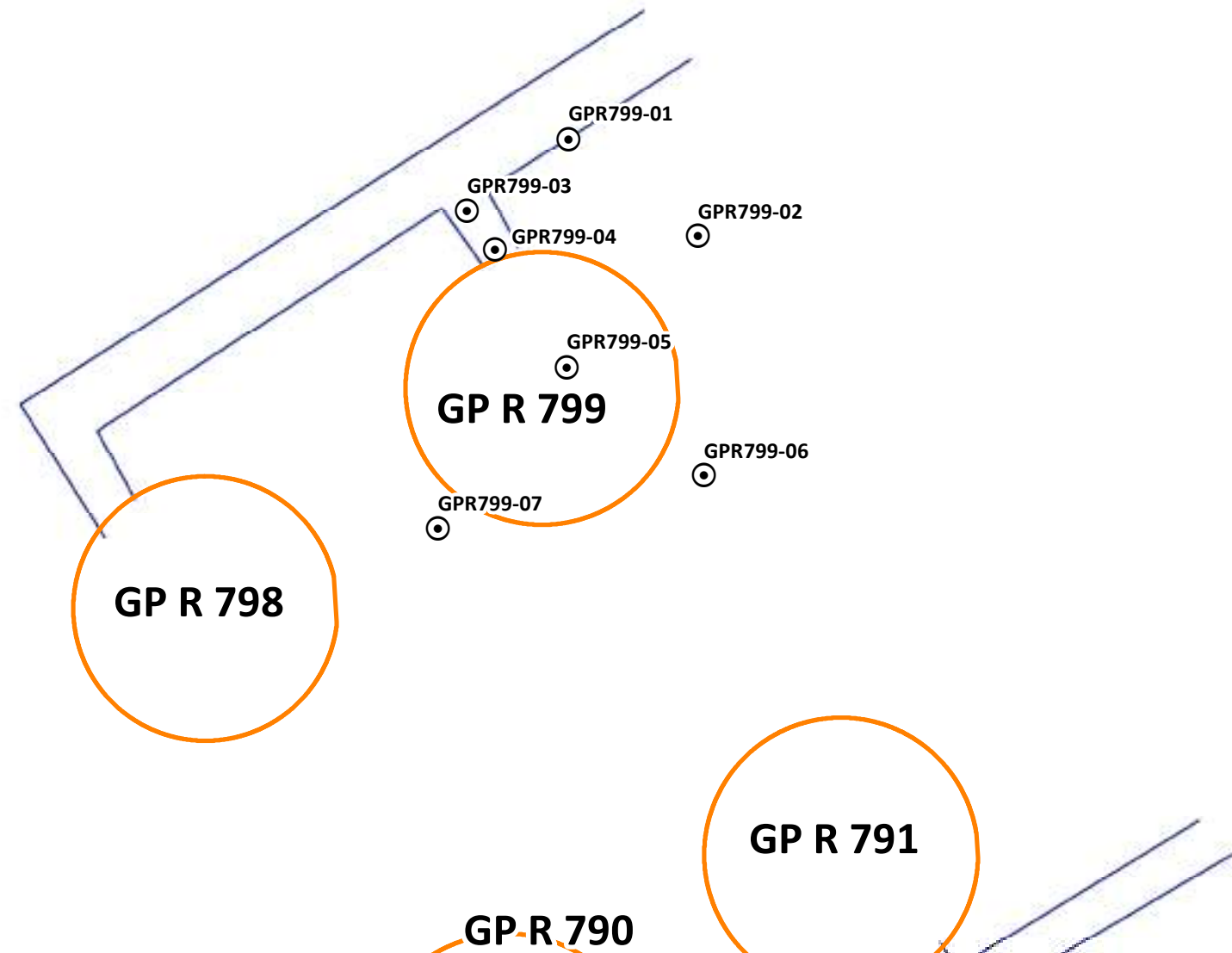
Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR799-01	GPR799-01-SS01	4	4.5	Benzene	SW8260C	Soil	2.2	0.27	7/18/2022	7/20/2022
GPR799-02	GPR799-02-SS01	4	4.5	Benzene	SW8260C	Soil	1.6	0.056	7/18/2022	7/19/2022
GPR799-03	GPR799-03-SS01	4	4.5	Benzene	SW8260C	Soil	16	0.45	7/18/2022	7/20/2022
GPR799-04	GPR799-04-SS01	4	4.5	Benzene	SW8260C	Soil	22	0.22	7/18/2022	7/19/2022
GPR799-05	GPR799-05-SS01	4	4.5	Benzene	SW8260C	Soil	2.7	0.046	7/18/2022	7/19/2022
GPR799-06	GPR799-06-SS01	4.5	5	Benzene	SW8260C	Soil	1.3	0.052	7/18/2022	7/19/2022
GPR799-07	GPR799-07-SS01	4.5	5	Benzene	SW8260C	Soil	0.71	0.1	7/18/2022	7/19/2022

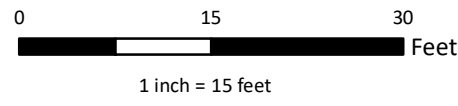
Notes:

SS -- Soil Sample.

File: N:\GIS\Projects\044_001_PESRM\PE\W\XDS\AST\Work\Tank_Group_07\For_AST_Closure_Report\Figure_11_039A_GPR_799.mxd 1/13/2023 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
	Tank Group 07
	Associated Piping
	PESRM Soil Sample Location



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Site Location and Sampling Map 039A (GP R 799)
Figure 11



Photograph 1:

View of Tank 039A (GP R 799) prior to demolition.

Product Movement and Waste Disposal Documentation (Tank 039A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004 - D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 43540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

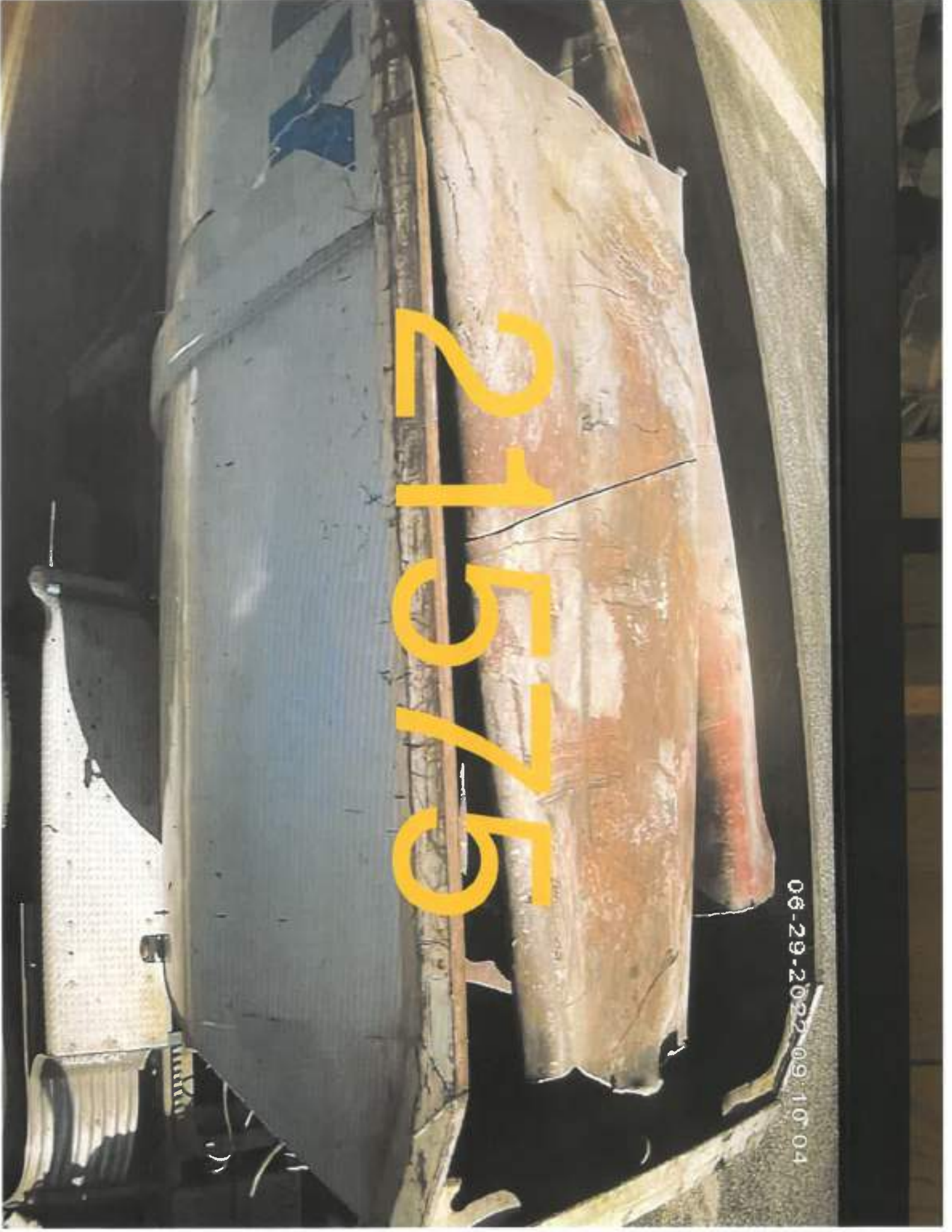
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11 53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 033A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

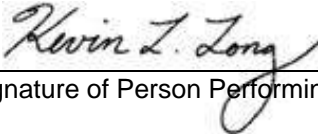
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2/ 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 6 - 033A (GP R 1088)

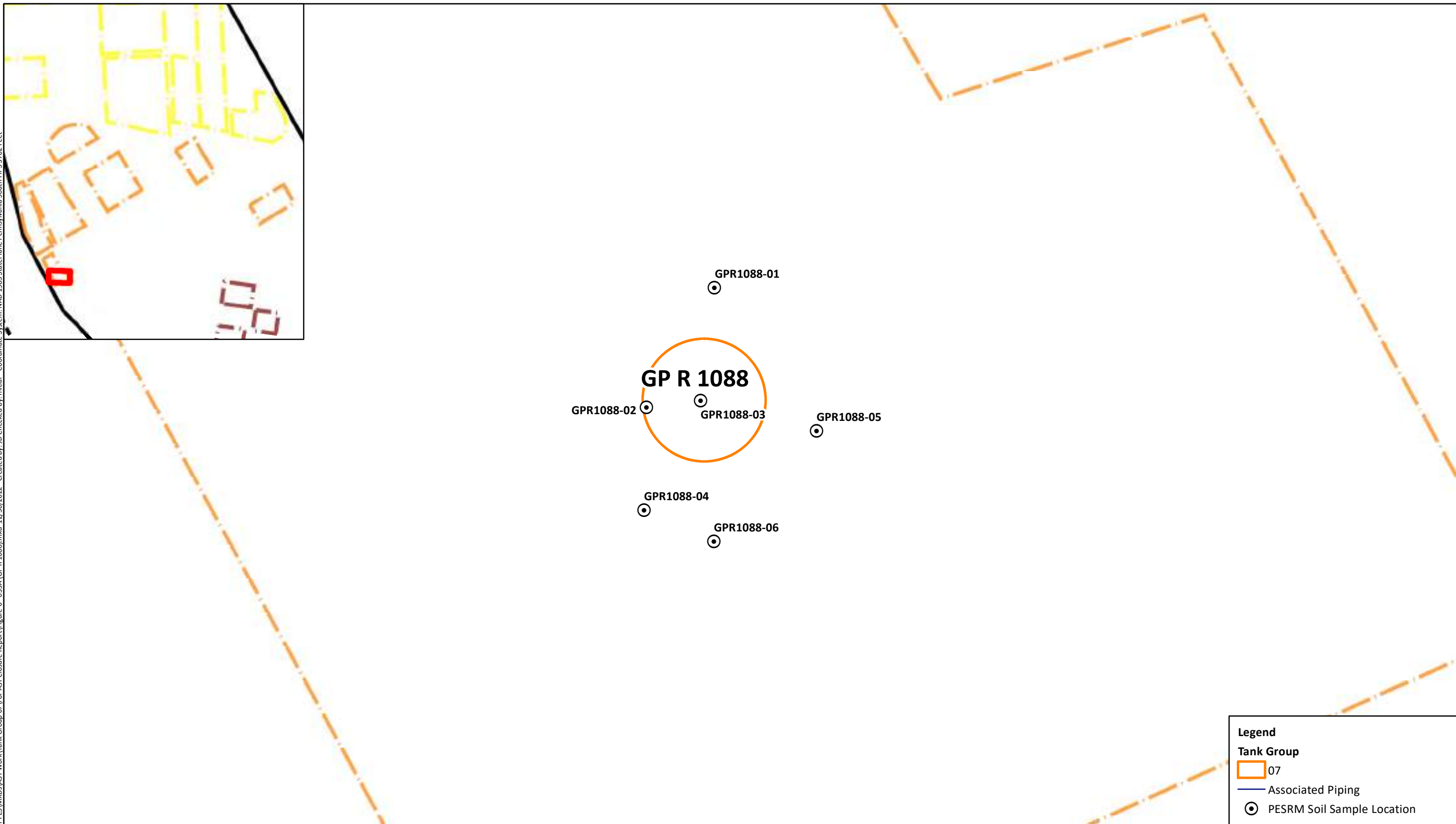
Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (SU)	Detection Limit (SU)	Date Sample Taken	Date Sample Analyzed
GPR1088-01	GPR1088-01-SS01	3	3.5	pH	SW9045D	Soil	8.5	0	8/2/2022	8/5/2022
GPR1088-02	GPR1088-02-SS01	3	3.5	pH	SW9045D	Soil	8	0	8/2/2022	8/5/2022
GPR1088-03	GPR1088-03-SS01	3	3.5	pH	SW9045D	Soil	8	0	8/2/2022	8/5/2022
GPR1088-04	GPR1088-04-SS01	3	3.5	pH	SW9045D	Soil	6.2	0	8/3/2022	8/8/2022
GPR1088-05	GPR1088-05-SS01	3	3.5	pH	SW9045D	Soil	8.9	0	8/3/2022	8/8/2022
GPR1088-06	GPR1088-06-SS01	3	3.5	pH	SW9045D	Soil	6.7	0	8/3/2022	8/8/2022

Notes:

SS -- Soil Sample.

File: N:\GIS\Projects\044_001_PESRM\PE\WXS\AST\Work\Tank Group 07\For AST Closure Report\Figure 6_033A (GP R 1088).mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



- Legend**
- Tank Group 07
 - Associated Piping
 - PESRM Soil Sample Location

0 15 30 Feet
1 inch = 15 feet



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Site Location and Sampling Map 033A (GP R 1088)

Figure 6



Photograph 1:
View of Tank 033A (GP R 1088) prior to demolition.



Photograph 2:
View of Tank 033A (GP R 1088) piping prior to demolition.

Product Movement and Waste Disposal Documentation (Tank 033A)



PES Project Load Ticket

S120103

Load Ticket: 21575

Date: 06-29-12

Sold to: Allegheny
Location: Tank 767
Carrier: Allegheny

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Melt
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

Non-Ferrous

- Insulated Copper Wire
- No. 1 Copper Wire
- Brass
- Aluminum
- Stainless, Grade _____
- Other Alloy, Grade _____
- Mixed
- Other: _____

Condition

- Prepared
- Unprepared
- Green Waste
- Concrete
- Masonry
- Mixed Masonry
- Wood Only
- Demo Debris (C&D)
- Dirt / Fill
- Sand Fill
- Crushed Stone
- Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004-D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck # _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 43540 lbs

Tare Weight: 40190 lbs

Net Weight: 23000 lbs

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPEMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20037354

Date: 06/29/2022 9 06 AM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 167330.528

Loads: 10949

DT1-56 - ALLEGHENY TRUCK 1 W/TRAILER 56

CARLAD - CARLA DAVILA

Remarks: SCRAP REMOVAL

Signature: _____

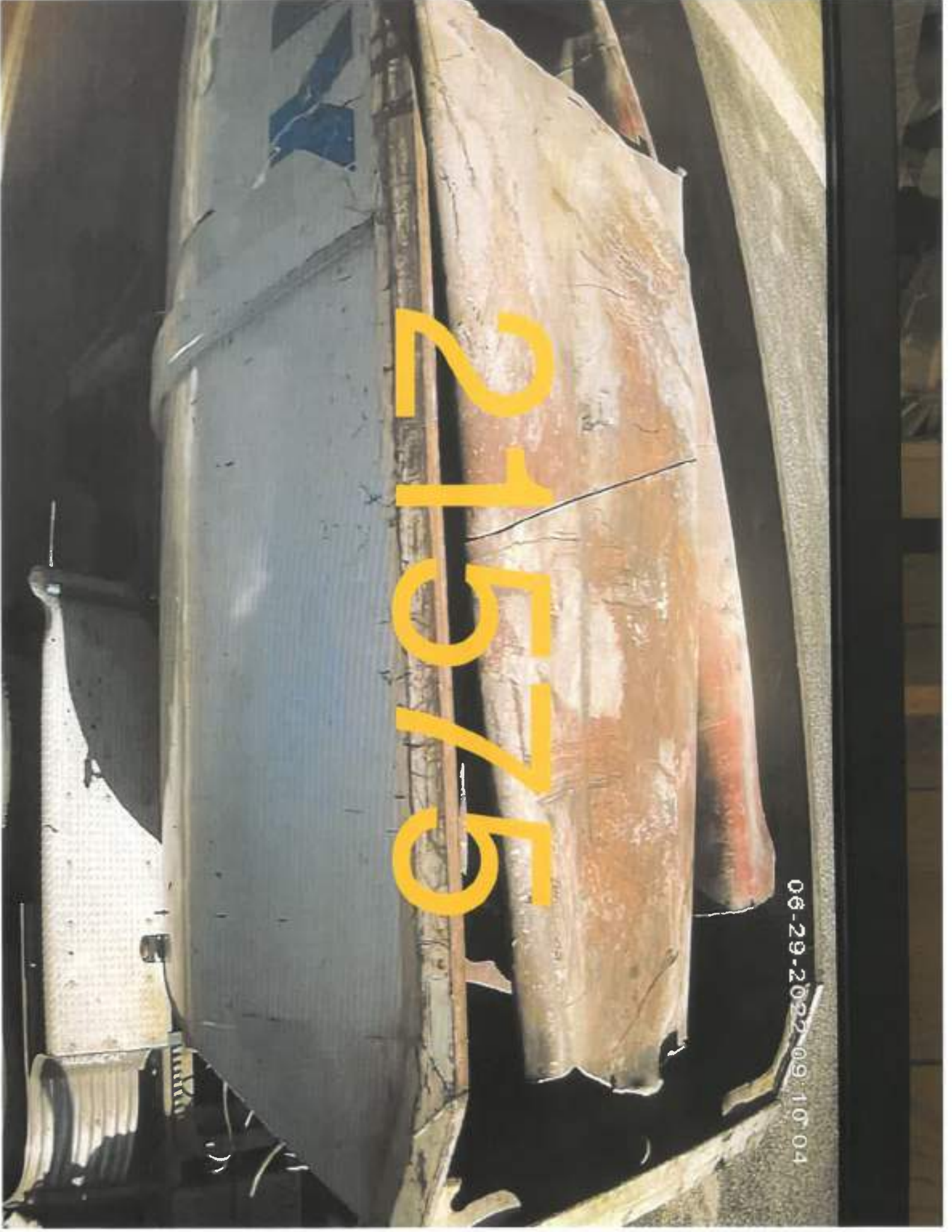
Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	11.53 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	63540.00	40480.00	23060.00

21576

06-29-2022 09:10:04



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 030A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

- A.** Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).
Bedrock N/A feet below land surface Water 15 feet below land surface
- B.** Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).
Length of piping N/A feet
- C. TANK SYSTEM REMOVED FROM THE GROUND/SITE**
- 1). Was obvious contamination observed while excavating, sampling or removing the tank system?
 NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.
 YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.
- 2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?
 YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.
 NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.
- D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE**
- Was obvious contamination observed during sampling, boring or assessing water depths?
 NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.
 YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> See end of this section for options on submission and maintenance of closure records.
- E.** If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

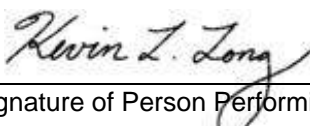
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2/ 1 /2023
Date

Principal Consultant
Title of Person Performing Site Assessment

Terraphase Engineering, Inc.
Name of Company Performing Site Assessment

609-236-8171 x93
Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 7 - 030A (GP R 1116)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1116-01	GPR1116-01-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.33	0.2	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Lead	SW6010D	Soil	19.4	2.87	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Pyrene	SW8270D	Soil	0.49	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.32	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Naphthalene	SW8270D	Soil	0.94	0.24	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Chrysene	SW8270D	Soil	0.42	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.57	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.58	0.2	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.38	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Anthracene	SW8270D	Soil	0.14	0.15	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00073	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Fluorene	SW8270D	Soil	0.11	0.24	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.026	0.0029	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.042	0.0029	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0015	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.016	0.0029	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Cumene	SW8260C	Soil	0.028	0.0015	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.0012	0.0015	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0029	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Toluene	SW8260C	Soil	0.00081	0.0015	7/18/2022	7/20/2022
GPR1116-01	GPR1116-01-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.00073	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Phenanthrene	SW8270D	Soil	0.94	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Benzo(a)anthracene	SW8270D	Soil	0.81	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Benzo(a)pyrene	SW8270D	Soil	1.2	0.24	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Benzo(b)fluoranthene	SW8270D	Soil	1.1	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.54	0.24	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Chrysene	SW8270D	Soil	0.92	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Pyrene	SW8270D	Soil	1.2	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Naphthalene	SW8270D	Soil	2	0.3	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.00097	0.0037	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Anthracene	SW8270D	Soil	0.34	0.18	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Fluorene	SW8270D	Soil	0.35	0.3	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.029	0.0037	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Cumene	SW8260C	Soil	0.0091	0.0018	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Lead	SW6010D	Soil	97.8	3.52	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Xylenes (total)	SW8260C	Soil	0.0215	0.0037	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00092	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0018	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Benzene	SW8260C	Soil	0.017	0.00092	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Ethyl Benzene	SW8260C	Soil	0.0031	0.0018	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0037	7/18/2022	7/20/2022
GPR1116-02	GPR1116-02-SS01	4	4.5	Toluene	SW8260C	Soil	0.02	0.0018	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.00056	0.0029	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Anthracene	SW8270D	Soil	0.3	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Phenanthrene	SW8270D	Soil	1.5	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.52	0.24	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Fluorene	SW8270D	Soil	0.75	0.24	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Chrysene	SW8270D	Soil	0.77	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.22	0.19	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.49	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.42	0.19	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.39	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Pyrene	SW8270D	Soil	0.68	0.14	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0095	0.0029	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Toluene	SW8260C	Soil	0.0008	0.0014	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0029	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.0004	0.0014	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Lead	SW6010D	Soil	1360	2.83	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Benzene	SW8260C	Soil	0.0012	0.00072	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0014	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00072	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Cumene	SW8260C	Soil	0.015	0.0014	7/18/2022	7/20/2022
GPR1116-03	GPR1116-03-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.00395	0.0029	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Anthracene	SW8270D	Soil	0.28	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.66	0.16	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.67	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.52	0.16	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Chrysene	SW8270D	Soil	0.52	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Fluorene	SW8270D	Soil	0.16	0.2	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.52	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.015	0.0023	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Pyrene	SW8270D	Soil	0.54	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Naphthalene	SW8270D	Soil	2.8	0.2	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00059	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.49	0.12	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Toluene	SW8260C	Soil	0.0017	0.0012	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.022	0.0023	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0012	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0089	0.0023	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Benzene	SW8260C	Soil	0.00056	0.00059	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Cumene	SW8260C	Soil	0.024	0.0012	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.001	0.0012	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0023	7/18/2022	7/20/2022
GPR1116-04	GPR1116-04-SS01	4.5	5	Lead	SW6010D	Soil	20.2	2.31	7/18/2022	7/20/2022
GPR1116-05	DUP-48	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0012	0.0035	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.028	0.18	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.04	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Benzo(a)pyrene	SW8270D	Soil	ND	0.18	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.042	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Chrysene	SW8270D	Soil	0.044	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Fluorene	SW8270D	Soil	0.087	0.23	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Naphthalene	SW8270D	Soil	0.16	0.23	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Phenanthrene	SW8270D	Soil	0.19	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Anthracene	SW8270D	Soil	ND	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Pyrene	SW8270D	Soil	0.1	0.14	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0038	0.0035	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Toluene	SW8260C	Soil	ND	0.0018	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0035	8/1/2022	8/3/2022
GPR1116-05	DUP-48	3	3.5	Ethyl Benzene	SW8260C	Soil	ND	0.0018	8/1/2022	8/3/2022
GPR1116-05	DUP-48									

Table 7 - 030A (GP R 1116)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1116-05	GPR1116-05-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.4	0.17	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.42	0.13	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.26	0.17	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Chrysene	SW8270D	Soil	0.27	0.13	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Fluorene	SW8270D	Soil	0.056	0.22	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Naphthalene	SW8270D	Soil	0.35	0.22	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Pyrene	SW8270D	Soil	0.21	0.13	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Toluene	SW8260C	Soil	0.078	0.094	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.15	0.13	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.78	0.19	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Anthracene	SW8270D	Soil	0.055	0.13	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Lead	SW6010D	Soil	67.9	2.49	8/1/2022	8/6/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.119	0.19	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.047	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.094	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.19	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Benzene	SW8260C	Soil	0.053	0.047	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Cumene	SW8260C	Soil	0.8	0.094	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.022	0.094	8/1/2022	8/3/2022
GPR1116-05	GPR1116-05-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.19	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.77	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Naphthalene	SW8270D	Soil	1.1	0.2	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Fluorene	SW8270D	Soil	0.22	0.2	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Chrysene	SW8270D	Soil	0.3	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.31	0.16	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.44	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.41	0.16	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.27	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Pyrene	SW8270D	Soil	0.55	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.67	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Lead	SW6010D	Soil	104	2.25	8/1/2022	8/6/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	1.5	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.19	0.77	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Cumene	SW8260C	Soil	18	0.77	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.38	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.15	1.5	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.77	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.38	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	1.2	1.5	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Anthracene	SW8270D	Soil	0.18	0.12	8/1/2022	8/3/2022
GPR1116-06	GPR1116-06-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	1.16	1.5	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	ND	6.6	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	ND	8.8	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	ND	6.6	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	8.8	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Chrysene	SW8270D	Soil	ND	6.6	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Fluorene	SW8270D	Soil	1.4	11	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Naphthalene	SW8270D	Soil	ND	11	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Pyrene	SW8270D	Soil	ND	6.6	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Toluene	SW8260C	Soil	0.17	0.093	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Phenanthrene	SW8270D	Soil	2.8	6.6	8/1/2022	8/8/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Lead	SW6010D	Soil	119	2.25	8/1/2022	8/6/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.18	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.087	0.093	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Cumene	SW8260C	Soil	8.4	0.093	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Benzene	SW8260C	Soil	0.037	0.046	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.12	0.18	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.093	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.046	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	2.7	0.18	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.43	0.18	8/1/2022	8/3/2022
GPR1116-07	GPR1116-07-SS01	4.5	5	Anthracene	SW8270D	Soil	ND	6.6	8/1/2022	8/8/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Anthracene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Benzo(a)anthracene	SW8270D	Soil	0.029	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Benzo(a)pyrene	SW8270D	Soil	ND	0.17	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.17	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Fluorene	SW8270D	Soil	0.024	0.21	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Naphthalene	SW8270D	Soil	ND	0.21	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Phenanthrene	SW8270D	Soil	0.062	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Pyrene	SW8270D	Soil	0.041	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Benzo(b)fluoranthene	SW8270D	Soil	0.035	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Xylenes (total)	SW8260C	Soil	1.075	0.16	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	1,3,5-Trimethylbenzene	SW8260C	Soil	0.025	0.16	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Toluene	SW8260C	Soil	6.8	0.078	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	1,2,4-Trimethylbenzene	SW8260C	Soil	0.1	0.16	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	1,2-Dichloroethane	SW8260C	Soil	ND	0.078	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Chrysene	SW8270D	Soil	0.03	0.12	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Benzene	SW8260C	Soil	28	0.19	8/1/2022	8/3/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Lead	SW6010D	Soil	85.3	12.2	8/1/2022	8/8/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Cumene	SW8260C	Soil	0.022	0.078	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Ethyl Benzene	SW8260C	Soil	0.34	0.078	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	Methyl tert-butyl ether	SW8260C	Soil	ND	0.16	8/1/2022	8/4/2022
GPR1116-08	GPR1116-08-SS01	2.5	3	1,2-Dibromoethane	SW8260C	Soil	ND	0.039	8/1/2022	8/4/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Naphthalene	SW8270D	Soil	ND	0.2	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Anthracene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	ND	0.16	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	ND	0.16	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Fluorene	SW8270D	Soil	ND	0.2	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Phenanthrene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	ND	0.002	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Chrysene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Lead	SW6010D	Soil	40.8	2.31	8/1/2022	8/6/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.002	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Pyrene	SW8270D	Soil	ND	0.12	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.001	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00051	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.001	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.002	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.00051	8/1/2022	8/3/2022
GPR1116-09	GPR1116-09-SS01									

Table 7 - 030A (GP R 1116)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1116-10	GPR1116-10-SS01	3	3.5	Naphthalene	SW8270D	Soil	2.2	0.22	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Fluorene	SW8270D	Soil	0.14	0.22	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Chrysene	SW8270D	Soil	0.52	0.13	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.94	0.17	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	1.2	0.13	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	1.4	0.17	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.4	0.13	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Pyrene	SW8270D	Soil	0.38	0.13	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Lead	SW6010D	Soil	13.9	2.48	8/1/2022	8/6/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Toluene	SW8260C	Soil	0.00084	0.001	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.002	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.00022	0.001	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Cumene	SW8260C	Soil	0.00054	0.001	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Benzene	SW8260C	Soil	0.0003	0.00051	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.00025	0.002	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.001	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00051	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.00072	0.002	8/1/2022	8/3/2022
GPR1116-10	GPR1116-10-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.00156	0.002	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.13	0.12	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.17	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.18	0.12	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.092	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Chrysene	SW8270D	Soil	0.16	0.12	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Fluorene	SW8270D	Soil	0.036	0.2	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Naphthalene	SW8270D	Soil	0.16	0.2	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Pyrene	SW8270D	Soil	0.16	0.12	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Toluene	SW8260C	Soil	ND	0.083	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Phenanthrene	SW8270D	Soil	0.083	0.12	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Lead	SW6010D	Soil	193	2.3	8/1/2022	8/6/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.015	0.083	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Cumene	SW8260C	Soil	0.068	0.083	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Benzene	SW8260C	Soil	ND	0.041	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.083	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.041	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.11	0.16	8/1/2022	8/3/2022
GPR1116-11	GPR1116-11-SS01	3	3.5	Anthracene	SW8270D	Soil	0.039	0.12	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Benzo(a)anthracene	SW8270D	Soil	0.34	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Benzo(a)pyrene	SW8270D	Soil	0.62	0.15	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Benzo(b)fluoranthene	SW8270D	Soil	0.68	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Benzo(g,h,i)perylene	SW8270D	Soil	0.31	0.15	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Chrysene	SW8270D	Soil	0.92	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Fluorene	SW8270D	Soil	1.2	0.19	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Naphthalene	SW8270D	Soil	0.32	0.19	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Pyrene	SW8270D	Soil	0.62	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Anthracene	SW8270D	Soil	0.45	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Phenanthrene	SW8270D	Soil	1.6	0.11	8/1/2022	8/3/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Lead	SW6010D	Soil	97.5	2.15	8/1/2022	8/6/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Xylenes (total)	SW8260C	Soil	1.26	0.13	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	1,2,4-Trimethylbenzene	SW8260C	Soil	16	0.13	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	1,2-Dibromoethane	SW8260C	Soil	ND	0.033	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	1,2-Dichloroethane	SW8260C	Soil	ND	0.066	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	1,3,5-Trimethylbenzene	SW8260C	Soil	3.8	0.13	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Benzene	SW8260C	Soil	0.052	0.033	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Cumene	SW8260C	Soil	3.8	0.066	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Ethyl Benzene	SW8260C	Soil	0.12	0.066	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Methyl tert-butyl ether	SW8260C	Soil	ND	0.13	8/1/2022	8/5/2022
GPR1116-12	GPR1116-12-SS01	2.5	3	Toluene	SW8260C	Soil	0.29	0.066	8/1/2022	8/5/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Toluene	SW8260C	Soil	0.0029	0.0013	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Phenanthrene	SW8270D	Soil	1.5	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Naphthalene	SW8270D	Soil	1.3	0.21	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Fluorene	SW8270D	Soil	0.53	0.21	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Chrysene	SW8270D	Soil	0.86	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.45	0.16	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Benzo(b)fluoranthene	SW8270D	Soil	0.92	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Benzo(a)pyrene	SW8270D	Soil	0.97	0.16	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Benzo(a)anthracene	SW8270D	Soil	0.85	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Pyrene	SW8270D	Soil	1.5	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0048	0.0026	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Anthracene	SW8270D	Soil	0.48	0.12	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Lead	SW6010D	Soil	375	2.37	8/1/2022	8/6/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Xylenes (total)	SW8260C	Soil	0.0142	0.0026	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00065	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0013	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0018	0.0026	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Benzene	SW8260C	Soil	0.00064	0.00065	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Cumene	SW8260C	Soil	0.0034	0.0013	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Ethyl Benzene	SW8260C	Soil	0.0011	0.0013	8/1/2022	8/3/2022
GPR1116-13	GPR1116-13-SS01	3	3.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0026	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Toluene	SW8260C	Soil	ND	0.0019	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Naphthalene	SW8270D	Soil	0.37	0.27	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Fluorene	SW8270D	Soil	0.74	0.27	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Chrysene	SW8270D	Soil	0.36	0.16	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Benzo(g,h,i)perylene	SW8270D	Soil	0.19	0.22	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Benzo(b)fluoranthene	SW8270D	Soil	0.44	0.16	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Benzo(a)pyrene	SW8270D	Soil	0.43	0.22	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Benzo(a)anthracene	SW8270D	Soil	0.42	0.16	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Pyrene	SW8270D	Soil	0.62	0.16	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Phenanthrene	SW8270D	Soil	1.5	0.16	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Lead	SW6010D	Soil	60.2	3.22	8/1/2022	8/6/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0037	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Ethyl Benzene	SW8260C	Soil	0.00041	0.0019	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Cumene	SW8260C	Soil	0.02	0.0019	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	Benzene	SW8260C	Soil	0.0012	0.00093	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0012	0.0037	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	1,2-Dichloroethane	SW8260C	Soil	ND	0.0019	8/1/2022	8/3/2022
GPR1116-14	GPR1116-14-SS01	3.5	4	1,2-Dibromoethane	SW8260C	Soil	ND	0.00093	8/1/2022	8/3/2022

Table 7 - 030A (GP R 1116)

Sample/Analysis Information (Attachment for Section III.)

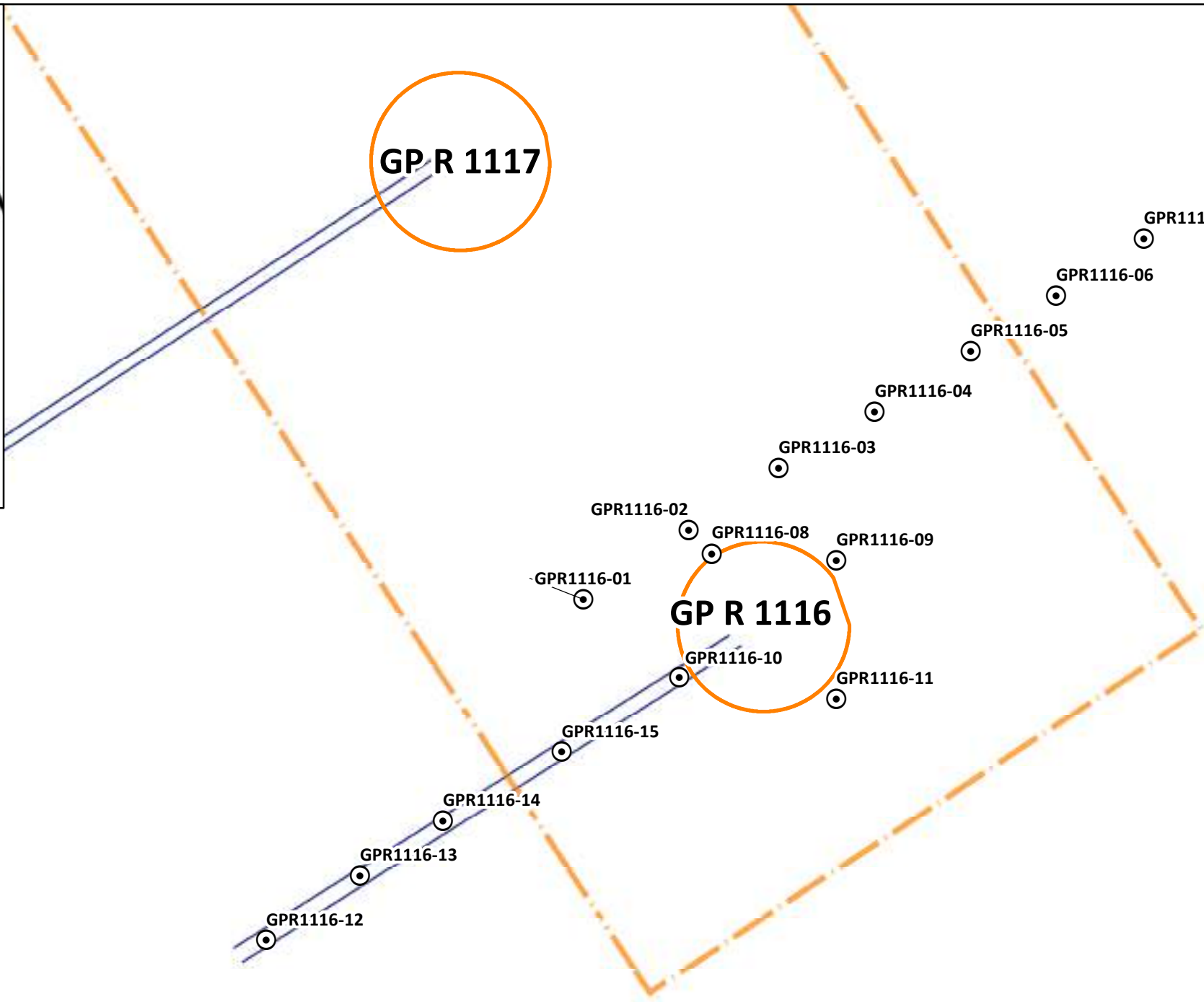
Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1116-15	GPR1116-15-SS01	1.5	2	Benzo(g,h,i)perylene	SW8270D	Soil	3.8	0.18	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Chrysene	SW8270D	Soil	3.7	0.14	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Fluorene	SW8270D	Soil	0.52	0.23	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Naphthalene	SW8270D	Soil	3.9	0.23	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Pyrene	SW8270D	Soil	4.3	0.14	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Toluene	SW8260C	Soil	0.35	0.19	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Phenanthrene	SW8270D	Soil	2.8	0.14	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Lead	SW6010D	Soil	189	2.68	8/1/2022	8/6/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Methyl tert-butyl ether	SW8260C	Soil	ND	0.39	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Ethyl Benzene	SW8260C	Soil	0.27	0.19	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Cumene	SW8260C	Soil	1.1	0.19	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Benzene	SW8260C	Soil	0.05	0.097	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	1,3,5-Trimethylbenzene	SW8260C	Soil	0.38	0.39	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	1,2-Dichloroethane	SW8260C	Soil	ND	0.19	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	1,2-Dibromoethane	SW8260C	Soil	ND	0.097	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	1,2,4-Trimethylbenzene	SW8260C	Soil	2.6	0.39	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Xylenes (total)	SW8260C	Soil	1.37	0.39	8/1/2022	8/3/2022
GPR1116-15	GPR1116-15-SS01	1.5	2	Anthracene	SW8270D	Soil	1.3	0.14	8/1/2022	8/3/2022

Notes:

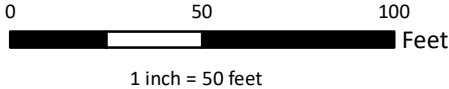
SS -- Soil Sample.

DUP-48 is a field duplicate associated with sample GPR1116-05-SS01.

File: N:\GIS\Prj\PO44_001_PESRM-PES\MXDS\AST\Work\Tank Group 07\For AST Closure Report\Figure 5 - 030A (GP R 1116).mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



- Legend**
- Tank Group 07
 - Associated Piping
 - PESRM Soil Sample Location



SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC
	PROJECT: Aboveground Storage Tank Closure
	PROJECT NUMBER: P044.001.002

Site Location and Sampling Map 030A (GP R 1116)

Figure 5



Photograph 1:
View of Tank 030A
(GP R 1116)
during demolition.



Photograph 2:
View of scrap piles
and the concrete
pad during
demolition.



Photograph 3:

View of the concrete pad following demolition.



Photograph 4:

View of the concrete pad following demolition.



Photograph 5:

View of the concrete pad and vicinity soils following demolition.

Product Movement and Waste Disposal Documentation (Tank 030A)



PES Project Load Ticket

#S12010³

Load Ticket: 16330

Date: 09/29/21

Sold to: Medtron Scrap
Location: Tampa III - 117
Carrier: Highway

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Mill
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

- Non-Ferrous
- Insulated Copper Wire
 - No. 1 Copper Wire
 - Brass
 - Aluminum
 - Stainless, Grade _____
 - Other Alloy, Grade _____
 - Mixed
 - Other: _____

- Condition
- Prepared
 - Unprepared
 - Green Waste
 - Concrete
 - Masonry
 - Mixed Masonry
 - Wood Only
 - Demo Debris (C&D)
 - Dirt / Fill
 - Sand Fill
 - Crushed Stone
 - Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004 - D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck #: _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 67180 lb

Tare Weight: 40450 lb

Net Weight: 26700 lb

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20030558

Date: 09/29/2021 12:55 PM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 85938.806

Loads 4401

DT56-1 - TRACTOR 1 TRAILER DT56

CARLAD - CARLA DAVILA

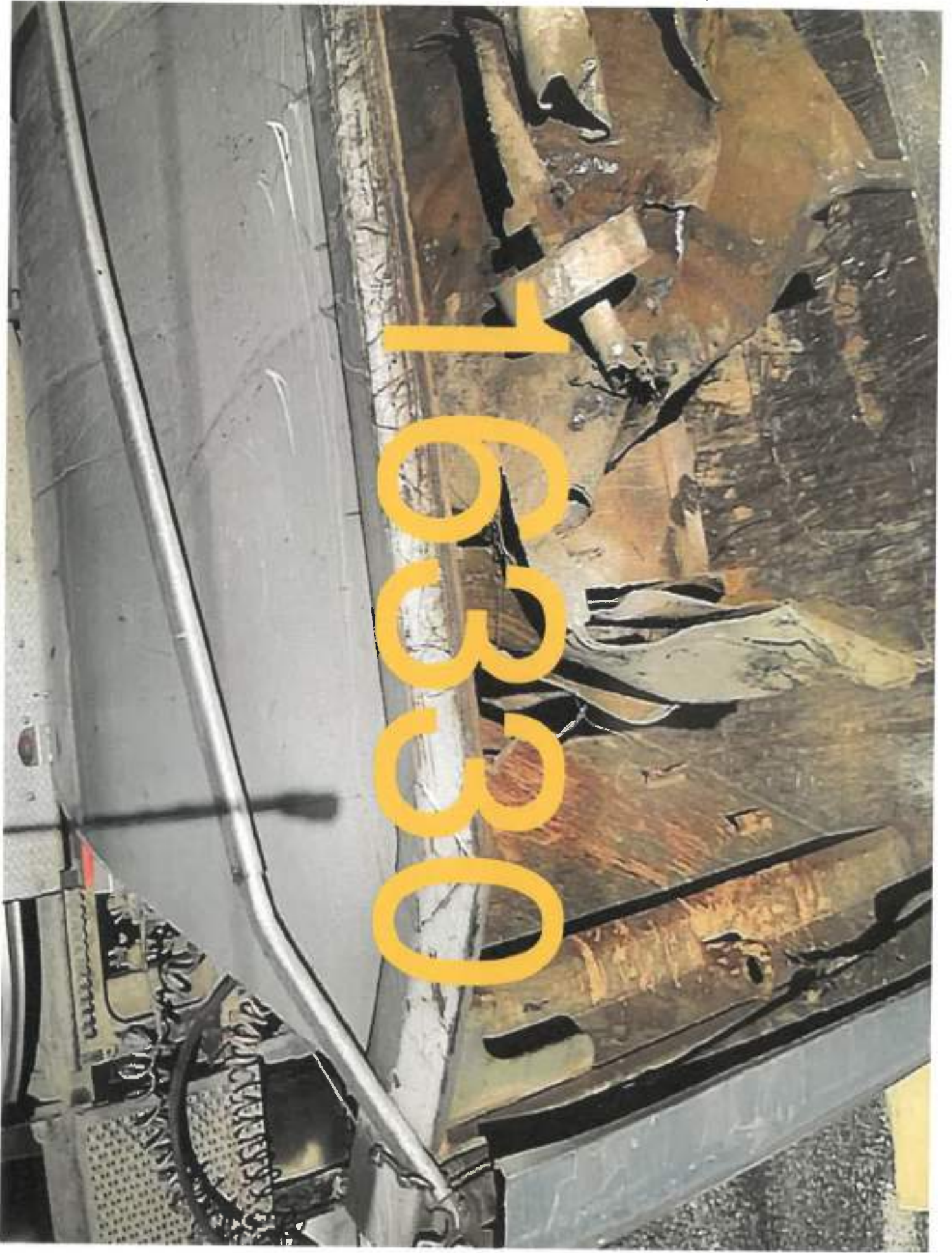
Remarks: SCRAP REMOVAL

Signature: _____

Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	13.35 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	67180.00	40480.00	26700.00



ABOVEGROUND STORAGE TANK SYSTEM CLOSURE REPORT FORM

SECTION III. Site Assessment Information

Tank Registration # 005A (complete one sheet for EACH tank system and attach ALL laboratory sheets pertaining to that system)

Facility ID Number 51 - 33624

A. Provide depth of *BEDROCK* and *WATER* IF encountered during excavation or soil boring (write "N/A": if NOT encountered).

Bedrock N/A feet below land surface Water 15 feet below land surface

B. Provide Length of *PIPING* IF piping was closed-in-place (write "N/A" if NOT closed-in-place).

Length of piping N/A feet

C. TANK SYSTEM REMOVED FROM THE GROUND/SITE

1). Was obvious contamination observed while excavating, sampling or removing the tank system?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records -----> Do not complete item C.2. below.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ -----> Complete item C.2. below.

2). Was contamination localized (within three feet of the tank system in every direction with no obvious water contamination)?

YES -----> Remove or remediate contaminated soil -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

NO -----> Continue Interim Remedial Actions -----> See end of this section for options on submission and maintenance of closure records.

D. TANK SYSTEM CLOSED-IN-PLACE OR CHANGED-IN-SERVICE

Was obvious contamination observed during sampling, boring or assessing water depths?

NO -----> Conduct confirmatory sampling -----> See end of this section for options on submission and maintenance of closure records.

YES -----> Report release to DEP within 24 hours -----> Describe contamination observed and likely source(s) (tank, piping, dispenser, spills, overfills): _____

_____ Continue with corrective action -----> See end of this section for options on submission and maintenance of closure records.

E. If the answer to C.1. is "no", the answer to C.2. is "yes" or the answer to D. is "no", confirmatory samples are required. Use the sample/analysis information sheet on page 10 of 11 to provide the information on confirmatory sampling and complete the diagram on Page 11 of 11.

Options for Submission and Maintenance of Closure Site Assessment Records

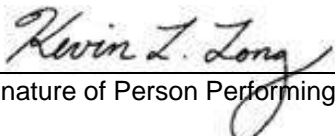
Records of the site assessment must be maintained for at least three years after completion of permanent closure or change-in-service in one of the following ways:

- (a) By the owners and operators who took the tank system out of service;
- (b) By the current owners and operators of the tank system site; or
- (c) By mailing these records to the DEP regional office responsible for the county in which the tank is located if they cannot be maintained at the closed facility.

Where the results of the site assessment indicate that obvious, localized soil contamination was encountered and the analytical results of the confirmatory sampling show levels below the statewide standard/action levels, this closure report form (Sections I, II, and III) or some other acceptable site characterization report must be received by the Department within 180 days of verbally reporting the release.

Where the results of the site assessment indicate that no obvious contamination or obvious, localized contamination was encountered, but the analytical results of the confirmatory sampling show levels above the statewide standard/action levels, or where there is obvious, extensive contamination, Section 245.310(a)(8) of the Corrective Action Process (CAP) regulations requires that details of removal from service be included in the site characterization report. A copy of the completed closure report form should be submitted as part of the site characterization report to satisfy the requirements of Section 245.310(a)(8) of the CAP regulations.

I, Kevin Long , hereby certify, under penalty of law as provided in 18 Pa. C.S. §4904 (relating to unsworn falsification to authorities) that I am the person who performed the site assessment activities associated with the closure of the above referenced storage tank system(s) and that the information provided by me in this closure report (Section III) is true, accurate and complete to the best of my knowledge and belief.



Signature of Person Performing Site Assessment

2 / 1 / 2023

Date

Principal Consultant

Title of Person Performing Site Assessment

Terraphase Engineering, Inc.

Name of Company Performing Site Assessment

609-236-8171 x93

Telephone Number of Person Performing Site Assessment

N - Samples placed in soil sample vial without a preservative present.

Site Location and Sampling Map - Use this page or suitable facsimile to provide a large-scale map of the site where storage tank systems were closed. Scales between 1" = 10 and 1" = 100 feet frequently work well. Include the following information as each applies to the site: facility name and I.D., county, township or borough, property boundaries or area of interest, buildings, roads and streets with names or route numbers, utilities, location and ID number of storage tank systems removed including piping and dispensers, soil stockpile locations, excavations or other locations of product recovery, north arrow, approximate map scale and legend. Also, show depth and location of samples with sample ID numbers cross-referenced to the same ID numbers shown on Page 10 of 11.

Facility Name and ID: -

County:

Township/Borough: See attached Figure

Table 1 - 005A (GP R 1117)

Sample/Analysis Information (Attachment for Section III.)

Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1117-01	GPR1117-01-SS01	4.5	5	Anthracene	SW8270D	Soil	0.22	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.72	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	1	0.22	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.97	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Chrysene	SW8270D	Soil	0.79	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.5	0.22	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Naphthalene	SW8270D	Soil	1.1	0.28	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.86	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.00315	0.0035	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Pyrene	SW8270D	Soil	1.2	0.17	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0023	0.0035	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Lead	SW6010D	Soil	157	6.55	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00087	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0016	0.0035	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Benzene	SW8260C	Soil	ND	0.00087	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Cumene	SW8260C	Soil	0.0055	0.0017	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0035	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Fluorene	SW8270D	Soil	0.26	0.28	7/18/2022	7/20/2022
GPR1117-01	GPR1117-01-SS01	4.5	5	Toluene	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Pyrene	SW8270D	Soil	1.5	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Anthracene	SW8270D	Soil	0.29	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Benzo(a)anthracene	SW8270D	Soil	0.76	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Benzo(a)pyrene	SW8270D	Soil	1.1	0.19	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.58	0.19	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Fluorene	SW8270D	Soil	0.27	0.24	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Phenanthrene	SW8270D	Soil	0.8	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Xylenes (total)	SW8260C	Soil	0.00263	0.0033	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Benzo(b)fluoranthene	SW8270D	Soil	1	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Naphthalene	SW8270D	Soil	2	0.24	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0015	0.0033	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Chrysene	SW8270D	Soil	0.88	0.14	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.0017	0.0033	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Toluene	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Benzene	SW8260C	Soil	ND	0.00083	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Lead	SW6010D	Soil	125	5.59	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Cumene	SW8260C	Soil	0.001	0.0017	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Ethyl Benzene	SW8260C	Soil	ND	0.0017	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0033	7/18/2022	7/20/2022
GPR1117-02	GPR1117-02-SS01	4	4.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00083	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Phenanthrene	SW8270D	Soil	8.9	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Benzo(a)anthracene	SW8270D	Soil	0.88	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Benzo(a)pyrene	SW8270D	Soil	0.84	0.19	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Benzo(b)fluoranthene	SW8270D	Soil	0.79	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Benzo(g,h,i)perylene	SW8270D	Soil	0.41	0.19	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Chrysene	SW8270D	Soil	1	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Naphthalene	SW8270D	Soil	6.3	0.24	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Pyrene	SW8270D	Soil	3.2	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0028	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Anthracene	SW8270D	Soil	1.4	0.14	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Fluorene	SW8270D	Soil	2.7	0.24	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	1,2,4-Trimethylbenzene	SW8260C	Soil	0.00085	0.0028	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Toluene	SW8260C	Soil	ND	0.0014	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0028	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Ethyl Benzene	SW8260C	Soil	ND	0.0014	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Lead	SW6010D	Soil	133	5.8	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Benzene	SW8260C	Soil	0.00024	0.00071	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Cumene	SW8260C	Soil	0.00049	0.0014	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	1,2-Dichloroethane	SW8260C	Soil	ND	0.0014	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	1,2-Dibromoethane	SW8260C	Soil	ND	0.00071	7/18/2022	7/20/2022
GPR1117-03	GPR1117-03-SS01	3.5	4	Xylenes (total)	SW8260C	Soil	0.00188	0.0028	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	2.9	0.12	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	3.1	0.16	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	3.4	0.12	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	1.6	0.16	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Chrysene	SW8270D	Soil	2.8	0.12	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Fluorene	SW8270D	Soil	1	0.2	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Phenanthrene	SW8270D	Soil	3.5	0.12	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Toluene	SW8260C	Soil	0.34	0.56	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Pyrene	SW8270D	Soil	4.8	0.12	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Naphthalene	SW8270D	Soil	2	0.2	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Lead	SW6010D	Soil	66.9	2.44	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	1.1	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	0.23	0.56	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Cumene	SW8260C	Soil	3.7	0.56	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Benzene	SW8260C	Soil	0.11	0.28	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.41	1.1	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.56	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.28	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	1.3	1.1	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	1.12	1.1	7/18/2022	7/20/2022
GPR1117-04	GPR1117-04-SS01	4.5	5	Anthracene	SW8270D	Soil	0.96	0.12	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Anthracene	SW8270D	Soil	0.54	0.22	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Benzo(a)anthracene	SW8270D	Soil	0.67	0.22	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Benzo(a)pyrene	SW8270D	Soil	0.64	0.3	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Benzo(g,h,i)perylene	SW8270D	Soil	0.36	0.3	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Fluorene	SW8270D	Soil	0.19	0.37	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Naphthalene	SW8270D	Soil	0.32	0.37	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Phenanthrene	SW8270D	Soil	1.2	0.22	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Pyrene	SW8270D	Soil	1.1	0.22	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Benzo(b)fluoranthene	SW8270D	Soil	0.75	0.22	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Xylenes (total)	SW8260C	Soil	ND	0.0044	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	1,2-Dibromoethane	SW8260C	Soil	ND	0.0011	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0044	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0022	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0044	7/18/2022	7/20/2022
GPR1117-05	GPR1117-05-SS01	4	4.5	Chrysene	SW8270D	Soil	0.66	0.22	7/18/2022	

Table 1 - 005A (GP R 1117)

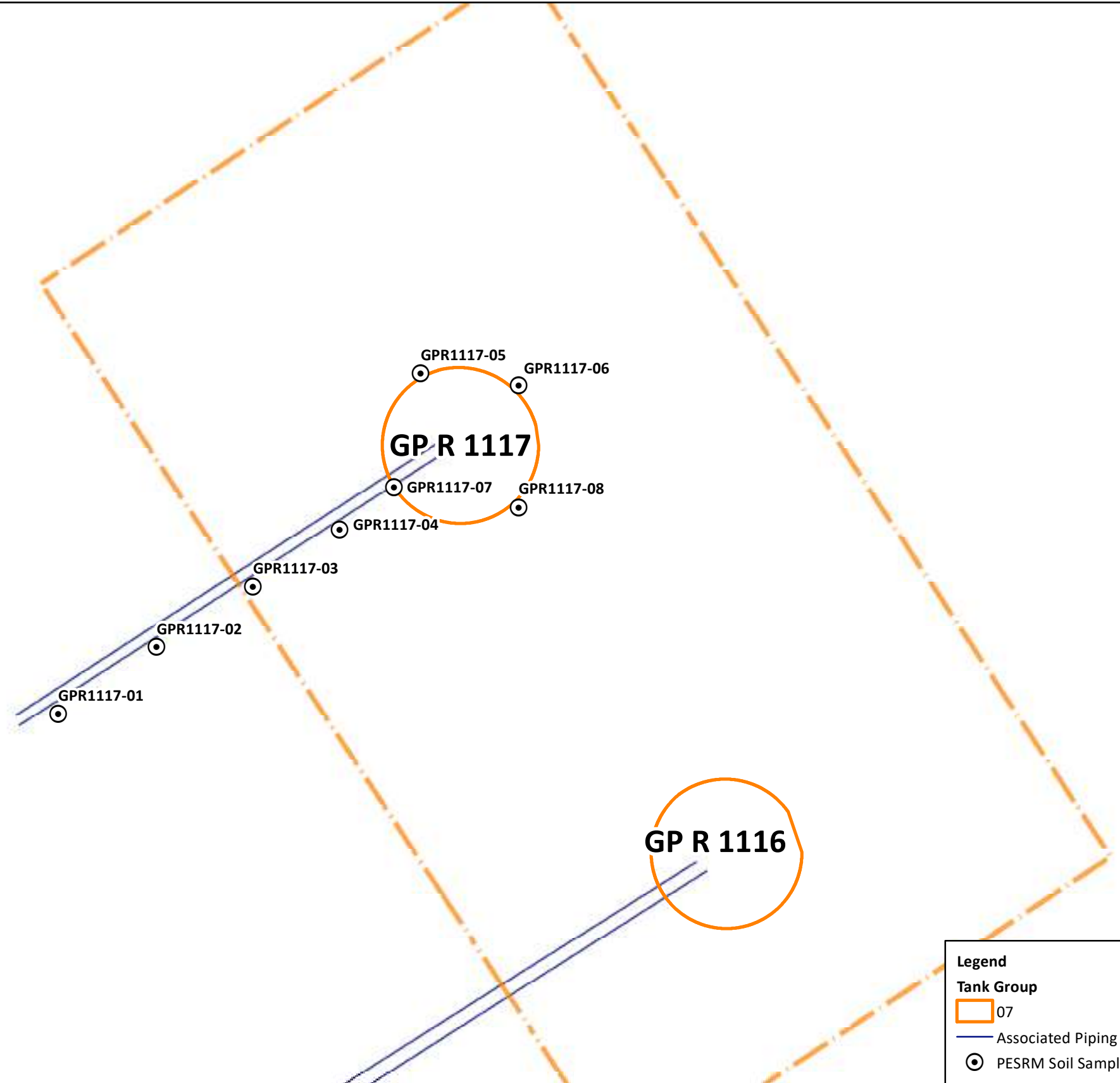
Sample/Analysis Information (Attachment for Section III.)




Location	Sample ID	Start Depth (ft)	End Depth (ft)	Parameter	Analytical Method	Media	Results (mg/kg)	Detection Limit (mg/kg)	Date Sample Taken	Date Sample Analyzed
GPR1117-06	GPR1117-06-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.72	0.19	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.76	0.14	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.49	0.19	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Chrysene	SW8270D	Soil	0.74	0.14	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Fluorene	SW8270D	Soil	0.12	0.24	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.52	0.14	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.53	0.14	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Toluene	SW8260C	Soil	0.002	0.0019	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Naphthalene	SW8270D	Soil	1.2	0.24	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00094	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Lead	SW6010D	Soil	687	2.85	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Anthracene	SW8270D	Soil	0.22	0.14	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	0.009	0.0038	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	0.0048	0.0038	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	0.0025	0.0038	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Benzene	SW8260C	Soil	0.0012	0.00094	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Cumene	SW8260C	Soil	0.0012	0.0019	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-06	GPR1117-06-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0038	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Phenanthrene	SW8270D	Soil	0.39	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Anthracene	SW8270D	Soil	0.098	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.45	0.28	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Fluorene	SW8270D	Soil	0.11	0.28	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Chrysene	SW8270D	Soil	0.27	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.2	0.22	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.36	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.3	0.22	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.26	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Pyrene	SW8270D	Soil	0.39	0.17	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	ND	0.0039	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00097	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Lead	SW6010D	Soil	981	3.24	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0039	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Benzene	SW8260C	Soil	0.00049	0.00097	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Cumene	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0039	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	Toluene	SW8260C	Soil	ND	0.0019	7/18/2022	7/20/2022
GPR1117-07	GPR1117-07-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0039	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Chrysene	SW8270D	Soil	0.58	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Benzo(a)anthracene	SW8270D	Soil	0.59	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Benzo(a)pyrene	SW8270D	Soil	0.54	0.17	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Benzo(b)fluoranthene	SW8270D	Soil	0.61	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Benzo(g,h,i)perylene	SW8270D	Soil	0.26	0.17	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Fluorene	SW8270D	Soil	0.12	0.21	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Naphthalene	SW8270D	Soil	0.14	0.21	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Anthracene	SW8270D	Soil	0.3	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Lead	SW6010D	Soil	20.4	2.46	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Phenanthrene	SW8270D	Soil	1.1	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Pyrene	SW8270D	Soil	1	0.13	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	1,2,4-Trimethylbenzene	SW8260C	Soil	ND	0.0024	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Toluene	SW8260C	Soil	ND	0.0012	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Methyl tert-butyl ether	SW8260C	Soil	ND	0.0024	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Ethyl Benzene	SW8260C	Soil	ND	0.0012	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Cumene	SW8260C	Soil	0.00028	0.0012	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Benzene	SW8260C	Soil	0.0054	0.00059	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	1,3,5-Trimethylbenzene	SW8260C	Soil	ND	0.0024	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	1,2-Dichloroethane	SW8260C	Soil	ND	0.0012	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	1,2-Dibromoethane	SW8260C	Soil	ND	0.00059	7/18/2022	7/20/2022
GPR1117-08	GPR1117-08-SS01	4.5	5	Xylenes (total)	SW8260C	Soil	ND	0.0024	7/18/2022	7/20/2022

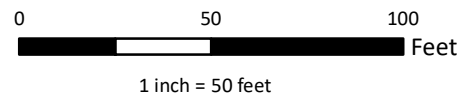
Notes:

SS -- Soil Sample.

File: N:\GIS\Prj\PO44_001_PESRM-PES\MXDS\AST\Work\Tank Group 07\For AST Closure Report\Figure 1_005A (GP R 1117).mxd 12/30/2022 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet



Legend	
 07	Tank Group
	Associated Piping
	PESRM Soil Sample Location




SAFETY FIRST 	CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC	Site Location and Sampling Map 005A (GP R 1117)
	PROJECT: Aboveground Storage Tank Closure	
PROJECT NUMBER: P044.001.002		

Figure 1



Photograph 1:
View of Tank 005A
(GP R 1117)
during demolition.



Photograph 2:
View of Tank 005A
(GP R 1117)
during demolition.



Photograph 3:
View of Tank 005A
(GP R 1117)
during demolition.



Photograph 4:
View of the scrap
pile.



Photograph 5:

View of the concrete pad and vicinity soils following demolition.



Photograph 6:

View of the concrete pad following demolition.

Product Movement and Waste Disposal Documentation (Tank 005A)



PES Project Load Ticket

#S12010 →

Load Ticket: 16330

Date: 09/29/21

Sold to: Medison Scrap
Location: Tanaka (111-11) 7
Carrier: Highway

Non-Haz / ACM / Special Waste

Activity Location: _____

Steel / Ferrous

- No. 1 P+S
- No. 2 Heavy Mill
- Cast Iron
- Mixed
- Pipe
- Light Iron
- Re-Bar
- Other: Tank Plate

- Non-Ferrous
- Insulated Copper Wire
 - No. 1 Copper Wire
 - Brass
 - Aluminum
 - Stainless, Grade _____
 - Other Alloy, Grade _____
 - Mixed
 - Other: _____

- Condition
- Prepared
 - Unprepared
 - Green Waste
 - Concrete
 - Masonry
 - Mixed Masonry
 - Wood Only
 - Demo Debris (C&D)
 - Dirt / Fill
 - Sand Fill
 - Crushed Stone
 - Other: _____

Waste Stream

- C&D Demolition Debris
- Non-Friable ACM
- Friable ACM
- PB WWTP Sludge
- GP WWTP Sludge
- Characteristic Haz Waste (flammable D001, corrosive D002, reactive D003, toxicity D004 -D043)
- Process Haz Waste
- Demo Debris (C&D)
- Non-Haz Waste (Solid)
- Non-Haz Waste (Liquid)
- PCB (Non-TSCA)
- PCB (TSCA)

Disposal Facility: _____

Carrier: _____

Truck #: _____

Container #: _____

Manifest #: _____

Profile / Approval #: _____

Scale Info

Scale Ticket #: _____

Gross Weight: _____

Tare weight: _____

Net weight: _____

Net Kilogram Conversion (PCB Only): _____

NorthStar Rep. Signature: _____

Scale Ticket #: _____

Gross Weight: 67180 lb

Tare Weight: 40450 lb

Net Weight: 26700 lb

NorthStar Rep. Signature: [Signature]

Received By: [Signature]

HILCO REDEVELOPMENT PARTNERS

3144 W. PASSYUNK AVE

PHILADELPHIA PA, 19145

Ticket #: 20030558

Date: 09/29/2021 12:55 PM

Phone: () -

Fax: () -

Customer: HILCO

HILCO

Order Number: 001

SCRAP REMOVAL

Tons: 85938.806

Loads 4401

DT56-1 - TRACTOR 1 TRAILER DT56

CARLAD - CARLA DAVILA

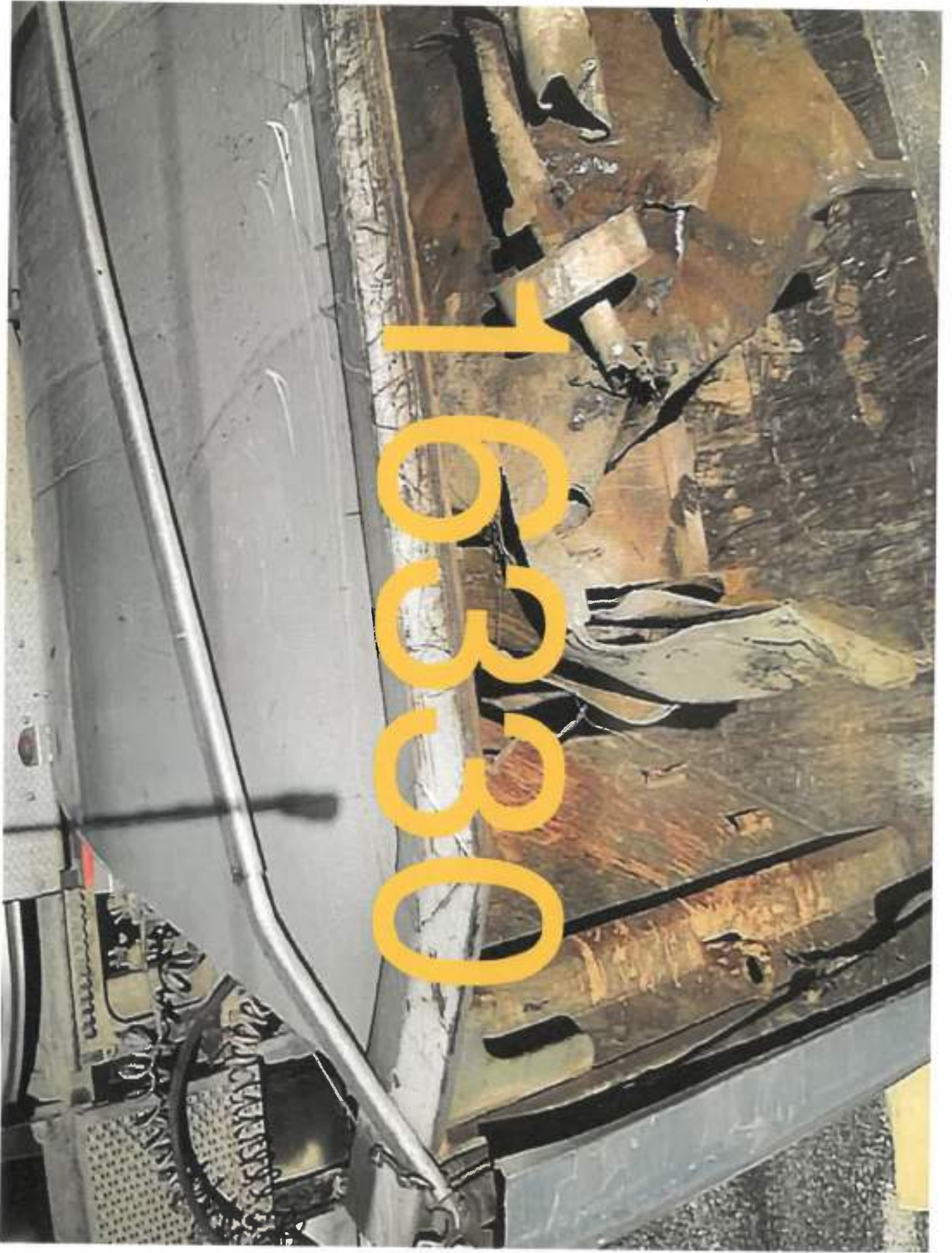
Remarks: SCRAP REMOVAL

Signature: _____

Material	Quantity	Price	Material \$	Delivery \$	Misc \$	Tax \$	Line Total \$
SCRAP	13.35 tn						

Weight Information

Material	Gross	Tare	Net
SCRAP	67180.00	40480.00	26700.00



Product Movement and Waste Disposal Documentation (Tank Group 07)

Date	From Tank #	Product Qty. (gal)	Transferred To Tank #	Product
791				
10/21/2020	GP 791	0	N/A	Benzene
798				
10/21/2020	GP 798	0	N/A	Benzene
250				
10/9/2020	GP 250	7,046	PB 219	Untreated Distillate
7/7/2021	Tank 250	3,200	Tank 843	NA
8/16/2021	Tank 250/251	2,000	Tank 219	Oil/Water
251				
8/26/2020	GP 251	7,046	PB 219	Untreated Distillate
8/16/2021	Tank 250/251	2,000	Tank 219	Oil/Water
9/10/2021	Tank 251	3,000	Wash Pad	Oil/Water
9/10/2021	Tank 251	3,000	Wash Pad	NA
9/10/2021	Tank 251	3,000	Wash Pad	Water
9/10/2021	Tank 251	3,000	Wash Pad	Water/Oil
9/10/2021	Tank 251	3,000	Tank 219	Oil
494				
6/28/2021	Tank 494	2,800	843	Oil
6/28/2021	Tank 494	2,800	843	Oil
6/28/2021	Tank 494	2800	843	Oil
6/28/2021	Tank 494	2800	843	Oil
6/28/2021	Tank 494	2800	843	Oil
6/28/2021	Tank 494	2800	843	Oil
6/29/2021	Tank 494	3000	219	Oil/Water
6/29/2021	Tank 137 & 494	3000	843	Water/Oil
6/29/2021	Tank 137 & 494	3000	219	Oil/Water
7/2/2021	Tank 494	3000	843	Heavy Oil
7/2/2021	Tank 494	2500	843	Recovery Oil and Water
7/2/2021	Tank 494	3000	843	Oil
7/2/2021	Tank 494	3000	Tank 843	Heavy Oil
7/2/2021	Tank 494	2500	Tank 843	Recover Oil/Water
7/2/2021	Tank 494	3000	Tank 843	Oil
7/16/2021	Tank 494	300	Tank 843	Flush
790				
10/21/2020	Tank 790	0	N/A	Benzene
792				
10/21/2020	Tank 792	0	N/A	Cumene
793				
10/21/2020	Tank 793	0	N/A	Cumene
794				
11/6/2020	Tank 794	11927.09375	TK# 796 and totes	Solvent (glycol)
799				
10/16/2020	Tank 799	305.8229167	PB 191	Benzene
767				
11/16/2020	Tank 767	1761.54	PB 191	Recovered Oil

TG07
Disposition of residual Liquid/ Tank Bottoms

Tank #	Primary Product	Reg. #	AMS #	Temp Out of Service or CIP Date	Removal Date	HSM Ship Date	Sold as Product	Remarks
GP 250	LCO	019A	P-009	10/9/2020	9/29/2021	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 251	Distillate, Untreated	020A	P-010	8/26/2020	9/29/2021	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 494	Main Frac Bottoms	029A	P-039	T -9/17/2021	4/14/2022	Yes	N/A	Multiple Shipping Dates Managed as HSM and shipped by Rail to WM (see Shipment #'s 11 thru 15)
GP 767	Recovered Oil	046A	P-135	T -11/16/2020	7/8/2022	N/A	N/A	Tank had approx. 1800 gallons of product that was transferred to PB 191 and subsequently sold and shipped by barge - sludge stabilized and shipped by Rail to WM (see Shipment #11)
GP 790	Benzene	034A	P-017	T-11/04/2019	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 791	Benzene	006A	P-018	T-11/04/2019	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 792	Cumene	035A	P-019	T - 4/22/2020	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 793	Cumene	036A	P-020	T - 4/24/2020	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 794	Tetraethylene Glycol	037A	P-153	T - 11/6/2020	2/21/2022	N/A	Yes	Direct load to tank truck and sold to PBF - Residuals product was transferred after sale to 796 / washwater and residuals were fed to the GP WWTP to augment
GP 795	Benzene	N/A	P-021	T - 7/24/2009	2/21/2022	N/A	Yes	Flow Thru Oprocess Tank Exempt from PADEP Registration Tank
GP 796	Spent Tetraethylene Glycol	038A	P-154	T - 8/26/2021	8/26/2021	N/A	N/A	Tank was RCRA Empty - Residual material and washwater were Drained to the GP WWTP to augment dwindling food source
GP 798	Benzene	007A	P-022	T - 11/22/2019	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 799	Benzene	039A	P-023	T - 8/3/2017	2/21/2022	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP 1088	*Fresh Caustic	033A	N/A	T - 10/15/2021	7/8/2022	N/A	Yes	Consolidated with other fresh Caustic into GP 973 and Sold to PBF Wash Water was drained at the bundle pad (BOL's to be posted)
GP 1116	Udex feed	030A	P-001	T - 12/19/2019	10/4/2021	N/A	N/A	Tank was empty and air gapped at turnover in June 2020
GP1117	Udex feed	005A	P-024	T - 2/6/2014	10/4/2021	N/A	N/A	Tank was empty and air gapped at turnover in June 2020

		Weight					
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position
5196	Tank 883	73,000	28,000	22.50	22.68	91143	F
5227	Tank 494	76,200	28,000	24.10	24.49	91143	E
5003	Tank 883	68,000	28,050	19.98	20.36	91143	D
5111	Tank 883	65,890	28,000	18.95	19.14	91143	C
5141	Tank 494	76,200	28,000	24.10	24.46	91143	B
5188	Tank 883	71,000	28,000	21.50	21.46	91143	A
5042	Tank 494	76,900	28,000	24.45	24.74	91494	F
5228	Tank 494	76,450	28,150	24.15	24.37	91494	E
5295	Tank 494	76,200	28,100	24.05	24.35	91494	D
5190	Tank 494	76,150	28,000	24.08	24.30	91494	C
5371	Tank 767	76,800	27,900	24.45	24.95	91494	B
5395	Tank 494	74,200	27,900	23.15	23.50	91494	A
5291	Tank 767	75,700	28,100	23.80	24.06	91133	A
5334	Tank 767	75,700	27,800	23.95	24.24	91133	B
5130	Tank 767	75,700	26,450	24.63	23.01	91133	C
5146	Tank 767	76,200	28,100	24.05	24.06	91133	D
5233	Tank 767	75,150	28,150	23.50	23.88	91133	E
5273	Tank 767	76,800	28,100	24.35	24.32	91133	F
5363	Tank 767	78,750	31,000	23.88	23.79	91403	A
5337	Tank 767	79,600	31,200	24.20	24.32	91403	B
5242	Tank 767	75,350	28,400	23.48	23.78	91403	C
5234	Tank 767	79,800	31,300	24.25	24.47	91403	D
5235	Tank 767	79,650	31,300	24.18	24.55	91403	E
5288	Tank 767	78,550	31,350	23.60	23.76	91403	F
5215	Tank 494	73,850	28,000	22.93	25.59	91063	A
5243	Tank 494	76,400	28,200	24.10	23.39	91063	B
5267	Tank 494	76,200	28,050	24.08	24.07	91063	C
5237	Tank 494	77,700	31,200	23.25	23.33	91063	D
5258	Tank 494	76,650	28,000	24.33	22.32	91063	E
5252	Tank 494	74,900	27,950	23.48	24.08	91063	F
					705.45	709.82	
Running Total					5,413.24	5,342.33	

<i>Over/Under</i>
-1.5
0.1
-4.0
-5.1
0.1
-2.5
0.4
0.1
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0.1
0.4
-0.9
-0.2
-0.1
0.6
0.1
-0.5
0.4
-0.1
0.2
-0.5
0.3
0.2
-0.4
-1.1
0.1
0.1
-0.8
0.3
-0.5
-15

		Weight						
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position	Over/Under
5346	Tank 494	77,050	30,550	23.25	23.55	91111	A	-0.8
5249	Tank 494	79,500	30,900	24.30	24.54	91111	B	0.3
5361	Tank 494	78,400	30,500	23.95	23.02	91111	C	-0.1
5068	Tank 494	79,000	30,950	24.03	23.07	91111	D	0.0
5073	Tank 494	79,400	30,700	24.35	24.60	91111	E	0.4
5293	Tank 494	78,700	30,850	23.93	24.06	91111	F	-0.1
5374	Tank 494	77,650	30,400	23.63	23.76	91069	A	-0.4
5056	Tank 494	78,850	30,650	24.10	24.36	91069	B	0.1
5166	Tank 494	78,200	30,550	23.83	23.88	91069	C	-0.2
5120	Tank 494	78,400	30,500	23.95	24.23	91069	D	-0.1
5133	Tank 494	78,750	30,650	24.05	24.31	91069	E	0.1
5214	Tank 494	77,650	30,600	23.53	23.71	91069	F	-0.5
5011	Tank 494	78,400	30,800	23.80	24.02	91431	A	-0.2
5064	Tank 494	78,250	30,700	23.78	24.50	91431	B	-0.2
5203	Tank 494	78,800	30,850	23.98	24.17	91431	C	0.0
5109	Tank 494	72,150	30,750	20.70	21.00	91431	D	-3.3
5186	Tank 494	78,600	30,800	23.90	24.20	91431	E	-0.1
5289	Tank 494	78,100	30,850	23.63	23.70	91431	F	-0.4
5082	Tank 494	79,300	31,050	24.13	24.42	91058	A	0.1
5161	Tank 494	79,700	31,100	24.30	24.66	91058	B	0.3
4050	Tank 494	79,600	31,200	24.20	24.38	91058	C	0.2
5207	Tank 494	79,850	31,200	24.33	24.68	91058	D	0.3
5315	Tank 494	79,700	31,050	24.33	24.64	91058	E	0.3
5077	Tank 494	78,800	31,150	23.83	23.52	91058	F	-0.2
5191	Tank 494	77,350	31,100	23.13	23.32	91475	A	-0.9
5369	Tank 494	79,800	31,000	24.40	24.67	91475	B	0.4
5236	Tank 494	79,700	31,450	24.13	24.07	91475	C	0.1
5155	Tank 494	79,150	30,950	24.10	24.39	91475	D	0.1
5292	Tank 494	79,800	31,200	24.30	24.67	91475	E	0.3
5180	Tank 494	79,250	31,500	23.88	24.00	91475	F	-0.1
5232	Tank 494	76,900	30,850	23.03	23.21	91117	A	-1.0
5257	Tank 494	78,850	30,800	24.03	23.92	91117	B	0.0
5179	Tank 494	77,250	30,900	23.18	23.32	91117	C	-0.8
5212	Tank 494	77,300	30,800	23.25	23.44	91117	D	-0.8
4134	Tank 494	80,200	31,400	24.40	24.69	91117	E	0.4
5147	Tank 494	78,500	30,800	23.85	24.07	91117	F	-0.1
				857.40	862.75			
Running Total (tons)				8,261.67	8,276.52	-6.60		

		Weight						
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position	Over/Under
5143	Tank 494	77,300	30,900	23.20	23.39	91434	A	-0.8
5327	Tank 494	78,150	30,650	23.75	23.75	91434	B	-0.3
5335	Tank 494	79,050	31,300	23.88	24.04	91434	C	-0.1
5348	Tank 494	77,850	30,650	23.60	23.73	91434	D	-0.4
5184	Tank 494	79,600	30,800	24.40	24.60	91434	E	0.4
5038	Tank 494	78,000	31,350	23.33	23.49	91434	F	-0.7
5193	Tank 494	78,450	31,050	23.70	23.85	91060	A	-0.3
5353	Tank 494	79,500	30,750	24.38	24.64	91060	B	0.4
5322	Tank 494	78,600	31,100	23.75	24.15	91060	C	-0.3
5165	Tank 494	79,400	30,800	24.30	24.56	91060	D	0.3
5284	Tank 494	79,450	30,950	24.25	24.58	91060	E	0.3
5356	Tank 494	76,350	31,075	22.64	22.86	91060	F	-1.4
5223	Tank 494	77,650	31,000	23.33	23.51	91506	A	-0.7
5200	Tank 494	78,350	31,000	23.68	24.47	91506	B	-0.3
5088	Tank 494	79,150	31,000	24.08	24.34	91506	C	0.1
5373	Tank 494	78,950	30,900	24.03	18.20	91506	D	0.0
5204	Tank 494	79,250	30,900	24.18	24.33	91506	E	0.2
5208	Tank 494	79,000	31,050	23.98	24.25	91506	F	0.0
5110	Tank 494	79,100	30,900	24.10	24.49	91085	A	0.1
5342	Tank 494	79,100	30,800	24.15	24.46	91085	B	0.1
5798	Tank 494	78,250	31,050	23.60	23.35	91085	C	-0.4
5360	Tank 494	77,450	31,000	23.23	23.47	91085	D	-0.8
5129	Tank 494	79,200	30,850	24.18	24.41	91085	E	0.2
5328	Tank 494	79,300	31,100	24.10	24.67	91085	F	0.1
5359	Tank 494	78,250	30,700	23.78	23.99	91436	A	-0.2
5312	Tank 494	79,150	30,600	24.28	24.51	91436	B	0.3
5298	Tank 494	78,150	30,850	23.65	24.13	91436	C	-0.4
5365	Tank 494	78,750	30,650	24.05	24.45	91436	D	0.1
5205	Tank 494	79,500	30,750	24.38	24.60	91436	E	0.4
5388	Tank 494	78,400	30,600	23.90	24.11	91436	F	-0.1
				715.79	717.38			
Running Total				7,404.27	7,413.77			

		Weight						
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position	Over/Under
5153	Tank 494	77,300	30,700	23.30	23.38	91027	A	-0.7
5382	Tank 494	79,500	30,700	24.40	24.57	91027	B	0.4
5142	Tank 494	78,800	30,650	24.08	24.34	91027	C	0.1
5364	Tank 494	78,100	30,650	23.73	24.03	91027	D	-0.3
5384	Tank 494	79,250	30,550	24.35	24.56	91027	E	0.4
5394	Tank 494	77,400	30,700	23.35	23.47	91027	F	-0.6
5398	Tank 494	76,800	30,600	23.10	23.41	91150	A	-0.9
5321	Tank 494	79,400	30,600	24.40	24.66	91150	B	0.4
5307	Tank 494	77,950	30,850	23.55	23.80	91150	C	-0.4
5217	Tank 494	78,800	30,750	24.03	24.29	91150	D	0.0
5154	Tank 494	78,600	30,600	24.00	24.29	91150	E	0.0
5336	Tank 494	77,250	30,550	23.35	23.66	91150	F	-0.6
5358	Tank 494	78,950	30,450	24.25	24.44	91075	A	0.3
5148	Tank 494	77,300	30,500	23.40	24.66	91075	B	-0.6
5317	Tank 494	78,650	30,600	24.03	24.32	91075	C	0.0
5308	Tank 494	78,500	31,000	23.75	23.94	91075	D	-0.3
5137	Tank 494	79,100	30,500	24.30	24.43	91075	E	0.3
5391	Tank 494	77,850	30,500	23.68	23.96	91075	F	-0.3
5343	Tank 494	77,100	30,800	23.15	23.24	91074	A	-0.9
5150	Tank 494	79,450	30,800	24.33	24.68	91074	B	0.3
5304	Tank 494	77,200	30,850	23.18	23.45	91074	C	-0.8
5037	Tank 494	78,350	30,950	23.70	23.93	91074	D	-0.3
5299	Tank 494	78,700	30,950	23.88	23.99	91074	E	-0.1
5283	Tank 494	76,900	30,900	23.00	23.15	91074	F	-1.0
5113	Tank 494	76,500	30,900	22.80	23.00	91525	A	-1.2
5300	Tank 494	78,100	31,000	23.55	23.79	91525	B	-0.4
5251	Tank 494	78,700	31,500	23.60	23.85	91525	C	-0.4
5085	Tank 494	77,150	30,950	23.10	23.26	91525	D	-0.9
5202	Tank 494	78,600	31,200	23.70	24.13	91525	E	-0.3
5383	Tank 494	77,000	30,800	23.10	23.32	91525	F	-0.9
				710.10	718.00			
Running Total				6,688.49	6,696.39			

		Weight					
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position
5246	Tank 494	78,600	31,200	23.70	23.90	91447	A
5145	Tank 494	78,400	31,100	23.65	23.80	91447	B
5144	Tank 494	77,000	31,000	23.00	22.63	91447	C
5231	Tank 494	78,000	30,750	23.63	23.87	91447	D
5400	Tank 494	78,550	31,100	23.73	24.05	91447	E
5271	Tank 494	77,000	30,700	23.15	23.04	91447	F
5352	Tank 494	82,550	35,000	23.78	23.91	91519	A
5278	Tank 494	79,450	30,750	24.35	24.63	91519	B
5282	Tank 494	77,750	31,050	23.35	23.69	91519	C
5201	Tank 494	77,850	30,850	23.50	23.78	91519	D
5349	Tank 494	79,100	30,700	24.20	24.44	91519	E
5019	Tank 494	78,500	30,700	23.90	24.06	91519	F
5075	Tank 494	77,400	31,100	23.15	23.30	91119	A
5123	Tank 494	79,300	30,950	24.18	24.42	91119	B
5170	Tank 494	78,850	31,400	23.73	24.16	91119	C
5340	Tank 494	77,500	30,900	23.30	23.33	91119	D
5020	Tank 494	77,800	31,350	23.23	24.58	91119	E
5266	Tank 494	77,300	31,200	23.05	23.49	91119	F
5240	Tank 494	79,500	31,600	23.95	24.42	91141	A
5225	Tank 494	76,950	31,200	22.88	24.63	91141	B
5206	Tank 494	77,500	31,200	23.15	23.37	91141	C
5276	Tank 494	78,700	31,350	23.68	23.89	91141	D
5272	Tank 494	79,000	31,100	23.95	24.26	91141	E
5270	Tank 494	77,350	31,350	23.00	23.21	91141	F
				565.15	572.86		
Running Total				5,978.39	5,915.19		

<i>Over/Under</i>
-0.3
-0.4
-1.0
-0.4
-0.3
-0.9
-0.2
0.4
-0.6
-0.5
0.2
-0.1
-0.9
0.2
-0.3
-0.7
-0.8
-0.9
-0.1
-1.1
-0.9
-0.3
-0.1
-1.0
-11

		Weight					
Container #	Origin of Waste	Gross	Tare	Net	Facility Net	Rail Car #	Railcar Position
5196	Tank 883	73,000	28,000	22.50	22.68	91143	F
5227	Tank 494	76,200	28,000	24.10	24.49	91143	E
5003	Tank 883	68,000	28,050	19.98	20.36	91143	D
5111	Tank 883	65,890	28,000	18.95	19.14	91143	C
5141	Tank 494	76,200	28,000	24.10	24.46	91143	B
5188	Tank 883	71,000	28,000	21.50	21.46	91143	A
5042	Tank 494	76,900	28,000	24.45	24.74	91494	F
5228	Tank 494	76,450	28,150	24.15	24.37	91494	E
5295	Tank 494	76,200	28,100	24.05	24.35	91494	D
5190	Tank 494	76,150	28,000	24.08	24.30	91494	C
5371	Tank 767	76,800	27,900	24.45	24.95	91494	B
5395	Tank 494	74,200	27,900	23.15	23.50	91494	A
5291	Tank 767	75,700	28,100	23.80	24.06	91133	A
5334	Tank 767	75,700	27,800	23.95	24.24	91133	B
5130	Tank 767	75,700	26,450	24.63	23.01	91133	C
5146	Tank 767	76,200	28,100	24.05	24.06	91133	D
5233	Tank 767	75,150	28,150	23.50	23.88	91133	E
5273	Tank 767	76,800	28,100	24.35	24.32	91133	F
5363	Tank 767	78,750	31,000	23.88	23.79	91403	A
5337	Tank 767	79,600	31,200	24.20	24.32	91403	B
5242	Tank 767	75,350	28,400	23.48	23.78	91403	C
5234	Tank 767	79,800	31,300	24.25	24.47	91403	D
5235	Tank 767	79,650	31,300	24.18	24.55	91403	E
5288	Tank 767	78,550	31,350	23.60	23.76	91403	F
5215	Tank 494	73,850	28,000	22.93	25.59	91063	A
5243	Tank 494	76,400	28,200	24.10	23.39	91063	B
5267	Tank 494	76,200	28,050	24.08	24.07	91063	C
5237	Tank 494	77,700	31,200	23.25	23.33	91063	D
5258	Tank 494	76,650	28,000	24.33	22.32	91063	E
5252	Tank 494	74,900	27,950	23.48	24.08	91063	F
					705.45	709.82	
Running Total					5,413.24	5,342.33	

<i>Over/Under</i>
-1.5
0.1
-4.0
-5.1
0.1
-2.5
0.4
0.1
0.1
0.1
0.4
-0.9
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-0.1
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-0.1
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-0.5
0.3
0.2
-0.4
-1.1
0.1
0.1
-0.8
0.3
-0.5
-15

Good morning Patrick,
The following boxes on EPIX 91143 required solidification.

5188
5141
5227

Thank you for your business.

JANET DOAN

Scheduling Coordinator

Gulf Coast Area

GulfCoastScheduling@wm.com

jdoan@wm.com

Main: 337.583.3700

Direct: 337.583.3745

7170 John Brannon Road

Sulphur, LA 70665



Recycling is a good thing. Please recycle any printed emails.

1052501

0001111/21

7/6/19/19

Bill of Lading (Page 1 of 2)

DOCUMENT # 91143A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket #1114

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RD, UNS077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., B, NI (BENZENE) PROFILE: 989843DA M CONTAINER# EPIU225188 RAIL CAR# EPIXB1143 ERG# 171 H039	CM	21.5	T

24

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and described as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time involved in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (D) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's obligation determined prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 PBR: *[Signature]* Date: 8-5-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01143A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70666
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 040791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>[Signature]</i>	Date: 8-5-21

Gross 73400
Tare 20480
Net 42920
Tons 21.46

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70663

Shows Weight ticket

RECEIVING TICKET # 7101949

WEIGHED BY _____

15301

00041133

7/19/21

Bill of Lading (Page 1 of 2)

DOCUMENT # 91143B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: GULFPORT LA 70665
 Phone: (337) 583-2788

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PA0049791098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticks 4/12

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFILE: 889843LA	GM	24.1	T
		IM CONTAINERS CPU225141			
		RAIL CAR# EPIX91143			
		ERG# 171 H039			

N/A

RECEIVED subject to the usual terms and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), material consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or to destination, if on its route, otherwise to deliver to another carrier on its route to said destination if it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject in all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: *Lucia Castro* Date: 7/16/21

Mark with "X" or "RQ" or appropriate designation Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(17) (a) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubois* Date: 7-5-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91143B

TO	
Consignee	CHEMICAL WASTE MANAGEMENT INC
Street	7170 JOHN BRANNON ROAD
EPA ID	LA0000777201
City/State/Zip	SULPHUR LA 70865
Phone	(337) 683-2169

FROM	
Shipper	PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street	3144 PASSEYUNKAVE
EPA ID	PAD 048791 088
City/State/Zip	PHILADELPHIA, PA 19145
Phone	(440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	
Acknowledgement of Receipt	
Per: <i>Daniel E. Carr</i>	Date: <i>8.5.21</i>

EPIU 228041

Gross 79740
Tare 30820
Net 48920
24.46

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761966

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

761920
DOCUMENT # 91143C

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7175 JOHN BRANNON ROAD
 EPA ID: LADDC0777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 048791 088
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Dubois 4/11/22

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	HAZ
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. II (BENZENE) PROFILE: 988843LA	GM	18.95	T
		IM CONTAINER# EPIU225111			
		RAIL CAR# EPIX91143			
		ERG# 171 H039			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and conditions of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the current agreement to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over and after any portion of said route to destination and as to each party at any time involved in all or any said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all of the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp.
 Per: *[Signature]* Date: 7/15/21
 Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "RQ" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1)(ii) of Title 49, Code of Federal Regulations, Area, when shipping hazardous materials. The shipper's certification qualifications prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading, need apply, unless a specific exception from this requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Date: 8-4-21

Amanda Smith

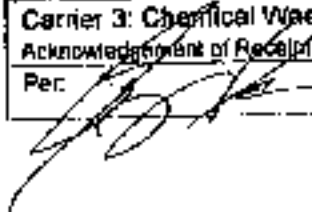
7/6/92

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1143C

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000777201	
City/State/Zip: SULPHUR LA 70885	
Phone: (337) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 048/01 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (410) 228-1524	

Carrier 2: DNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: 	Date: 6-4-21

653155

EPIK 511
AD

TICKET 36

ID 653155
GROSS 73240 lb INBOUND
OUTBOUND TICKET 09/04/2021

GROSS 73240 lb RECALLED
TARE 34960 lb
NET 38280 lb

NET 19.14 TON

03:44PM 09/04/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761920

WEIGHED BY _____

7/15/21

Bill of Lading (Page 1 of 2)

DOCUMENT # 91143D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC.
Street: 7170 JOHN BRAINSON ROAD
EPA ID: LA039077201
City/State/Zip: BULTHUR LA 70685
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 09B
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1521

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Woods 4/12/23

SHIPPER'S INSTRUCTIONS

BAKED 30003

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S., 8, (BENZENE) PROFILE: 989843LA	CM	19.98	T
		IM CONTAINER# EPIU225003			
		RAIL CAR# EPIX91143			
		ERG# 171 H03B			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (damages and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract to include any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every arrival to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions at the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp
Per: <i>[Signature]</i>	Per: <i>Luis Castro</i>
Date: <i>7/15/21</i>	Date: <i>7/16/21</i>

Mark with "X" or "RM" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.214(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>[Signature]</i>	Date: <i>8/4/2021</i>
<i>Amenda Devito</i>	<i>[Signature]</i>

V M

761921

Bill of Lading (Continuation Sheet) 2 of 2


DOCUMENT# 911430

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70986
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 008791 028
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	
LA0000147272 (800) 336-2169	
Acknowledgement of Receipt:	
Per: 	Date: 8/4/2021

653501

~~653501~~

TICKET 37 EPIU

ID 653501
GROSS 71180 lb INBOUND
10:38AM 08/04/2021

22
5003
AD

Tare 30460
Net 40720

Tare
~~GROSS~~ 30460 lb
04:00PM 08/04/2021

net 40720

20.36

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761921

WEIGHED BY _____

15213

0000143E

Bill of Lading (Page 1 of 2)

DOCUMENT # 91143E

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70585
Phone: (337) 683-2185

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 278-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

10/11

10/15/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 0. (BENZENE) PROFILE: 888848LA	CM	24.1	T
		IM CONTAINER# EPIU225227			
		RAIL CAR# FPIX81143			
		ERG# 171 1039			

H32

2H

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination, if applicable, otherwise to deliver in another carrier or the mode to said destination. It is mutually agreed as to each carrier of it or any of said property, over all or any portion of said route to destination and as to each party at any time indicated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: *7/15/21* Per: *Luis Castro* Date: *7/16/21*

Mark with "X" or "RCF" (appropriate to describe Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (g)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: *8-5-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01143E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 503-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Edgar Lopez Velazquez</i>	Date: <i>6/5/21</i>

EPH 225221

10 157
SECRET 10 15 1972
20 15

67003 67-72 14 INBOUND

JAN 07 10 21 12 50
10 157
SECRET 10 15 1972
20 15

Gross	83620	RECEIVED
Tare	34640	RECEIVED
Net	48980	
	24.49	

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70663

Start weight ticket

RECEIVING TICKET # 761972

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91143F

761952

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 683-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAU 049781 086
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Probit 49125

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UN29
X	1	RQ, UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B III (BENZENE) PROFILE 988543LA	CM	22.5	T
		IN CONTAINER# EPIU225190			
		RAIL CAR# EPIX91143			
		ERG# 171 H032			

RECEIVED subject to the classifications and limits in effect on the date of the issue of the Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or organization in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier or the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: *Luis Castro* Date: 7/16/21

Mark with "X" in "Q1" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.2014a(1)(ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.2014a) of the Federal Regulations, as indicated on the Bill of Lading ones apply, unless a specific exception from this requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Lembock* Date: *7-5-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1143F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&W LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049794 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	
LA0000147772 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Edward V. Valenzuela</i>	Date: <i>8/5/21</i>

EMU 225176

Gross 79180
Tare 33850
Net 45330
22.67 Tm

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761952

WEIGHED BY _____

Good morning,
The following boxes on 91133 required solidification.

5291
5146

Thanks,

JANET DOAN

Scheduling Coordinator

Gulf Coast Area

GulfCoastScheduling@wm.com

jdoan@wm.com

Main: 337.583.3700

Direct: 337.583.3745

7170 John Brannon Road

Sulphur, LA 70665



7/6/2021

Bill of Lading (Page 1 of 2)

DOCUMENT# 91133-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRF TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Tickets 47136</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B, III (BENZENE) PROFILE: 980643LA	CM	23.8	T
		IM CONTAINER# EPIU225291			
		RAIL CAR# EPIX91133-2			
		ERG# 171 H038			

NA

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as indicated hereon. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of at or dry of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp.
Per:	Date: 7/15/21
Per: Luis Castro	Date: 7/16/21

Mark with "X" or "RQ" if appropriate designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(7) (e) of 49 CFR, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Carrie Dubreuil</i>	Date: 7-6-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91133-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049751 DBS
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 220-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Ethel...</i>	Date: 8-6-21

CP1922204

TICKET 54

ID 653153
GROSS 82520 lb INBOUND
11:55AM 08/06/2021

OUTBOUND TICKET 54

GROSS 82520 lb RECALLED
TARE 34400 lb
NET 48120 lb

NET 24.06 TON

03:46PM 08/06/2021

Gross 82520
Tare 34400
Net 48120
24.06 Tons

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761994
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91133-2B

762.000

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA00007772D1
City/State/Zip: SUICHR PA 70885
Phone: (337) 683-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 040701 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Tank 90130</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. III (BENZENE) PROFILE: 0898432A	CM	23.85	T
		IM CONTAINER# EPIU225334			
		RAIL CAR# EPIX91133-2			
		ERG# 171 H036			

ALL

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (conditions and condition of packages unimpaired), marked consigned and destined as indicated above which as if carrier (the word carrier being understood through this notation as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination, if said route, or otherwise to make to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, that all or any portion of said route to destination and as to each party at any time intersected in either any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with, and the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: *7/15/21* Per: *Luis Castro* Date: *7/16/21*

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional means for identifying hazardous materials on Bills of Lading 172.201(h)(1) (1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from this requirement is provided in the Regulation for a particular material.


Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Pa: *Carrie Lembocky* Date: *8-6-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91133-2B

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 000
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: 	Date: 8-6-21

53501

EPIU 22

TICKET 65334

TO 653501
GROSS 79160 lb INBOUND
OUTBOUND TICKET 08/06/2021

GROSS 79160 lb RECALLED
TARE 30680 lb
NET 48480 lb

NET 24.24 TON

04:34PM 08/06/2021

Gross 79160
Tare 30680
Net 48480

24.24 Tons

100

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 702000

WEIGHED BY _____

435 42293 12711321014115

Bill of Lading (Page 1 of 2)

761985

DOCUMENT # 91133-2C

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7179 JOHN BRANNON ROAD
GPA ID: LADC00777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2109

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 314 PASSYUNKAVE
EPA ID: PAD 040701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 226-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Telco 4/13/21</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 II: (BENZENE) PROFILE: 868643LA	CM	24.83	T
		IM CONTAINER# EPIU225130			
		RAIL CAR# EPIX91133-2			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract to mean any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated hereon. If on its route, otherwise to deliver in another carrier or thereafter to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of the U.S. Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
Per: *Carrie Dumbauld* Date: 8-6-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1133-2C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228 1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2188	
Acknowledgement of Receipt	
Per: <i>Derrick Gary</i>	Date: <i>8-6-21</i>

11/13/00

11/13/00

Tare
11/13/00

11/13/00

Gross	76540
Tare	30520
Net	46020
23.01 Tms	

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 16114

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91133-2D

7/6/21

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 683 2189

SHIPPER

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PA10049781098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 726-1524

ADDITIONAL INFORMATION

VRI TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticks 49139

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE: 088843LA	CM	24.05	T
		IM CONTAINER# EPIU226148			
		RAIL CAR# EPIX01133-2			
		ERG# 171 H038			

RECEIVED subject to the classifications and labels in effect on the date of the issue of this Bill of Lading, the property described above is received in apparent good order, except as noted (contents and condition of packages unexamined), marked, stenciled and labeled as indicated above which shall constitute the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract agrees to carry to the usual place of delivery or said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. If it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time increased in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/15/21
 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RQ" appropriate designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(f) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie DeBodaux* Date: 8-6-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91133-2D

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANKIN ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 0487R1 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per: <i>Stephen W. Wilson</i>	Date: <i>8/6/21</i>

6553

SPIN 20
5146

TICKET 24

ID 653375
GROSS 82300 lb
09/06/21
INDOLINO
08/06/2021

Tare 34180 lb
09/09/2021

Gross 82300
Tare 34180
Net 48120

NET 48120

24.06 Tons

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 761984
WEIGHED BY _____

W. J. H. 10913

Bill of Lading (Page 1 of 2)

762012

DOCUMENT # 9133-2E

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SLA PHUR LA 70665
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 046791 069
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
<i>Ticket # 49140</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RD UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9.11 (BENZENE) PROFILE: 889843LA	CM	23.50	T
		IM CONTAINER# EPIU225233			
		RAIL CAR# EPIX01133-2			
		ERG# 171 H03B			

NH

RECEIVED subject to the classifications and limits in effect on the date of this Bill of Lading, the property described above in apparent good order, weight, packed (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination, if on the route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time increased in any case, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp.
Per: <i>[Signature]</i>	Date: 7/15/21
Per: <i>Luis Castro</i>	Date: 7/16/21

Mark with "X" or "RC" in approved to the signatory Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Carrie Dubodreau</i>	Date: 8-9-21

Bill of Lading (Continuation Sheet) 2 of 2


DOCUMENT# 91133-ZF

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 683-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&W LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 009
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: 	Date: 8-9-21

EP14 22
5233

Gross	82020
Tare	34260
Net	47760
Net	23.88 Ton

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # ... 762012 _____
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

~~762011~~ 762011

DOCUMENT# 91133-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0300777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

Ticket 47141

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WGT
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE: 889843LA	CM	24.35	T
		IN CONTAINER# EPIU225273 RAIL CAR# EPIX91133-2			
		ERG# 171 H339			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry for the satisfaction of delivery as said destination, if on his route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp.
Per: <i>[Signature]</i>	Date: 7/15/21
Per: Luis Castro	Date: 7/16/21

Mark with "X" or "RC" if appropriate to describe Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional check for identifying hazardous materials on Bills of Lading 172.201(a)(1)-(10) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on this Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Mandy A. DeWitt* Date: 08-09-21

762011

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91133-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (937) 585-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228 1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	LA0000147272 (800) 396-2189
Acknowledgement of Receipt	
Per: <i>[Signature]</i>	Date: 8.9.21

EPIU 22
5273

Gross	79480
Tare	30876
Net	48604
Tons	24.32

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SUI PHUR, LA 70863

Stals ticket

RECEIVING TICKET # 262011

WEIGHED BY _____

Patrick Dauria

From: Doan, Janet <JDoan@wm.com>
Sent: Wednesday, August 11, 2021 9:29 AM
To: Patrick Dauria; Rhyne, John
Subject: BOLs & weight ticket for EPIX 91063-2
Attachments: 91063-2.pdf

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Good morning!
I am happy to announce none of the 6 boxes went to solidification.
All will be billed at \$382/ton.

See you tomorrow 😊

5215 ✓
5243 ✓
5267 ✓
5237 ✓
5257 ✓
5252 ✓

JANET DOAN
Scheduling Coordinator
Gulf Coast Area
GulfCoastScheduling@wm.com
jdoan@wm.com

Main: 337.583.3700
Direct: 337.583.3745
7170 John Brannon Road
Sulphur, LA 70665



Recycling is a good thing. Please recycle any printed emails.

762051

Bill of Lading (Page 1 of 2)

DOCUMENT # 91063-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: 1 ADD00777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 000
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. DeWitt

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6. III (BENZENE) PROFILE: 9598431 A	CM	22.93	T
		IM CONTAINER# EPIU225215			
		RAIL CAR# EPIX81083-2			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading. The property described above is apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 2/15/21
Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) or Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification is required provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials

Per: *Amanda DeWitt / A DeWitt* Date: 8-10-21

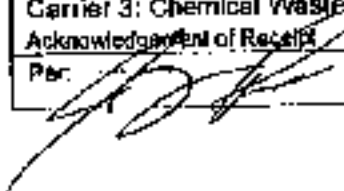
Bill of Lading (Continuation Sheet) 2 of 2

762051

DOCUMENT# B1063-2A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70689	
Phone: (337) 583-2189	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 040781 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: 	Date: 8-10-21

1/16/80
1980
12 1979
1980 1980
1980 1980

Tare

Gross 81580
Tare 30400
Net 51180

All 51180

25.597

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 10001

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762062

DOCUMENT # 91063-2R

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD003777201
City/State/Zip: SULPHUR LA 70068
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 640751 038
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Tickets 4/11/19

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIALS	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RO, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.D.S. B. III (BENZENE) PROFILE: 989843LA	CM	24.1	T
		IN CONTAINER# EPIU225243			
		RAIL CAR# EPX91063-2			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and contained as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as aforesaid. If on its route, otherwise to deliver to another carrier on the route to and destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the sale terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CBX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "RO" if appropriate to original Hazardous Materials Regulations as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a)(1) (2) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubois* Date

Bill of Lading (Continuation Sheet) 2 of 2

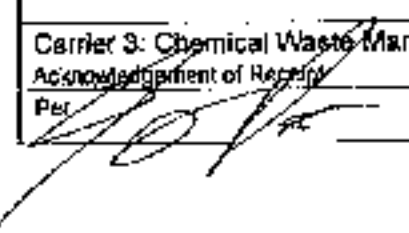
DOCUMENT# 91063-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 538-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 086
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgment of Receipt	
Per: 	Date: 8-10-21

EVIL 22 3270

Gross	77480
Tare	30700
Net	46780
	23.39 Ton

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70603

Stat-ticket

RECEIVING TICKET # 762062

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91063-20

762040

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRF TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(f) 1241

Telabs 4/15/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.D.S. 9. III (BENZENE) PROFILE: 989843LA	CM	24.08	T
		IM CONTAINER# EPIU225287			
		RAIL CARR EPX01083-2			
		ERG# 174 H039			

NA

FROM UNTO subject to the provisions and terms in effect on the date of the issue of this Bill of Lading, the property described above is appraised good order, except as noted (contents and condition of packages unknown), marked, certified and destined as indicated above which said carrier (and word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery at said destination. If on its route, it otherwise delivers to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party in any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/15/21
 Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "H" if appropriate to indicate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column as an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials
 Per: *Carrie Embury* Date: 8-9-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91063-20

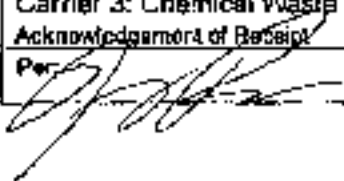
TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 683-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 019781 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per:	Date:



EPN 225267

Gross	50140
Tare	3400
Net	46740
Ton	2407

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70883

Stubs ticket

RECEIVING TICKET # 762040

WEIGHED BY _____

702038

Bill of Lading (Page 1 of 2)

DOCUMENT # 91063-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 683-2160

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 040791088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1247

Ticket 69151

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B, III (BENZENE) PROFILE: 989843LA	CM	23.25	T
		IM CONTAINER# EPIU225237 RAIL CAR# EPIX81063-2			
		ERG# 171 H03B			

NH

RECEIVED subject to the classification and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to which carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in or to any said property, that any service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per:  Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RQ" if appropriate to identify hazardous materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(c)(1) (i) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in Section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
Per: Carrie Embrey Date: 8-9-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91063-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SLULPHUR LA 70066
Phone: (337) 693-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 099
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (803) 336-2169	
Acknowledgement of Receipt	
Per: <i>Derrick Gray</i>	Date: <i>8-9-21</i>

8/14/22
1/ 23;

GROSS 77500
Tare 30870
Net 46630
23.33 Ton

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762038
WEIGHED BY _____

762059

Bill of Lading (Page 1 of 2)

DOCUMENT# 91063-2E

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SUITLAND LA 70685
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 949791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (484) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>TRUCK 4M152</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UCL
X	1	RQ UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.1 (BENZENE) PROFILE: 669843LA IM CONTAINER# EPIU226750 RAIL CAR# EPIX81063-2 0	CM	24.33	T
		ERG# 171 H03B			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is shipped in good order, except as noted (contents and condition of packages unknown) marked, counted and weighed as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination, if on its route, otherwise to deliver to another carrier on the route to said destination if it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and in the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *7/15/21* For: *Luis Castro* Date: *7/16/21*

Mark with "X" or "RD" if appropriate to identify Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of Hazardous Materials. The use of this column is an optional method for identifying hazardous materials on bills of Lading 172.201(b)(1) (g) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the bill of lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: *8-10-21*

Bill of Lading (Continuation Sheet) 2 of 2

Waste

DOCUMENT# 01003-2C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SU,PHAR LA 70686
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049701 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2169
Acknowledgment of Receipt	
Per: <i>[Signature]</i>	Date: <i>8/10/21</i>

685

EMU / L

TICKET 43

30 5058 653501
GROSS 79660 INBOUND
12:19PM 08/10/2021

OUTBOUND TICKET 43

GROSS 79660 lb RECALLED
FARE 35020 lb
NET 44640 lb

NET 22.32 TON

04:02PM 08/10/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # 76059

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762047

DOCUMENT# 91063-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SUITLAND LA 70085
 Phone: (337) 583-2188

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

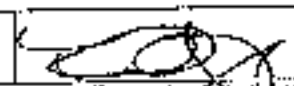
VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

Tickets 49153

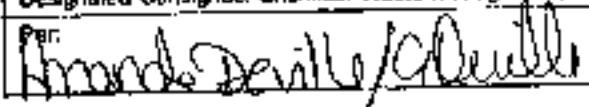
SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RQ, UN 3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9.11 (BENZENE) PROFILE: 908843LA	CM	23.48	T
		IM CONTAINER# EPIU225762 28			
		RAIL CARN# EPIX91083-2			
		ENGN 171 H03B			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the ultimate place of delivery as said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp.
 Per:  Date: 7/15/21
 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RQ" (if appropriate) Designate Hazardous Materials Regulations as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column on optional method for identifying hazardous materials on (DOT's of Lading 172.201(a)(1)) (U) of 1702 is a Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's classification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per:  Date: 8-10-21

762047

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91063-2F

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street 3144 PASSYUNKAVE
EPA ID: PAD 049701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (484) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Derrill Casey</i>	Date: <i>8-10-21</i>

EMU 225002

Gross	82200
Tare	21090
Net	61110
Tons	24.08

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70688

Stat ticket
~~Stat ticket~~

RECEIVING TICKET #

762047

WEIGHED BY

Patrick Dauria

From: Doan, Janet <JDoan@wm.com>
Sent: Friday, August 13, 2021 9:06 AM
To: Patrick Dauria; Rhyne, John
Subject: EPIX 91403-2
Attachments: 91403-2.pdf

Good morning,
Patrick – great to finally meet you!
John – good to see you again, been WAY too long!

I hope The Big Easy was kind to you guys last night 😊

BOLs and weight tickets attached for 91403-2.
All six boxes invoiced at solid rate of \$382/ton.

Have a Wonderful Weekend.

5363 ✓
5337 ✓
5242 ✓
5239 ✓
5235 ✓
5288 ✓

JANET DOAN
Scheduling Coordinator
Gulf Coast Area
GulfCoastScheduling@wm.com
jdoan@wm.com

Main: 337.583.3700
Direct: 337.583.3745
7170 John Brannon Road
Sulphur, LA 70665



Recycling is a good thing. Please recycle any printed emails.

Bill of Lading (Page 1 of 2)

DOCUMENT # 91403-2A

762054

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD0010777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 663-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 068
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

John 4/1/2

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CLASS
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE 6R8043LA	CM	23.88	T
		IM CONTAINER# EPIU225303			
		RAIL CAR# EPIX91403-2			
		ERG# 171 H038			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent, good value, except as noted contents and condition of packages unknown, marked, counted and cleaned as indicated above when sold carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or other destination. If on its route, otherwise to deliver in another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time provided in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSA Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RQ" if appropriate to identify Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a)(1) (3) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's classification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubodaux* Date: 8-11-21

Bill of Lading (Continuation Sheet) 2 of 2

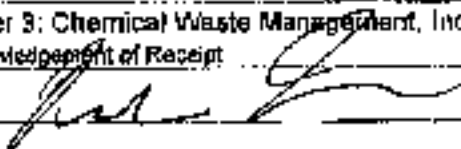
DOCUMENT# 01403-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 090
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 8-11-01

EPIU 225363

Gross	77900
Tare	30320
Net	47580
Tons	23.79

Styrene

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70663

RECEIVING TICKET #

762084

WEIGHED BY

Bill of Lading (Page 1 of 2)

762095

DOCUMENT # 91403-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00377201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 683-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Teddy MMS</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UCM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. & III (BENZENE) PROFILE 989843LA	CM	24.2	T
		1M CONTAINER# EPU225337			
		RAIL CAR# EPIX91403-2			
		ERG# 171 H339			

NH

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in separate good order, except as noted (contents and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, each part or any portion of said route to destination and as to each party of any time incurred in all or any said property, that such service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: Per: *Luis Castro* Date: *7/10/21*

Mark with "X" or "RC" if appropriate, Designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(b)(1) (i) of Title 49, Code of Federal Regulations, Also, when shipping hazardous materials, the shipper's certificate statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular article.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Chabodeaux* Date: *7-12-21*

Bill of Lading (Continuation Sheet) 2 of 2


DOCUMENT# 91403-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRAINSON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2189	
Acknowledgement of Receipt	
Per: 	Date: 8-12-21

Handwritten notes and stamps at the top right of the page, including a date stamp that appears to be 12/12/08.

RECEIVED
DATE: 12/12/08
BY: [Signature]
WEIGHT: [Blank]
VOLUME: [Blank]

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762078
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91403-ZC

762072

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 008
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket 4/1/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RG UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.1f (BENZENE) PROFILE: 099843LA	CM	23.48	T
		IM CONTAINER# EPIU225242			
		RAIL CAR# EPIX91403-Z			
		ENC# 17: H039			

24

RECEIVED subject to the classifications and limits in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination if it mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and be the sole party of any time interested in or any said property, the entire service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "RC" if appropriate, designate hazardous materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1)(i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Ambroseaux* Date: 7-11-21

Bill of Lading (Continuation Sheet) 2 of 2

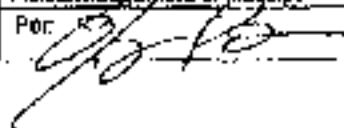
DOCUMENT# B1403-2C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 049791 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA000D147272 (600) 338-2189
Acknowledgement of Receipt	
Per: 	Date: 8-11-21

CP142220412

TICKET 15

ID 653153
GROSS 82860 16 INBOUND
OB: 33AN 08/11/2021

Tax

35300 10
43:07PM 08/11/2021

Gross 82860
Tax 35300
Net 47560

[Handwritten scribbles]

417560

23.78 Tms

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

4

RECEIVING TICKET # 762072

WEIGHED BY _____

11 30

Bill of Lading (Page 1 of 2)

70205

DOCUMENT# 91403-2J

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 563-2180

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 040701 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

Tanks 47145

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. D.B. (BENZENE) PROFILE: 431 A	GM	24.25	T
		IN CONTAINER# EPIU225238			
		RAIL CAR# EPIXB1403-2			
		ERG# 171 H036			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in appraisal good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. It on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time incurred in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with 'X' or 'RD' if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1) (i) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(g) of the Federal Regulations, as indicated on the Bill of Lading date apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: Amanda Deville / Deville Date: 8-11-21

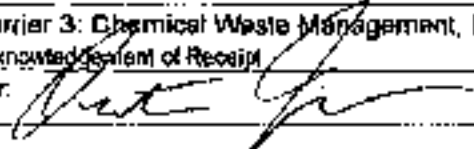
762075

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT # 91403-20

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70985	
Phone: (337) 663-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PA0 049791 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	
LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 8-11-21

EP14-225257

TICKET 17

ADD

ID 653501
GROSS 79820 lb INBOUND
08:52AM 08/11/2021

OUTBOUND TICKET 17

GROSS 79820 lb RECALLED
TARE 30880 lb
NET 48940 lb

NET 24.47 TON

02:57PM 08/11/2021

[Handwritten scribbles]

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762075

WEIGHED BY _____

[Handwritten signature]

Bill of Lading (Page 1 of 2)

76207

DOCUMENT # 91403-25

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAC 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VAC TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Labels 4/14/16

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WGT.
X	1	RQ. UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: 988843LA	CM	24.18	T
		IM CONTAINER# EPIU225235			
		RAIL CAR# EPIX01403-2			
		ERG# 121 1103B			

124

RECEIVED subject to the descriptions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), stored, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination, and as to each party of any line interested in all or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21
 Per: *Luis Castro* Date: 7/16/21

Mark with "X" or "RQ" (appropriately) designate Hazardous Materials Substances as defined in the Department of Transportation Regulations covering the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172-201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Dubreuil* Date: 8-12-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91403-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70666
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PABBYUNKAVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per: _____	Date: _____
Carrier 3: Chemical Waste Management, Inc.	
LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Daniel Gray</i>	Date: <i>8-12-21</i>

Bill of Lading (Page 1 of 2)

76208

DOCUMENT# 91403-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048791 098
City/State/Zip: PHILADELPHIA PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Davis 07/14/21

SHIPPER INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. & III (BENZENE) PROFILE: 688843LA	CM	23.6	T
		IM CONTAINER# EPIU225286			
		RAIL CAR# EPIX91403-2			
		ERG# 171 H03B			

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and insured as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the destination or to deliver as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time hereof, in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *7/15/21* Per: *Luis Castro* Date: *7/16/21*

Mark with "X" or "H" if appropriate to indicate Hazardous Materials Shipments as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(b)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, or indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Amund DeWitt / ADewitt* Date: *8-11-21*

76200

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01403-25

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70685
Phone: (504) 583-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 008
City/State/Zip: PHILADELPHIA PA 19146
Phone: (480) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per <i>[Signature]</i>	Date: <i>8-11-21</i>

EPIU 22.5 288

Gross	42375
Tare	35160
Net	47520
Tons	23.76

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNDON ROAD
SULPHUR, LA 70063

Fertilizer

RECEIVING TICKET # 762087
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762422

DOCUMENT# 91494A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19143
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>1 Relet 41130</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	TY	Vol and	QU
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9, III (BENZENE) PROFILE: 060843LA	CM	23.16	T
		IM CONTAINER# EPIU225395			
		RAIL CAR# EPIX91494			
		ERG# 171 H030			

NH

RECEIVED subject to the descriptions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination, if on its route, otherwise to deliver to another carrier on its route to said destination, it is mutually agreed as in each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "90" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (a) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(a) of the Federal Regulations, as indicated on CM Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Embodeaux* Date: 8-25-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01404A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAIX00777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049701 008
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Joseph Courville</i>	Date: <i>6/25/2021</i>

Bill of Lading (Page 1 of 2)

762455

DOCUMENT # 914948

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAC000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0048781088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (484) 228-1524

ADDITIONAL INFORMATION

VRF TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.11(a) 1241

T. J. Adams 4/13/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU225371 RAIL CAR# EPIX01494 ERG# 171 H038	CM	24.45	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), is hereby shipped and destined as indicated above which, said carrier (who and carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the actual place of delivery as said destination. It is further agreed, otherwise indicated in another carrier on the route to said destination, if it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in an or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp.
Per: <i>[Signature]</i> Date: 7/15/21	Per: <i>Luis Castro</i> Date: 7/16/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of Hazardous Materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Pemberton* Date: *8-26-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91494B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70666
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	
LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph Comulka</i>	Date: <i>8/25/2021</i>

Bill of Lading (Page 1 of 2)

DOCUMENT # 91494C

762377

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SUITPHUR LA 70888
Phone: (337) 583-2108

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA01 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
TICKETS 47132


SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.D.S. B. III (BENZENE) PROFILE: 888843LA	CM	24.98	T
		IM CONTAINER# EPIU225180			
		RAIL CAR# EPIX81494			
		ERG# 171 HD39			


NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in, all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that it is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per:  Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "REQ" if appropriate designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 177.201(a)(3) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 177.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per:  Date: 8-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 914840

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70855
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph</i>	Date: <i>8/29/2021</i>

Bill of Lading (Page 1 of 2)

762374

DOCUMENT # 91494D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADDD077201
City/State/Zip: SULPHUR LA 70665
Phone: (537) 583-2188

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 090
City/State/Zip: PHILADELPHIA PA 19145
Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 12.41
<i>Tickets 47133</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RD UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.1 (BENZENE) PROFILE: 988843LA	CM	24.05	T
		IM CONTAINER# EPIU223285			
		RAIL CAR# EPIX91484			
		ERG# 171 H039			

NH

RECEIVED subject to the classification and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as in each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: *7/15/21* Per: *Luis Castro* Date: *7/16/21*

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (D) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubodaux* Date: *8-24-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 914940

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70085
Phone: (987) 593-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 229-1524

Carrier 2: BNSF Railway Company Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189 Acknowledgement of Receipt	
Per: <i>Daniel Kas</i>	Date: <i>8-24-21</i>

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 260574

WEIGHED BY _____

762406

Bill of Lading (Page 1 of 2)

DOCUMENT# 91494E

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket # 47134

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNCLAS.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 6.11 (BENZENE) PROFILE: 669843LA	CM	24.15	T
		IM CONTAINER# EMI225225			
		RAIL CAR# EPIXB14B4			
		ERG# 171 H039			

RECEIVED subject to the classifications and labels in effect on the date of the issue of this Bill of Lading, the property described above in approved good order, except as noted (carriers and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the said carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on his route, otherwise in deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in or of any said property, that every notice to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp.

Per: *[Signature]* Date: 7/15/21 Per: Luis Castro Date: 7/16/21

Mark with "X" or "PO" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (b) (1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials

Per: *[Signature]* Date: 8-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91494E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOFIN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS REM LLC
Street: 3144 MASSYUNKAVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Commins</i>	Date: <i>8/28/2021</i>

EP14225220
TICKET 62

ID 652592.
GROSS 81280 lb INBOUND
02:14PM 08/24/2021

OUTBOUND TICKET 62

GROSS 81280 lb RECALLED
FARE 32540 lb
NET 48740 lb
NET 2437 TON
04:19PM 08/24/2021

Handwritten notes and scribbles in blue ink, including a large '4' and a circled 'P'.

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762404
WEIGHED BY _____

4415

Handwritten signature or initials at the bottom left.

Bill of Lading (Page 1 of 2)

702397

DOCUMENT# 91494F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048731 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Ticket #1735</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	FROM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 8. III (BENZENE) PROFILE: 888843LA	GM	24.45	T
		IM CONTAINER# EPIU226042			
		RAIL CAR# EPIX91494			
		ERG# 171 H039			

NH

RECEIVED subject to the descriptions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in special good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above when said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry (a) to the usual place of delivery as said destination, if on its route, otherwise to deliver to another carrier on the route to said destination, if it is mutually agreed on to each carrier at all or any of said property, over (a) or any portion of said route to destination and up to each party at any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the (B) of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC		Carrier: CSX Railroad Corp.	
Per: <i>[Signature]</i>	Date: 7/15/21	Per: <i>Luis Castro</i>	Date: 7/16/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. This use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading date apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc		Certificate of receipt of materials	
Per: <i>Carrie Dubocleaux</i>	Date: 8-24-21		

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91494F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 503-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Daniel</i>	Date: <i>8-24-21</i>

EP1422304

TICKET 53

ID 653375
GROSS 83740 1b INBOUND
01:11PM 08/24/2021

OUTBOUND TICKET 53

GROSS 83740 1b RECALLED
FARE 34260 1b
NET 49480 1b
NET (24574) TON
02:39PM 08/24/2021

CC

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

762397

WEIGHED BY _____

4415

1.13521120 3701

Bill of Lading (Page 1 of 2)

762467

DOCUMENT # 91141-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 099
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
T. Lewis

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RO UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 980843LA	CM	23.95	1
		IN CONTAINER EPIU775240 RAIL CAR# EPIX01141			
		ERG# 171 H03B			

MS

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, shipment to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any firm interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 For: *[Signature]* Date: 7/20/21
 Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RO" if appropriate designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading. 49 CFR 171.20(a)(1) of Title 49, Code of Federal Regulations, also, when shipping hazardous materials, the shipper's verification statement provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Carrie Dumbord Date: 8-26-21

Bill of Lading (Continuation Sheet) 2 of 2

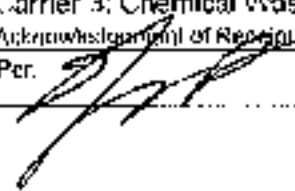
DOCUMENT# 91141-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 503-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (484) 220-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 8-26-21

EP14223210

TICKET 33

ID 653504
GROSS 79920 lb INBOUND
10:46AM 08/26/2021

OUTBOUND-TICKET 33

GROSS 79920 lb RECALLED
TARE 31080 lb
NET 48840 lb

NET 24.42 TON

01:01PM 08/26/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762467

WEIGHED BY _____

4415

DISPOSITION ASK

Bill of Lading (Page 1 of 2)

262469

DOCUMENT # 91141-2R

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD0007772D
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2169

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.46(d) 1241
 Talbot 4/17/18

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RO, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.III (BENZENE) PROFILE: R69043LA	CM	22.83	7
		IM CONTAINER# EPIU225225			
		RAIL CAR# EPIX9114			
		ERG# 171 H039			

NR

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its next place of delivery as said destination. If said route, otherwise to deliver to another carrier on the route to said destination. It is hereby agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/26/21
 Per: Luis Castro Date: 7/26/21

Mark with "X" or "RC" if appropriate to describe Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 472 201(a)(1) 40 of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172 201(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 8-26-21

Bill of Lading (Continuation Sheet) 2 of 2


DOCUMENT# 91141-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70555
Phone: (337) 593-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC
Street: 3144 PASSYUNKAVE
EPA ID: PA0 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LAC000147272 (800) 336-2189
Acknowledgement of Receipt	
Per: 	Date: 8-26-21

EV14223
TICKET 34 225

ID 653375
GROSS 83240 1b INBOUND
10:53AM 08/26/2021

OUTBOUND TICKET 34

GROSS 83240 1b RECALLED
FARE 33980 1b
NET 49260 1b
NET 2063 TON
01:47PM 08/26/2021

CW
CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762469

WEIGHED BY _____

+415

Bill of Lading (Page 1 of 2)

DOCUMENT # 91141-20

7624159

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

SHIPPER'S INSTRUCTIONS

(Empty box for shipper's instructions)

Includes 40 CFR

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9, III (BENZENE) PROFILE: 069843LA	CM	23.16	1
		IM CONTAINER# EPIU225208			
		RAIL CAR# EPIX91141			
		ERG# 171 HOSB			

Net

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination, if on its route, otherwise to deliver to another carrier on the route to an destination. It is mutually agreed as to each carrier of all or any of said property, that every vehicle to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 7/27/21
 Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for classifying hazardous materials on Bills of Lading 171.201(a)(1) 33 of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as included on the bill of lading does apply, unless a specific exception from the requirement is permitted in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Rumbodaux* Date: 8-26-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91141-2G

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70005
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 999
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Joseph [Signature]</i>	Date: <i>8/26-2021</i>

EP14229206

TICKET 22

ID 652592
GROSS 79140 lb INBOUND
09:13AM 08/26/2021

OUTBOUND TICKET 22

GROSS 79140 lb RECALLED
TARE 32400 lb
NET 46740 lb

NET 23.37 TON

10:55AM 08/26/2021

Q

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

762459

RECEIVING TICKET # _____

WEIGHED BY _____

415

4251109 BHC

Bill of Lading (Page 1 of 2)

760479
DOCUMENT # 91141-2T

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7175 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70666
 Phone: (337) 583 2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 040791 090
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

John Castro

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL NO. SHIPPING UNITS DESCRIPTION OF ARTICLES SPECIM. MARKS & EXCEPTIONS Type Volume UOM

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIM. MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN0077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S., 9.11 (BENZENE) PROFILE: 9608431A	CM	23.6B	T
		1M CONTAINER# EPI1226276			
		RAIL CARR# EPIX91141			
		ERG# 171 H039			

AK

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown, marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If en route, it agrees to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route in destination and as to each party or any one interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21 Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RC" if applicable to designate Hazardous Materials Substances as entered in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading. 49 CFR 171.15 (f) of Title 49 Code of Federal Regulations, also, when shipping hazardous materials, the shipper's certification statement provided in section 172.201(d) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 8-26-21

762479

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81141-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (484) 220-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LAD000747272 (800) 338-2169	
Acknowledgement of Receipt	
Per. <i>Joseph Covello</i>	Date: <i>8/26/2021</i>

Bill of Lading (Page 1 of 2)

762505

DOCUMENT# 91141-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 717C JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70566
 Phone: (337) 533-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVI
 EPA ID: PAD 049191 090
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOT TOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
 Talbot 4/1/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	HQ, UNS077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFIT# E: 9898431A	CM	23.95	T
		IM CONTAINER# EPJ0225272			
		RAIL CAR# EPIX91141			
		ERG# 173 H039			

NA

RECEIVED subject to the classifications and limits in effect on the date of the issue of the Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and distilled as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or said destination. If only route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the regulations and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp.
 Per: *[Signature]* Date: 7/23/21
 Per: Lucia Castro Date: 7/26/21

Mark with "X" or "HC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for designating hazardous materials on Bill of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: Camie Dubodaux Date: 8-27-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91741-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
FPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 040791 09B
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000777272 (800) 335-2169	
Acknowledgement of Receipt	
Per: <i>Daniel Garcia</i>	Date: <i>8-27-21</i>

13

EP14225272

TICKET 23

ID 653375
GROSS 82460 lb INBOUND
08:49AM 08/27/2021

OUTBOUND TICKET 23

GROSS 82460 lb RECALLED
FARE 33940 lb
NET 48520 lb

NET 24.26 TON

10:29AM 08/27/2021

CO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

EP14225272

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91141 2F

702484

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 585-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 045795 080
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 278-1524

ADDITIONAL INFORMATION

VRE TANK BOT TONS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40 CFR 261.4(a) 1211
 Includes 47782

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	FROM
X	1	RD UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225270 RAIL CAR# EPIX91141 ENG# 177 H039	CM	23.00	1

RECEIVED subject to the classification and labels in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), received consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. It will its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every carrier to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the rate of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the rate of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Pier: *[Signature]* Date: 7/23/21 Per: Luis Castro Date: 7/26/21

Mark with "X" or "R" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 8-27-21

Bill of Lading (Continuation Sheet) 2 of 2

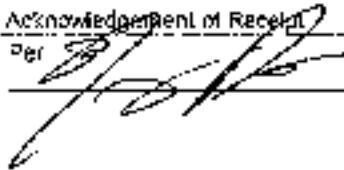
DOCUMENT# 91147-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7176 JOHN BRANNON ROAD
EPA ID: LA0000777203
City/State/Zip: SLTYPDR LA 70665
Phone: (337) 563-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1521

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LADJUN14/2/2 (800) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 8-23-21

EP14225270

TICKET 3

ID 653504
GROSS 77360 lb INBOUND
07:08AM 06/27/2021

OUTBOUND TICKET 3

GROSS 77350 lb RECALLED
FARE 30940 lb
NET 46410 lb

NET 23.21 TON

08:21AM 08/27/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 262484

WEIGHED BY _____

762358

Bill of Lading (Page 1 of 2)

DOCUMENT # 91519-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70695
 Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASBYUNKAVE
 EPA ID: PA0 049791 000
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.47(b) 1241

SHIPPER'S INSTRUCTIONS

Ticks 47762

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9. II (BENZENE) PROFILE: 9898431 A	GM	23.78	1
		HM CONTAINER# EPI11225352			
		RAIL CAR# EPIX91519			
		ERG# 171 H039			

NY

RECEIVED subject to the classifications and labels affixed on the date of the issue of this Bill of Lading, the property described above in support good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this context) as meaning any person or corporation in possession of the property under the contract, agrees to carry to the usual place of delivery as said destination, if on its route, otherwise to deliver to another carrier or the route to said destination if it is usually agreed as to each carrier or if of any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21 Per: *[Signature]* Date: 7/26/21

Mark with "X" or "RQ" if appropriate designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(3) (b) of Title 49, Code of Federal Regulations, A-30, when shipping hazardous materials, the shipper's certification element prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular mode.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 8-23-21

Bill of Lading (Continuation Sheet) 2 of 2

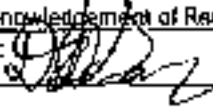
DOCUMENT# 01518-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000017231
City/State/Zip: SUICHR LA 70665
Phone: (337) 589-2169

Shipper: Phil ADÉLPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADÉLPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per: 	Date: 8-23-21

EP111225332

TICKET 37

ID 653375
GROSS 82100 lb INBOUND
12:04PM 08/23/2021

OUTBOUND TICKET 37

GROSS 82100 lb RECALLED
TARE 34280 lb
NET 47820 lb
NET 2491 TON

02:22PM 08/23/2021

CO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762358

WEIGHED BY _____

7415

762365

Bill of Lading (Page 1 of 2)

DOCUMENT # 91519-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4/al 1241
Tickets 4/1/163

SHIPPER'S INSTRUCTIONS

H039

NH

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE. SOLID. N.O.S. 9. III (BENZENE) PROFILE: 969843LA	CM	24.35	T
		IM CONTAINER# EPIU225278			
		RAIL CAR# EPIX91519			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If en route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp
Per: <i>[Signature]</i>	Date: 7/23/21
Per: Luis Castro	Date: 7/26/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of Lading 172.201(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Karl DeKrome</i>	Date: <i>8-23-21</i>

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81519-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70855
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 046781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph Courville</i>	Date: <i>8/23/2021</i>

652 274

EPLU 2-10

TICKET 51

ID 652592
GROSS 81360 lb INBOUND
01:35PM 08/23/2021
OUTBOUND TICKET 51

GROSS 81360 lb RECALLED
TARE 32100 lb
NET 49260 lb
NET 24.63 TON

03:28PM 08/23/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762 365

WEIGHED BY _____

4115

LASHAWA BIR

Bill of Lading (Page 1 of 2)

DOCUMENT# 91519-2C

702330

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777261
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-7169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048781 098
 City/State/Zip: PHILADELPHIA PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ted Y. M. 4/11/04

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3377, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6. III (BENZENE) PROFILE, 969848LA	CM	23.35	T
		IM CONTAINER# EPIU225282			
		RAIL CAR# EPIX91619			
		ERG# 171 H039			

N/A

ACCEPTED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on the route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all of any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21 Per: *Luis Castro* Date: 7/26/21

Made with "X" or "RC" if appropriate to the United Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1) (a) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carmie Ombroleano* Date: 8-20-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91519-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SUITLAND LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 998
City/State/Zip: PHILADELPHIA, PA 19114
Phone: (480) 220-1524

Carrier 2: BNSF Railway Company Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LAD000147272 (800) 336-2169 Acknowledgement of Receipt	
Per: <i>Joseph Courville</i>	Date: <i>8/20/2021</i>

EPIU225282

TICKET 60

ID 652592
GROSS 79860 lb INBOUND
01:39PM 08/20/2021

OUTBOUND TICKET 60

GROSS: 79860 lb RECALLED
TARE 32480 lb
NET 47380 lb

NET 23.69 TON

04:11PM 08/20/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

C

RECEIVING TICKET # 060336

WEIGHED BY _____

4/15

11:15 AM 11/10/21

Bill of Lading (Page 1 of 2)

DOCUMENT # 91519-20

762313

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70585
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PABBYUNKAVE
 EPA ID: PAD 069791 090
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 229-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 231.4(a) 1241

Tobias TMS

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXEMPTIONS	Type	Volume	UOM
X	1	RQ, UN3377, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 969843 LA	GM	23.50	T
		IM CONTAINER# EPIU225201			
		RAIL CAR# LPIX91519			
		LRGP# 1/1 RQ39			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If said route, otherwise to deliver to another carrier on the route to said destination, is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time exercised in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 7/23/21
 Per: *Luis Castro* Date: 7/30/21

Mark with "X" or "RC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations covering the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201(a)(1)(C) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(j) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials
 Per: *Cecile Dubocleaux* Date: 8-20-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91519-2D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70666
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. A0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph Cournelle</i>	Date: <i>8/20/2021</i>

Bill of Lading (Page 1 of 2)

DOCUMENT# 91519-2E

762344

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC.
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70665
 Phone (937) 503-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PA0049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 124t

T. J. Smith

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UFCM
X	1	RQ, UN3077, ENVIRONMENTAL I.Y. HAZARDOUS SUBSTANCE. SOLID. N.O.S. 9 R (BENZENE) PROFILE: 989843LA IM CONTAINER# FPIU225348 HAIL CAR# EPIX81519 ERG# 171 H039	CM	24.20	T

MRP

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If not to route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination that we as each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 7/23/21
 Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RQ" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(5) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as required on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials
 Per: *Carrie Dubodreau* Date: 8-23-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91519-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 040781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (BOD) 338-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Cornille</i>	Date: <i>8/23/2021</i>

Bill of Lading (Page 1 of 2)

202-75

DOCUMENT # 91519-237

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0009777201
 City/State/Zip: SUUFHUR LA 70065
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PA0 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRI TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 124

Ticked 4/11/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & RECEPTIONS	Type	Volume	MOU
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S., 9. III (BENZENE) PROFILE: 959843LA	CM	23.90	T
		IM CONTAINER# EPIU225015			
		RAIL CAR# EPIX91519			
		FROM 171 H039			

NA

RECEIVER: Subject to the classifications and labels in effect on the date of the issue of this Bill of Lading, the property described above an apparent good piece, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver in another carrier on the main to said destination, it is mutually agreed as in each carrier of all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions: the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21 Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RC" if applicable designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this power is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (b) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading 000s apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubouche* Date: 8-20-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91519-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0001777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2109

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 328-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	EA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Carly Smith</i>	Date: <i>8-20-21</i>

10/10/06
10/10/06
10/10/06
10/10/06
10/10/06

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

2406

RECEIVING TICKET # _____

WEIGHED BY _____

10/10/06

10/10/06

762260

Bill of Lading (Page 1 of 2)

DOCUMENT # 90119A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: (AD000717201)
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2163

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 030
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Include 44169

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Code
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFILE: 069843LA	CM	23.15	T
		IM CONTAINER# EPIU225075			
		RAIL CAR# EPX91119			
		ERG# 171 H339			

N/R

RECEIVED subject to the reclassifications and limits in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted for leaks and condition of packages unknown, marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. It will route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of it or any of said property, over all or any portion of said route to destination and as to each party of any firm interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Date: 7/23/21
 Per: Luis Castro

Mark with "X" or "RQ" to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(6) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Date: 8-19-21
 Per: Carrie Ambrose

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91119A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD009777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 099
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, inc	
LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Carl Smith</i>	Date: <i>8-19-21</i>

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BHANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 1600000000

WEIGHED BY _____

762299

DOCUMENT # 911193

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2199

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&W
LLC
Street: 3111 PASSYUNKAVF
EPA ID: PAD 0487B1 690
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (483) 226-3524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Robert P. MO

HAZARDOUS MATERIAL NO. SHIPMENT UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

UOM

HAZARDOUS MATERIAL	NO. SHIPMENT UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3377, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 959843LA	CM	24.16	T
		1M CONTAINER# EPIU225123			
		RAIL CAR# EPIX91115			
		ERG# 171 HD39			

AKR

ACCEPTED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above is received in good order, except as noted (conditions and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. It is to be noted, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any part of said route to destination and as to each party at any time stipulated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification or the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&W LLC
Carrier: CSX Railroad Corp
For: *[Signature]* Date: 7/23/21
Per: *Luis Castro* Date: 7/26/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 174.201(a)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.214(g) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials
[Signature] Date: 0848-21

Bill of Lading (Continuation Sheet) 2 of 2

762298

DOCUMENT# 911183

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC.	
Street: 7170 JOHN BRAKNON ROAD	
EPA ID: LAD000777204	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M I.C.	
Street: 3144 PASSYUNK AVE	
EPA ID: PA17 048791 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Cathy Smith</i>	Date: <i>08-19-21</i>

EPIC 225100
TICKET 68

TO 653501
GROSS 29300 lb INBOUND
01:52PM 08/19/2021

OUTBOUND TICKET 68

GROSS 29300 lb RECALLED
LOSS 20540 lb
NET 8760 lb
NET 24.47 TON
1 PH 08/19/2021

RESUP
21000

CO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762299

WEIGHED BY _____

4415

Bill of Lading (Page 1 of 2)

DOCUMENT# 91119C

702267

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7370 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SLI PHUR LA 70065
 Phone: (337) 583-2409

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PA0 049781 096
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (484) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.11(a)(24)

SHIPPER'S INSTRUCTIONS

[Empty box for shipper's instructions]

John Brannon

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNION
X	1	RD. 61N3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9.11 (BENZENE) PROFILE: 960849LA	CM	28.70	T
		IN CONTAINER# EPIU225170			
		RAIL CAR# EPIX01119			
		RR# 171 H030			

NIR

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown, marked, consigned and destined as indicated above which said carrier (the word rail is being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination. It will not, however, be delivered to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *7/23/21*
 Per: *Lucia Castro* Date: *7/26/21*

Mark with "X" or "100" if applicable, to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. This use of the column is an optional method for identifying hazardous materials on bills of Lading 122.2014(m)(1) (49 CFR 171.45, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 122.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Date: *8-19-21*

[Signature]

Bill of Lading (Continuation Sheet) 2 of 2

Wesson

DOCUMENT# 9111BC

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7174 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SUITPHUR LA 70685	
Phone: (337) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 049791 088	
City/State/Zip: PHILADELPHIA PA 19146	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA00001472/2 (800) 338-2169	
Acknowledgement of Receipt	
Per: <i>Joseph Courville</i>	Date: <i>8/19/2004</i>

Bill of Lading (Page 1 of 2)

DOCUMENT # 91119D

762553

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2189

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION
 VRF TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER ADCFR
 201.414.1241

SHIPPER'S INSTRUCTIONS

Table #1112

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RG UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE. SOLID. N.O.S. 9 WK (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225340 RAIL CAR# EPIX91119 ERG# 171 H038	CM	23.30	I

NA

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier, the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract, agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, each on or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: Luis Castro
 Date: 7/26/21

Mark with "X" or "R" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172-20 (a)(1) (2) of 49 CFR 172.204(a) of the Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: Amanda Daily/O'Neill
 Date: 8-18-21

702253

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 011190

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SUITPHILIR LA 70865	
Phone: (337) 563-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 049791 098	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (480) 226-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Carly Smith</i>	Date: <i>08-18-21</i>

1125501

EPL 4225510

TICKET 62

AD

ID 653501
GROSS 77560 lb INBOUND
01:33PM 08/18/2021

OUTBOUND TICKET 62

GROSS 77560 lb RECALLED
TARE 30900 lb
NET 46660 lb
NET 23.33 TON

03:27PM 08/18/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

7602253

RECEIVING TICKET # _____

WEIGHED BY _____

3115

1125501

1 2

762300

Bill of Lading (Page 1 of 2)

DOCUMENT# 511190

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 TPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2160

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 090
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRF TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a)1241

SHIPPER'S INSTRUCTIONS

Tanks 1/1/13

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 9. III (BENZENE) PROFILE: 969949LA IN CONTAINER# 8P4U225020 TAIL LARK# 8P4X91119 ETG# 171 H039	CM	23.25	T

AKK

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted good order except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry for its usual place of delivery as said destination. It on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Per: *[Signature]* Date: 7/23/21

Carrier: CSX Railroad Corp
 Per: *Lucas Castro* Date: 7/26/21

Mark with "X" or "RQ" if applicable to designate Hazardous Materials - Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of Lading 172.305(c)(1) (2) of title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the Shipper's certification statement prescribed in section 172.304(a) of the Federal Regulations, as indicated on this bill of Lading does not apply, unless a specific exception from the requirement is provided by the Regulator for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Amanda Devito / Deville* Date: 8-19-21

762800

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 811195

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 717D JOHN BRANNON ROAD
EPA ID: LA000277201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 682-2159

Shipper: PHILADELPHIA ENERGY SOLUTIONS H&M LLC
Street: 3114 PASSYUNKAVE
EPA ID: PA0 049793 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 238 1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt: _____ Date: _____
Per: _____
Carrier 3: Chemical Waste Management, Inc A000214/272 (000) 336-2169
Acknowledgement of Receipt: _____ Date: 8/14/2021
Per: <i>Joseph C. ...</i>

EP14223020

TICKET 69 A

ID 652592
GROSS 81800 lb INBOUND
01:58PM 08/19/2021

OUTBOUND TICKET 69

GROSS 81800 lb RECALLED
FARE 32640 lb
NET 49160 lb
NET 24.58 TON

03:43PM 08/19/2021

Handwritten initials "CP"

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 7602300

WEIGHED BY _____

Handwritten number "4415"

Handwritten signature or name at the bottom of the page

762232

Bill of Lading (Page 1 of 2)

DOCUMENT # 91119F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 503-7669

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 220-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.11(a)(24)
Tel: 480-220-1524

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLE SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZENE) PROFILE: 959843LA	CM	23.05	T
		IM CONTAINER# FPIU225260 RAIL CAR# LHX91119			
		FRGW 171 14039			

ME

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is apparent good order, except as noted contents and condition of packages unknown, marked, assigned and delivered as indicated above which said carrier, the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract, agrees to carry to its usual place of delivery as said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any portion of said property, as to each party of all or any portion of said property, that every service to be performed hereunder shall be subject to all the B/L of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 7/23/21 Per: Luis Castro Date: 7/26/21

Mark with "X" or "RQ" as appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Dubodaux* Date: 8-12-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01119F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANKON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 588-2180

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0349791098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 928-1924

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336 2189	
Acknowledgement of Receipt	
Per: <i>Joseph Conner</i>	Date: <i>8/18/2021</i>

Handwritten notes at the top right of the page, including the number 60.

Handwritten text in the middle section, possibly a date or reference number.

Handwritten number 177.

Handwritten number 100.

Handwritten text in the middle section, possibly a date or reference number.

Handwritten number 23.49.

CHEMICAL WASTE MANAGEMENT INC.
7170 JOHN BRANNON ROAD
SLI PLUR, LA 70865

RECEIVING TICKET # 1602232
WEIGHED BY _____

702214

Bill of Lading (Page 1 of 2)

DOCUMENT # 91447-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD00077201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2160

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASBYUNKAVE
 EPA ID: PAD 048791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 220-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticks 47650

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UDM
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9.III (BENZENE) PROFILE: 969843LA	DM	23.70	T
		IM CONTAINER# EPIU225246			
		RAIL CAR# EPIX91447			
		ERG# 171 H039			

AKK

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the said carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of it or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/01 Per: Lucia Castro Date: 7/26/01

Mark with "X" or "RD" if applicable to Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on this Bill of Lading 172.201(a)(3) (H) or Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirements provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management Inc Certification of receipt of materials

Per: *[Signature]* Date: 8-17-01

70214

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91447-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3141 PASSYUNKAVE
EPA ID: PAU 049791 09A
City/State/Zip: PHILADELPHIA, PA 19115
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt
Per: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169
Acknowledgement of Receipt
Per: <i>Joseph Courville</i> Date: <i>9/17/2021</i>

10/21

14-1171-K

762224

Bill of Lading (Page 1 of 2)

DOCUMENT # 91447-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2199

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC
 Street: 3141 PASSYUNK AVE
 EPA ID: PA0 048791 086
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

WHE TANK BOT TOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Labels must

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	5	RD UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZENE) PROFILE: 969843LA	DM	23.65	-
		IM CONTAINER# EPIU225145			
		RAIL CAR# EPIX91447			
		ERG# 171 H036			

N/A

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages included). Marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions for the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *[Blank]*
 Per: *Luis Castro* Date: *7/26/21*

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(5) (4) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as amended on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consigner: Chemical Waste Management, Inc. Certification of receipt of materials
 Per: *Carrie Cumberland* Date: *8-18-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91447-215

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70585
Phone: (337) 583-2166

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS H&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049/91 090
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	Date:
Per:	
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 336-2169
Acknowledgement of Receipt	Date: 08-18-21
Per: <i>Chris Smith</i>	

EQU 240123

Gross	78440
Tare	30840
Net	47600
	25.80

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762226

WEIGHED BY _____

7218-

Bill of Lading (Page 1 of 2)

DOCUMENT # 91447-20

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VHE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket 41152

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	COM
X		RO, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9.1 (BENZENE) PROFILE: B69B43LA	CM	23.00	T
		IM CONTAINER# EPIU275144			
		RAIL CAR# EPIX91447			
		ERG# 171 H039			

KCP

RECEIVED subject to the stipulations and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, certified and destined as indicated above which said carrier (no word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery, as said destination. If on its route, otherwise to deliver to another carrier on its route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

For: *[Signature]* Date: *7/23/21* Per: *Luis Castro* Date: *7/26/21*

Mark with "X" or "M" appropriate designations hazardous materials as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.205(b) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

For: *[Signature]* Date: *8-16-21*

762785

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 61447-20

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SHELPHUR LA 70665
Phone: (337) 583-2169

FROM

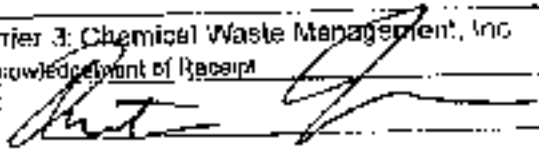
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 018791 098
City/State/Zip: PHILADELPHIA, PA 19115
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
 Acknowledgment of Receipt

Per: _____ Date: _____

Carrier 3: Chemical Waste Management, Inc LA0000147272 (800) 336-2169

Acknowledgment of Receipt

Per:  Date: 8-16-21

Bill of Lading (Page 1 of 2)

7/26/21

DOCUMENT# 91467-2D

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2269

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048791 090
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 328-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4761 1241
 TCS 4/16/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	COM
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 II (BENZENE) PROFILE: 969843LA IN CONTAINER# EPII225231 RAIL CAR# EPIX91447 ERG# 171 H039	CM	23.63	T

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is shipped in accordance with the classification and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is shipped in accordance with the classification and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is shipped in accordance with the classification and tariffs in effect on the date of the issue of this Bill of Lading.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 7/26/21
 Per: Luis Castro Date: 7/26/21

Made with "X" or "RC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulation governing the transportation of hazardous materials. The use of "X" column is an optional method for identifying hazardous materials or W/As of Lading 172.201(a)(1) (ii) of the Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on this Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Date: *[Signature]* 7-26-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01447-2D

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SUITPHUR LA 70659
Phone: (337) 583 2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PA000048791009
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgment of Receipt
Per: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169
Acknowledgment of Receipt
Per: <i>Joseph Cruz</i> Date: <i>8-16-2011</i>

EPA 25231

TICKET 73

TO 652592
GROSS 80420 lb INBOUND
02:02 PM 08/16/2021

Tax
GROSS 7580 lb
09:23 AM 08/17/2021

~~47740~~

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

Alt 617740

23.87

RECEIVING TICKET # 762184

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91447-05

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADG00777201
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3114 PASSYUNK AVE
EPA ID: PAD 049731 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

Label false

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 868843LA	CM	23.73	T
		IM CONTAINER# EPIU225400			
		RAIL CAR# EPIX91447			
		ERG# 171 11039			

W/

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. It on its route, otherwise to deliver to another carrier on the route to said destination. If it mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification of the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification of the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21
Per: Luis Castro Date: 7/26/21

Mark with "X" or "RQ" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.203(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, where shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading code apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials

Per: *Carrie Duboucheaux* Date: 5-18-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91447-2E

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70665	
Phone: (337) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 049701 09B	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1524	

Carrier 2: HNSF Railway Company	
Acknowledgement of Receipt:	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 335-2169
Acknowledgement of Receipt:	
Per: <i>Joseph C. De</i>	Date: <i>8/18/2021</i>

EPIU 22 5400

Gross	80360
Tare	32260
Net	48100
	24.05

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762228

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

702213

DOCUMENT# 91447-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000977201
 City/State/Zip: SULPHUR, LA 70665
 Phone: (337) 583-2159

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 220-1524

ADDITIONAL INFORMATION

VRE TANK BOT TOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) (2)(4)

Tickets 4/16/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 8, III (BENZENE) PROFILE 889843LA	DM	29.15	T
		IM CONTAINER# EPIJ225271			
		RAIL CAR# EPIX91447			
		ERG# 171 H039			

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in agreement good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated herein which said carrier (the word "carrier" being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination. If on the route, otherwise to deliver in another carrier on the route to said destination, it is mutually agreed as to each carrier of it or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 7/23/21
 Per: Luis Castro Date: 7/26/21

Made with "X" or "RQ" it is applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Date: 8-17-21

Bill of Lading (Continuation Sheet) 2 of 2

762213

DOCUMENT# 01447 2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70865
Phone: (857) 583-2169

Shipper: PHI ADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA11049791 09B
City/State/Zip: PHI-ADELPHIA, PA 19143
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LAD000147272 (B30) 336 2169	
Acknowledgement of Receipt	
Per: <i>Carly Christ</i>	Date: <i>8-17-21</i>

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

70-218

WEIGHED BY

762584

Bill of Lading (Page 1 of 2)

DOCUMENT # 91027-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAC000777201
City/State/Zip: SULPHUR LA 70665
Phone: (937) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241

Telco 9/24/21

SHIPPER'S INSTRUCTIONS

NH

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CLASS
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU225153 RAIL CAR# EPIX01027-2 ERG# 171 H039	CV	23.3	T

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and sealed as indicated above which said carrier (the word carrier being understood through this contract as bearing any duty or responsibility in possession of the property under the contract) agrees to carry to the usual place of delivery or its destination, if on his route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the additional conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Transportation
Per: <i>[Signature]</i>	Date: 7/28/21
Per: <i>Luis Castro</i>	Date: 7/30/21

Mark with "X" or "RD" if applicable to designated Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.221(a)(1) (B) of Title 49 Code of Federal Regulations. Also, when shipping infectious materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Karl Dabman</i>	Date: 8-31-21

762584

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91027-2A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70005	
Phone: (337) 503-2180	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3114 PASSYUNK AVE	
EPA ID: PAD 049101 09R	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (BDD) 336-2189	
Acknowledgement of Receipt	
Per: <i>LeAnn Belland</i>	Date: 8-31-21

10/23/06

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W

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 710581

WEIGHED BY _____

10/23/06

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01027-2a

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 583-2188	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 040791 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (410) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Joshua Bellard</i>	Date: <i>9-1-21</i>

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(10)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SUITE PHUR, LA 70686

RECEIVING TICKET # _____ 760001

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762588

DOCUMENT # 91027-2C

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADC00777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 653-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 090
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1741

Tickets 48245

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. D.H. (BENZENE) PROFILE: 869043LA	CM	24.08	T
		1M CONTAINERS EPIU225142			
		RAIL CAR# EPIX01027-2			
		ERG# 171 H038			

NH

RECEIVED subject to the classifications and rights in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
Per: *Luis Castro* Date: 7/30/21

Marks with "X" or "RG" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials or bills of lading 172.201(a)(1) (j) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials

Per: *Cami Dubois* Date: *8-9-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81027-2C

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000077201	
City/State/Zip: SULPHUR LA 70665	
Phone: (337) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 049791 088	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 335-2169
Acknowledgement of Receipt	
Per: <i>Dennis [Signature]</i>	Date: <i>8-31-21</i>

1006, 1007

DATE: 02/01/2004
BY: [Signature]

02/01/2004

02/01/2004

02/01/2004

02/01/2004

02/01/2004

(14)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

(14)

RECEIVING TICKET # 1006555

WEIGHED BY _____

02/01/2004

Bill of Lading (Page 1 of 2)

262604

DOCUMENT# 91027-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 717D JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048701 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
281.41/91 1241

Tickets 4/2/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & RECEPTIONS	Type	Volume	TCM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZENE) PROF. ID. 808043LA	CM	23.73	T
		1M CONTAINER# EPK1225384			
		RAIL CAR# EPK91027-2			
		ERG# 171 H039			

NA

RECEIVED subject to the classification and tariffs in effect on the date of this Bill of Lading, the property described above is shipped in good order, except as noted (contents and condition of packages unknown), and is consigned and destined as indicated above with said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time involved in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
Per: Luis Castro Date: 7/30/21

Mark with "X" or "RC" as appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a)(1) (3) of Title 49, Code of Federal Regulations, also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204 (3) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials

Per: *Carrie Lembody* Date: 9-1-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91027-2D

TO
Compliee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000377201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2188

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 04R791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Denned Gary</i>	Date: <i>9-12-1</i>

Bill of Lading (Page 1 of 2)

262200

DOCUMENT# 91077-2E

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0009777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 683-2188

SHIPPER
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1624

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a)(124)
 [Signature]

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. & III (BENZENE) PROFILE: 889843LA W. CONTAINER# EPIU226384 RAIL CAR# EPIX91027-2 ENG# 171 H330	CM	24.35	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted hereon and condition of packages unknown, marked, numbered and destined as indicated above which said carrier (who would carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as noted hereon, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time hereon that every invoice to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: [Signature] Date: 7/30/21
 Pnr: Luis Castro Date: 7/30/21
 Mark with "X" or "RQ" if applicable to designated Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (3) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.
 Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: Carrie Dubockaux Date: 9-1-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01027-2E

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70085	
Phone: (337) 683-2168	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 049791 088	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (410) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2189
Acknowledgement of Receipt	
Per: <i>Robert Ballard</i>	Date: <i>9-1-21</i>

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10/1/21

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14003 14270 11389430
13.2200 39707202

10/1/21
10/1/21

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(11/1/21)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762000

WEIGHED BY _____

10/1/21

1162603

Bill of Lading (Page 1 of 2)

DOCUMENT# 91027-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7470 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (837) 683-2189

FROM

Shipper PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (483) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Jones *L. Castro*

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.M (BENZENE) PROFILE: B096431.A	CM	23.35	T
		IM CONTAINER# EPIU226384			
		RAIL CAR# EPIXB1027-2			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and limits in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (marks and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
 Per: *Luis Castro* Date: 7/30/21

Mark with "X" or "RQ" appropriate designates Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for designating hazardous materials on Bills of Lading 172.201(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Lombodeaux* Date: 9-1-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91027-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M ILC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph [Signature]</i>	Date: <i>9/11/2021</i>

11/23/07

11/23/07

11/23/07 11:23 AM
SULPHUR, LA 70665

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SULPHUR, LA 70665
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11/23/07

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 6710000

WEIGHED BY _____

11/23/07

11/23/07

762572

Bill of Lading (Page 1 of 2)

DOCUMENT# 93150-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SUDBURY LA 70886
Phone: (337) 583-2188

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1924

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(b) 1241

Tanks 48219

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
K	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. II (BENZENE) PROFILE: 989943LA	CM	23.1	T
		IM CONTAINER# EPIU226398			
		RAIL CAR# EPIX91160-2			
		ERG# 171			
		103B			

HEREBY subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the word carrier being understood through the contract, as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If en route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the conditions and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Transportation
Per: *Luis Castro* Date: *7/30/21*

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulation governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (b)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a special exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials
Per: *Carrie Dubodreau* Date: *8-31-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91150-2A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000077201	
City/State/Zip: SULPHUR LA 70695	
Phone: (337) 583-2189	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 049701 088	
City/State/Zip: PHILADELPHIA PA 19145	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Dennis</i>	Date: 8.31.21

767585

Bill of Lading (Page 1 of 2)

DOCUMENT# 911502B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA060077201
 City/State/Zip: SULPHUR LA 70695
 Phone: (337) 683-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048701 098
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1524

ADDITIONAL INFORMATION:
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
 1/25/21 48250

SHIPPER'S INSTRUCTIONS

NH

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9 III (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225821 RAIL CAR# EPIX011502 ERG# 171 H030	CM	24.4	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (see 2211) and condition of packages unknown, marked, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the caption) agrees to carry to the next place of delivery as said destination. If on its route, desiring to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time hereafter in all or any said property, that every carrier to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 7/29/21
 Per: Luis Castro Date: 7/30/21

Mark with "X" or "RC" as appropriate to indicate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.30(a)(1) (b) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on this Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: _____ Date: _____

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91150-28

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70888
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 898
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	Acknowledgment of Receipt:	Date:
Per:		
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2189	
Acknowledgment of Receipt:		Date: 8/21/2021
Per: <i>Joseph [Signature]</i>		

01/14/01

08:14

HC 10000
JOB: 1000 1000000
E-0000 00/01/2001

1000 10000

1000 10000

(Handwritten mark)

(Handwritten notes: 1000, 10000, 0966)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 262088

WEIGHED BY _____

1000

Bill of Lading (Page 1 of 2)

DOCUMENT # 91150-2C

762526

10

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2166

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

J. Castro 48251

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WGT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B III (BENZENE) PROFILE: 889843LA	DM	23.55	T
		1M CONTAINER# EPIJ225307			
		RAIL CAR# EPIX91150-2			
		ERG# 171 H039			

NH

RECEIVED subject to the classifications and labels in effect on the date of the issue of the Bill of Lading, the property described above in separate good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise it, delivers to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line traversed in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. SHIPPER hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 7/28/21
 Per: *Luis Castro* Date: 7/30/21

Mark with "X" or "RQ" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement 172.203(b) in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Destination: Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Embrock* Date: *7-27-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 9115D-2C

TO	
Consignee:	CHEMICAL WASTE MANAGEMENT INC
Street:	7170 JOHN BRANNON ROAD
EPA ID:	LA0000777201
City/State/Zip:	SULPHUR LA 70685
Phone:	(337) 583-2169

FROM	
Shipper:	PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street:	3144 PASSYUNK AVE
EPA ID:	PAD 048791 093
City/State/Zip:	PHILADELPHIA, PA 19146
Phone:	(480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt:	
Per: <i>Carly Smith</i>	Date: <i>8-27-21</i>
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2169
Acknowledgement of Receipt:	
Per:	Date:

10/19/87

BY: [Signature]
DATE: 10/19/87
TIME: 9:00 AM

WEIGHT: 1000 LB

RECEIVED BY: [Signature]
DATE: 10/19/87

TIME: 10:00 AM

BY: [Signature]

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 76252

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762512

DOCUMENT # 91150-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PABBYUNKAVE
EPA ID: PAD 048791 000
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Trails 4/25/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9 III (BENZENE) PROFILE: 989B43LA IN CONTAINER# EP10225217 RAIL CAR# EP: X91150-2 ERG# 171 H036	CM	24.03	T

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and destined as indicated above which as of carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as a final destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in or to any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Transportation

Per: *[Signature]* Date: 7/29/21 Per: Luis Castro Date: 7/30/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an option, reserved for identifying hazardous materials on Bills of Lading 172.301(a)(1) (A) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
Per: *Carrie Ambrose* Date: 8-27-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01150-2D

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA00077701	
City/State/Zip: SULPHUR LA 70685	
Phone: (837) 683-2160	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 049791 098	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	Date:
Per:	
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	Date:
Per: <i>Joseph...</i>	<i>8/27/2021</i>

10

7114033017
10/21/01
10/21/01
10/21/01
10/21/01

10/21/01
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10/21/01
10/21/01

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762512
WEIGHED BY _____

10/21/01

10/21/01

Bill of Lading (Page 1 of 2)

762534

DOCUMENT # 91150-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LADC00777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a)1241

Tickets 46253

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. & III (BENZENE) PROFILE: 950843LA	CM	24	1
		1M CONTAINER# EPIU225154			
		RAIL CAR# FPIX81150-2			
		ERG# 171 HC39			

RECEIVED subject to the classifications and tariffs in effect at the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (condition and condition of packages unknown), packed, consigned and delivered as indicated above with said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated above, if on its route, otherwise to deliver to either carrier on the route to said destination, if mutually agreed as to each carrier or to any of said property, over all or any portion of said route to destination and as to each party at any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
 Per: Luis Castro Date: 7/30/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this marking is an option provided for identifying hazardous materials on Bills of Lading 772.20(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as included on the Bill of Lading, does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials

Per: *[Signature]* Date: 8-27-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91150-2E

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70665	
Phone: (337) 583-2160	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 048781 096	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1624	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2160
Acknowledgement of Receipt	
Per: <i>Joseph Counts</i>	Date: <i>8/27/2021</i>

1-11-14 2013

1013 1 30

123212121
00:00:00
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Quantity: 2000
Weight: 2420

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2420

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762554

WEIGHED BY _____

1000 1000

1000 1000

762530

Bill of Lading (Page 1 of 2)

DOCUMENT# 91150-2P

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70985
Phone: (337) 583-2188
ADDITIONAL INFORMATION
VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
<i>1 check 4/20/21</i>

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 058
City/State/Zip: PHILADELPHIA PA 19145
Phone: (480) 228-1624

SHIPPER'S INSTRUCTIONS
<i>None</i>

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UCM
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9. III (BENZENE) PROFILE: 889843LA	CM	23.36	T
		IM CONTAINER# EPI0225336			
		RAIL CAR# EPX91150-2			
		ENR# 171 H038			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the vessel carrier being designated through this contract or meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed to each carrier of ship or any of said property, over all of any portion of said route to destination and as to each party at any time interested in any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the exceptions and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Transportation
Per: <i>[Signature]</i>	Date: 7/29/21
Per: <i>Luis Costas</i>	Date: 7/30/21

Mark with "X" or "RC" appropriate to describe Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this return is an optional method for identifying hazardous materials on Bills of Lading 132.201 (b)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
For: <i>[Signature]</i>	Date: <i>[Signature]</i> 8-2-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81150-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (482) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 335-2169	
Acknowledgment of Receipt	
Per: <i>Derrill King</i>	Date: <i>8-27-21</i>

11/11/11 10:18

11/11/11

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 11/11/11 10:18

WEIGHED BY _____

11/11/11

11/11/11

Bill of Lading (Page 1 of 2)

DOCUMENT # 91075A

20891

10
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC.
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70085
 Phone: (337) 383-2169

FROM:
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049701 093
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1324

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(b) 124.1

SHIPPER'S INSTRUCTIONS

Ticket 48255

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WGHT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFILE: 988843LA IM CONTAINER# EPIU226358 RAIL CAR# EPLX81075 ERG# 174 HC38	DM	24.25	T

NH

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through the contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any portion of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in effect on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *Luis Castro* Date: *7/30/21*

Per: *[Signature]* Date: *7/28/21*
 Mark with "X" or "HC" if appropriate in dangerous Hazardous Materials Balances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.20145(i)(1) 6(i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of material's
 Per: *Carrie Embodear* Date: *9-15-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91076A

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7175 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 683-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt _____ Date: _____
Per: _____
Carrier 3: Chemical Waste Management, Inc. LAC000147272 (800) 338-2169
Acknowledgement of Receipt _____ Date: _____
Per: _____

7/16/91
11:31 AM

TO: 603 25
FROM: 62240 603 2000
DATE: 07/16/91

RECEIVED 11:31 AM '91

GRCS: 603 25
TAG: 62240
S.I. 603 20

TO: 603 25

DATE: 07/16/91

110

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

110

70, 891

RECEIVING TICKET # _____

WEIGHED BY _____

Waste Management, Inc.

762911

Bill of Lading (Page 1 of 2)

DOCUMENT # 91075B

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 583-2169

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 12-11

Tickets 48256

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD C48781 C88
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

SHIPPER'S INSTRUCTIONS

N/A

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 868843LA RM CONTAINER# EPIU225148 RAIL CAR# EPIX81075 ERG# 171 H038	GM	23.40	T

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to the usual place of delivery or to its destination, if on its route, otherwise to deliver to another carrier on the route to said destination if it is mutually agreed as to each carrier at or any of said property over all or any portion of said route to destination and as to each party at any time interested in or any title property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions as the governing classification on the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Transportation

Per:

[Signature]

Date:

7/28/21

Per:

Luis Castro

Date:

7/30/21

Mark with "X" or "RC" if applicable to designate hazardous materials as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of UN numbers is an optional method for identifying hazardous materials on Bills of Lading 172.201(b)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement presented in Section 172.204(g) of the Federal Regulations, as indicated on the Bill of Lading, does not apply unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

[Signature]

Date:

[Signature] 9-15-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1075B

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7175 JOHN BRANNON ROAD
EPA ID: LA000577720
City/State/Zip: SULPHUR LA 70886
Phone: (337) 583-2189

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt
Per: _____

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt
Per: *Joseph Combs*

Date: _____
LA0000147272 (800) 336-2169
Date: *9/15/2021*

6/2/00

1/17/00

12/31/00

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12/31/00 00000000
00000000 00000000

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(Handwritten signatures and initials)
1/17/00
(04.66)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BIRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 767711

WEIGHED BY _____

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Bill of Lading (Page 1 of 2)

DOCUMENT# 91075C

7/20/21

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70866
 Phone: (337) 583-2169

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 048791 088
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1624

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

T. White 4/25/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE); PROFILE: 989843LA	CM	24.03	T
		IM CONTAINER# EMIU225517 RAIL CAR# EPIX91076			
		ERG# 171 H338			

AM

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. It is the route, chartered to deliver to another carrier en route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Transportation

Per: *[Signature]* Date: *7/25/21*

Per: *Luis Castro* Date: *7/30/21*

Mark with "X" or "RQ" as appropriate to designate hazardous materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 772.201(a)(1)(ii) of Title 49-Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 772.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials


Per: *Carrie Ambodeaux* Date: *9-15-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1075C

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70965	
Phone: (337) 583-2188	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R6M LLC	
Street: 3144 PAGESYUNGAVE	
EPA ID: PAD 049781 098	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 9.15.24

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(11)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

11/11/00

RECEIVING TICKET # 11/11/00

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762854

DOCUMENT# 910750

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2189

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PA0048781082
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241
T. Dubois

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.D.S. 9 II (BENZENE) PROFILE: 869843LA	GM	23.75	T
		1M CONTAINER# EPIU225305 RAIL CAR# EPIX91075			
		ERG# 171 H038			

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract to mean any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as and destination. If on its route, otherwise to deliver to another carrier or the carrier to another destination it is mutually agreed as to each parcel or set of any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 9/28/21
 Per: *Lucia Castro* Date: 7/30/21

Mark with "X" or "HQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation's Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201 (b)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in part of 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from this requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Dubodaux* Date: 9-15-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# R10750

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 663-2166

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 338-2169
Acknowledgement of Receipt	
Per: <i>Joseph Connolly</i>	Date: <i>9/15/2021</i>

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BY: 0000/00

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 7600884

WEIGHED BY _____

Waste Management, Inc.

Bill of Lading (Page 1 of 2)

762920

DOCUMENT # 91075B

TO

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 2176 JOHN BRANNON ROAD
 EPA ID: LAD000777231
 City/State/Zip: SULPHUR LA 70686
 Phone: (837) 682-2188

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.11(a)(24)

Ticked 9/15/21

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 040781 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Lot#
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.D.S. 8.14 (BENZENE) PROFILE: 889843LA	CM	24.35	T
		IM CONTAINER# EPIU225137			
		RAIL CAR# EPIX91075			
		ERG# 171 H039			

RECEIVED as per the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described herein in apparent good order, except as noted (contents and condition of packages unknown), marked, contained and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination. If on its route, otherwise to go her to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms of Lading forms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading forms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation

Per: *[Signature]* Date: *9/15/21*
 Per: *Luis Castro* Date: *7/30/21*

Mark with "K" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this notation is an optional method for identifying hazardous materials on Bills of Lading 172-201(A)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172-204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Dubois* Date: *9-15-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91075E

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19148
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per: _____

Date: _____

Carrier 3: Chemical Waste Management, Inc.

Acknowledgement of Receipt

Per: _____

LA0000147272 (800) 336-2169

Date: _____

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 160700

WEIGHED BY _____

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Bill of Lading (Page 1 of 2)

DOCUMENT # 910751

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 2170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 226-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket # 8260

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	HOW
X	1	RO. UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. B.L. (BENZENE) PROFILE: 989843LA IM CONTAINER# EPIU225391 RAIL CAR# EPIX91075 ERG# 171 H038	CM	23.65	T

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the said carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, whereto to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to a) the Bill of Lading terms and conditions in the governing classification on the date of shipment; Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 7/28/21
 Per: Luis Castro Date: 7/30/21

Mark with "X" or "RQ" if appropriate to indicate hazardous materials substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed is set on 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations to a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Date: *[Signature]* 7-15-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91075F

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70966
Phone: (337) 583-2189

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 090
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 276-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt
Rec: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt
Rec: _____ Date: 9-15-21
LA0000147272 (800) 336-2169

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 11/11/77

WEIGHED BY _____

11/11/77

Bill of Lading (Page 1 of 2)

26293

DOCUMENT# 91525-3A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777204
City/State/Zip: SULPHUR LA 70685
Phone: (337) 503-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PABBYUNKAVE
EPA ID: PAD 019791 099
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Tickets 48284

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 6 II (BENZENE) PROFILE: 989843LA	GM	22.80	T
		IM CONTAINER# EPIU225113			
		RAIL CARN# EPIX91525-3			
		ERG# 171			

RECEIVED subject to the classification and labels in effect at the date of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and certified as indicated above which said carrier, the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract, agrees to carry to its usual place of delivery as per destination. If said carrier, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed on to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in it, or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Transportation

Per: *[Signature]* Date: *7/30/21* Per: *Luis Castro* Date: *7/30/21*

Mark with "X" or "RQ" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a special exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carré Dubocleaux* Date: *9-16-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01525-3A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: GULPHUR LA 70665	
Phone: (337) 503-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PA0 049781 095	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1624	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Derrick Gary</i>	Date: <i>9-16-21</i>

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762-937
WEIGHED BY _____

01/16/2001

Bill of Lading (Page 1 of 2)

7629468

DOCUMENT# 91525-38

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC

Street: 7170 JOHN BRANNON ROAD

EPA ID: LA0000777201

City/State/Zip: SULPHUR LA 70685

Phone: (337) 883-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Street: 3144 PASSYUNK AVE

EPA ID: PA0000048781000

City/State/Zip: PHILADELPHIA PA 19145

Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(g) 1241

Truck # 40237

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WCM
X	1	RQ UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.12 (BENZENE) PROFILE: 888843LA	CM	23.65	T
		IM CONTAINER# EPIU225300			
		RAIL CAR# EPIK61526-3			
		ERG# 171 H039			

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above when said carrier (the word carrier being understood through this contract as meaning any carrier or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, and all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21

Per: Luis Castro Date: 7/30/21

Mark with "X" or "HQ" if applicable to Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(i) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading, does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per: Carrie Dubodaux Date: 9-16-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01525-3B

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000772201	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 583-2168	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Address: 3144 PASSYUNK AVE	
EPA ID: PA0 640791 008	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (410) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per: <i>Joseph [Signature]</i>	Date: 9/16/2021

Bill of Lading (Page 1 of 2)

262934

DOCUMENT # 91525-3C

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (937) 583-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticks 262934

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXEMPTIONS	Type	Volume	TCM
X	1	RQ (UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B, III (BENZENE)) PROFILE: 889B43LA	CM	23.80	T
		1M CONTAINER EPIU225251			
		RAIL CAR# EPIX81626-3			
		ERG# 1/1 H030			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described herein is apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as designated. If en route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time hereafter in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Transportation
Per: <i>[Signature]</i>	Date: 7/28/21
Per: <i>Luis Castro</i>	Date: 7/30/21

Mark with "X" or "TCM" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping licensor materials, the shipper's certification statement provided in section 172.204(j) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials

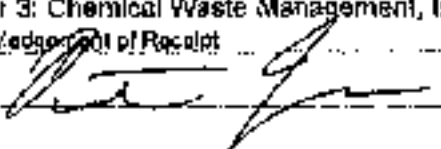
Per: *Carrie Dubodreau* Date: 9-16-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01625-30

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70605
Phone: (337) 583-2189

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 040781 085
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: 	Date: 9-16-21

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SUI PHUR, LA 70665

RECEIVING TICKET # 700934
WEIGHED BY _____

762931

Bill of Lading (Page 1 of 2)

DOCUMENT # 91525-333

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD049701090
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Trucks 4/24/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9. III (BENZENE) PROFILE: 069843LA	CM	23.10	T
		IM CONTAINER# EPIU226086			
		RAIL CARN# EPX91575-3			
		ENG# 171 H039			

RECEIVED subject to the classifications and bills in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and destined as indicated above when said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property hereunder) agreed to carry the same to the place of delivery as said destination. It is his duty, wherever he delivers to another carrier or the route to said destination, if it is actually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time (transit in all or any part of property, that every service to be performed remains subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading forms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Transportation
Per: <i>[Signature]</i>	Per: <i>Luis Castro</i>
Date: <i>9/16/21</i>	Date: <i>9/30/21</i>

Mark with "X" or "HC" if appropriate for designated Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)-(3) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exception from the requirements provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carmé Dubaleaux* Date: *9-16-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01625-3D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADD0077201
City/State/Zip: SULPHUR LA 70966
Phone: (337) 582-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 080
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LADD00147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Joseph C. ...</i>	Date: <i>9/16/2024</i>

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 70000001

WEIGHED BY _____

PHH

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Bill of Lading (Page 1 of 2)

762955

DOCUMENT# 91525-38

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70663
Phone: (337) 683-2188

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

F. Clark

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 8.11 (BENZENE) PROFILE: 065843LA	CM	23.70	T
		IM CONTAINER# EPIU225202			
		RAIL CAR# EPIX01525-3			
		ERG# 174 H388			

N/A

RECEIVED subject to the definitions and terms in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through its contract as meaning any person, or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated above. If on its route, otherwise to deliver to another center on the route to said destination, the carrier may stop at any such center at all or any of said property, over all or any portion of said route to destination and as to each party at any time hereafter agreed to in each carrier at all or any of said property. This every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
Pat: *Luis Castro* Date: 7/30/21

Mark with "X" or "RC" in appropriate column to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading (49 CFR 172.201(a)(4)(ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as incorporated on the Bill of Lading does apply, unless a specific exception listed the requirement is provided in the Regulation for a particular material.

Destination/Consignee: Chemical Waste Management, Inc
Certification of receipt of materials

Pat: *Carrie Embouraux* Date: 9-17-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91525-3E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2169
Acknowledgement of Receipt	
Per: <i>Dennis Carney</i>	Date: <i>9.17.21</i>

12/11/03 11:30 AM

CLASS: HAZARDOUS WASTE
DATE: 12/11/03

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(11)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 700955

WEIGHED BY _____

[Handwritten signature]

Bill of Lading (Page 1 of 2)

DOCUMENT# 91525-3F

762951

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULLY LA 70865
 Phone: (337) 683-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PA0 049781 008
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

True 4/24/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RG UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9.11 (BENZENE) PROFILE: 8888431A	CM	23.10	T
		IM CONTAINER# EPIU226383			
		RAIL CAR# EPIX81525-3			
		ERG# 171 H039			

RECEIVED subject to the demurrage and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the wagon being used) through this contract as making any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated herein. If not so noted, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of this property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
 Per: Luis Castro Date: 7/30/21

Mark with "X" or "RG" as appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 112.201 (b)(1) (3) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification under and prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials

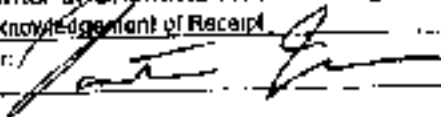
Per: *Carrie Dumbodaux* Date: 9-16-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91525-3F

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70885	
Phone: (337) 569-2188	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 018701 090	
City/State/Zip: PHILADELPHIA, PA 19148	
Phone: (480) 225-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (600) 336-2169	
Acknowledgement of Receipt	
Per: 	Date: 9-16-21

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TO: 0000/00

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(P)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # 760951

WEIGHED BY _____

0000

11-13-18

762958

Bill of Lading (Page 1 of 2)

DOCUMENT# 91074-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70895
 Phone: (337) 583-2186

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 040791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VME TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Tides

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UN
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. Q.11 (BENZENE) PROFIDE. 800843CA IM CONTAINER# EPIU225343 RAIL CAR# EPIXB1074-2 ERG# 171 H039	CM	23.15	T

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), received, weighed and counted as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 7/30/21
 Per: *Lucia Castro* Date: 7/30/21

Made with "X" or "RQ" in accordance to Hazardous Materials Regulations as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of UN# column is an optional method to identify hazardous materials on Bills of Lading 172.201(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.234(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from this requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carmie Ambodeaux* Date: 9-17-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91074-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 080
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	Date:
Per:	
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2189
Acknowledgement of Receipt	Date: 9/17/2021
Per: <i>Joseph Courville</i>	

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 1102818

WEIGHED BY [Signature]

11/21/02

Bill of Lading (Page 1 of 2)

762966

DOCUMENT # 91074-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAP000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PABBYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241

Ticket # 263

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIM MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9, 21 (BENZENE) PROFILE: 888843LA	OV	24.93	T
		IM CONTAINER# EPIJ225150			
		RAIL CAR# EPIX91074-2			
		ERG# 171			
		HQ99			

RECEIVED subject to the disallowance and limits in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and position of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the place of delivery as said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each parcel of all or any of said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation
 Per: *[Signature]* Date: 7/30/21
 Per: *[Signature]* Date: 7/30/21

Mark with "X" or "RQ" if appropriate to identify hazardous materials. Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading, does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Date: 9-17-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1074-2B

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
CITY/State/Zip: SULPHUR LA 70665	
Phone: (337) 683-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 048781 088	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (480) 228-1624	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	Date:
Per:	
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 336-2169
Acknowledgement of Receipt	Date:
Per: <i>[Signature]</i>	9/17/21

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CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SUITE PHUR, LA 70665

RECEIVING TICKET # _____ 1011604 _____
WEIGHED BY _____

10/11

Bill of Lading (Page 1 of 2)

762950

DOCUMENT# 91074-20

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7173 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2160

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M L.L.C.
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 048791 000
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Castro

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.1.1 (BENZENE) PROFILE: 868843LA	CM	23.18	T
		IM CONTAINER# EPIU228304			
		RAIL CAR# EPIX81074 2			
		ERG# 171 HC3F			

RECEIVED subject to the conditions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line designated in or on any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing Tariff in effect on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 Carrier: CSX Transportation
 Date: 7/29/21
 Date: 7/30/21
 Per: *Luis Castro*

Mark with "X" or "RC" if applicable to designate Hazardous materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 112.2C1(b)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 112.204(a) of the Federal Regulations, as indicated on the Bill of Lading form apply, unless a specific exception form 20 requirement is provided in the Regulation for a particular material.

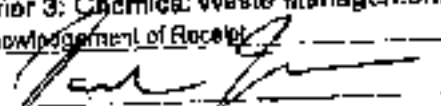
Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carmie Demboleanu*
 Date: 9-17-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01074-2C

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7470 JOHN BRANNON ROAD	
EPA ID: LAD00077201	
City/State/Zip: SULPHUR LA 70685	
Phone: (837) 883-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 0407P1 088	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: 	Date: 9-17-21

1 (214) 300 2007
10/31/16

TO: [unclear] 10/31/16
FROM: [unclear] 10/31/16
DATE: 09/17/2016

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WT 10/31/16 11 30814.0

WT 25.50 16

10/31/16 09/17/2016

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 10280

WEIGHED BY _____

10/31/16

10/31/16

762969

Bill of Lading (Page 1 of 2)

DOCUMENT# 91474-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048781 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.41(a) 1241

Travis

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 9.111 (BENZENE) PROFILE: 868843LA	CM	23.70	T
		IM CONTAINER# EPIU225037 RAIL CAR# EPIX91074-2			
		ERG# 171 H339			

RECEIVED subject to the classifications and UN/NA in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and shipped as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under this contract) agrees to deliver to the actual place of delivery as indicated above. If on its route, whether to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination one or to each party at any time interspersed in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Transportation

Per: *Lucia Castro* Date: *7/30/21*

Mark with "X" or "RQ" is appropriate to describe Hazardous Materials Situations as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (4) of the Federal Regulations. Also, where shipping hazardous materials, the shipper's certification statement, as provided in Section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per: *Amanda DeWitt/A DeWitt* Date: *9-17-21*

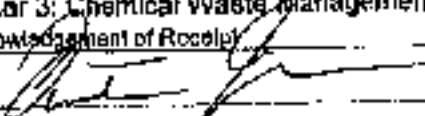
762969

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# R1074-2D

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000777201	
City/State/Zip: SULPHUR LA 70865	
Phone: (337) 583-2189	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 048791 068	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt:	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	
LA0000147272 (800) 336-2189	
Acknowledgment of Receipt:	
Per: 	Date: 9-17-21

7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

TEL: 337-533-1111
FAX: 337-533-1112

RECEIVED DATE: _____

WEIGHT: _____
TYP: _____
EST: _____

BY: _____
DATE: _____

(11)

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 7105368

WEIGHED BY _____

11/11

11/11/11

Bill of Lading (Page 1 of 2)

DOCUMENT # 91074-21

762974

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD00077201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048791 C86
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1247

T. Davis

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Liability
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 969843LA	CM	23.88	T
		1M CONTAINER# EPIU226298			
		RAIL CAR# EPIX91074-2			
		ERG# 171 H039			

RECEIVED subject to the classifications and rules in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If any route, otherwise to deliver to another carrier or to another place to said destination, the carrier mutually agreed to with each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, the carrier service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the sub-terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation

Per: *[Signature]* Date: 7/28/21
 Per: *Luis [Signature]* Date: 7/30/21

Mark with "X" or "RCY" appropriate to describe hazardous materials. Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of lading 49 CFR 171.15(b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials

Per: *Carrie Embodaux* Date: 9-20-21

Bill of Lading (Continuation Sheet) 2 of 2

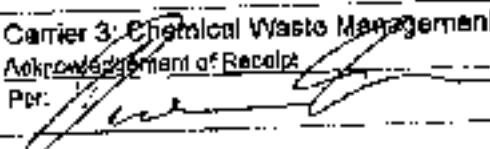
DOCUMENT# 91074-2E

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70869
Phone: (337) 683-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt
Per: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc
Acknowledgement of Receipt
Per:  Date: 9-20-21
LA0000147272 (800) 336-2169

EMU-25299

22840
21860
11/1980
23.99

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762976

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

762970

DOCUMENT # 91074-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: EUNING LA 70865
 Phone: (337) 593-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAC 049781 008
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Jones 4/20/01

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT.
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. R 11: (BENZENE) PROFILE: 608643LA IM CONTAINER# EPIU225283 RAIL CAR# EPIX91074-2 ERG# 171 H039	GM	23.00	T

RECEIVED subject to the date of issue and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as indicated herein. If on its route, otherwise to deliver to another carrier on the route to said destination, it is equally bound as in each carrier of all or any of said property, over all or any portion of said route to destination and as in each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Transportation Per:
 Per: *[Signature]* Date: *7/30/01*
 Date: *7/30/01* Per: *Luis Castro*

Mark with "X" or "RD" in appropriate designated Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Destination: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Ambrose* Date: *9-17-01*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81074-2F

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70855	
Phone: (857) 333-2189	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 048781 008	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147772 (800) 333-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Conde</i>	Date: <i>9/17/2021</i>

EPL4225283
TICKET 51

ID 652597
GROSS 73900 lb INHOLAND
12:42PM 09/17/2021

OUTBOUND TICKET 51

GROSS 76900 lb RECALLED
TARE 32600 lb
NET 46300 lb

NET 23.15 TON

12:53PM 09/17/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

762920

WEIGHED BY _____

26-2809
 29

Bill of Lading (Page 1 of 2)

DOCUMENT # 1085-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70085
 Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 314-4 PASSYUNK AVE
 EPA ID: PA0000049781006
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 231.4(a) 1241

Tristo 4/8/21

SHIPPER'S INSTRUCTIONS

[Signature]

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Weight
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. B.II (BENZENE) PROFILE: 088843LA IM CONTAINER# EPIU220110 RAIL CAR# EPIK91085 EAGS 171 H039	CM	24.10	T

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted in good order, except as noted (contents and condition of packages unknown), marked, consigned, and delivered as indicated above which said carrier (the word carrier being understood through this contract to mean any person or corporation that performs the transportation of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of its route to destination and as to each party at any time interested in all or any said property, that every service to be performed thereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is hereunto bound with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Port: *[Signature]* Date: *8/4/21* Per: *Luis Castro* Date: *8/6/21*

Mark with "X" or "RD" if applicable to designate Hazardous Materials Substances as defined under Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201(a)(5)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception for the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: *9-10-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1085-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC.
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2188

Shipper: PHILADELPIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 019781 090
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 220-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2188	
Acknowledgement of Receipt	
Per: <i>Joseph C. [Signature]</i>	Date: 9/10/2021

25110

TICKET 55

ID 652592..
GROSS 81340 lb INBOUND
12:36PM 09/10/2021

OUTBOUND TICKET 55

GROSS 81340 lb RECALLED
TARE 32360 lb
NET 48980 lb
NET 24.49 TON

02:41PM 09/10/2021

COO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 762809

WEIGHED BY _____

4.11

762813

Bill of Lading (Page 1 of 2)

DOCUMENT # 91085-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777207
 City/State/Zip: SULPHUR LA 70088
 Phone: (337) 868-3168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048791 080
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VME TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Tank 4882

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Weight
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 2. III (BENZENE) PROFILE: 988843LA	GM	24.16	T
		IM CONTAINER# EPIU225342			
		RAIL CAR# EPIX81095			
		ERG# 171 H030			

NH

RECEIVED subject to the clarifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above with and carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or other destination. If on its route, otherwise to refer to another carrier on the route in said destination, it is mutually agreed as to each carrier of or any of said property, error of or any portion of said route in destination and as to each party at any time interested in or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/4/21
 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "H" if applicable to describe the Hazardous Materials Substances as defined in the Department of Transportation Regulations covering the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a)(1) (B) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certificate statement provided in section 172.204 (a) of the Federal Regulations, as indicated on the Bill of Lading does apply. Indicate a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Pemberton* Date: 9-10-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1085-2B

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000077201	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 683-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3143 PASSYUNK AVE	
EPA ID: PAD 048781 088	
City/State/Zip: PHILADELPHIA, PA 19141	
Phone: (484) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Josa Logan</i>	Date: <i>9-10-2021</i>

EPIU225342

TICKET 65

ID 653501
GROSS 79380 lb INBOUND
01:56PM 09/10/2021

OUTBOUND TICKET 65

GROSS 79380 lb RECALLED
TARE 30468 lb
NET 48912 lb

NET 24.46 TON

03:26PM 09/10/2021

1-CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

762813

RECEIVING TICKET # _____

WEIGHED BY _____

42115

1.57111

202790

Bill of Lading (Page 1 of 2)

DOCUMENT # 91085-2C

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2189

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049781 016
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 220-1924

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Tides 48883

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RD, UN3077, ENVIRONMENTAL LY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 8. II (BENZENE) PROFILE: 888648LA IN CONTAINER# EPIU226788 2M RAIL CAR# EPX91085	CM	23.60	T
		ER06 171 H038			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in separate good order, except as noted (quantity and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (who would carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of pay (who is intended in all or any of said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification of the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/4/21
 Per: Luis Castro Date: 8/16/21

Mark with "X" or "IC" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation 49 CFR 172.101(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement: provided in section 172.101(a) of the Federal Regulations, as indicated on the Bill of Lading does not, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carmie Chubody* Date: 9-10-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1085-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70985
Phone: (337) 683-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M L.L.C
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 225-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Derrick Lee,</i>	Date: <i>9-10-21</i>

EPI4223178
TICKET 25

ID 653375
GROSS 79680 lb INBOUND
09:21AM 09/10/2021

OUTBOUND TICKET 25

GROSS 79680 lb RECALLED
TARE 12980 lb
NET 66700 lb

NET 23.35 TON

11:07AM 09/10/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

Revised weight of 1-10-21
702790

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

262289

DOCUMENT # 91085-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADD0077201
City/State/Zip: SULPHUR LA 70606
Phone: (337) 593-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 08A
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Ticket # 18884

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	TEMP
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 988543LA	CM	23.23	T
		IM CONTAINER# EPIU228360			
		RAIL CAR# EPIK81085			
		ERG# 171 H030			

NH

RECEIVED subject to the conditions and tariffs in effect as the date of the issue of this Bill of Lading, the property described above is accepted in good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through its context as meaning any person or corporation in possession of the property under the contract) agrees to carry to the place of delivery as each destination. If made route, otherwise (additive to another order on the route to said destination, if it is actually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party in any line transported in all or any said property, full and complete to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the tariffs and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: C&D Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "H" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading. (49 CFR 171.15) (a) (1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on this Bill of Lading, does apply, unless a specific exception from the requirement is provided in the regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 9-10-21

Carrie Ambodeaux

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91086-2D

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LAD000777201	
City/State/Zip: SULPHUR LA 70885	
Phone: (537) 383-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M H.C.	
Street: 3344 PASSYUNK AVE	
EPA ID: PAD 048791 028	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 228-1624	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LAC000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per: <i>[Signature]</i>	Date: 9-10-21

EP142236

TICKET 23

ID 653501
GROSS 77540 lb INBOUND
09:04AM 09/10/2021

OUTBOUND TICKET 23

GROSS 77540 lb RECALLED
TARE 30600 lb
NET 46940 lb

NET 23.47 TON

10:48AM 09/10/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

762789

WEIGHED BY

2039412-011371

Handwritten signature and notes

Bill of Lading (Page 1 of 2)

DOCUMENT# 91085-2E

762786

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70665
 Phone: (837) 683-2100

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PABBYLUNKAVE
 EPA ID: PAD 049791 008
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.40(g) 1241
 Tickets 4888-5

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	COM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. R.H (BENZENE) PROFILE: 888043LA IM CONTAINER# EPIU225129 RAIL CAR# EPIX81085	CR6	24.18	T
		ERG# 171 H038			

N/A

RECEIVED subject to the classification and tariffs in effect on the date of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), received, equipped and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If said article, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of or to any of said property, over all or any portion of said route to destination, and as to each party of any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: C&X Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: Luis Castro Date: 8/6/21

Mark with "X" or "RD" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exemption from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *[Signature]* Date: 9-10-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91065-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: BULPHUR LA 70556
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 278-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
For:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2169	
Acknowledgement of Receipt	
For: <i>Joseph [Signature]</i>	Date: 9/10/2021

EPH223129

TICKET 19

10 652592
GROSS 81300 lb INBOUND 300
08:36AM 09/10/2021

OUTBOUND TICKET 19

GROSS 81300 lb RECALLED
TARE 32480 lb
NET 48820 lb
NET 24.41 TON
10:05AM 09/10/2021

54

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

762786

WEIGHED BY

Bill of Lading (Page 1 of 2)

702620

DOCUMENT# 91085-2T

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LADD0077201
 City/State/Zip: SULPHUR LA 70885
 Phone: (837) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 040791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 226-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
Ticket # 4886

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNIT
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 980843LA IM CONTAINER# EPIU225928 RAIL CAR# EPIX01085 ERG# 171 H339	CM	24.10	T

RH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above to appear in good order, except as notes (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If en route, otherwise in delivery to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, that all or any portion of said route is deposited and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Fer: *Luis Castro* Date: 8/6/21

Mark this "X" or "RQ" as appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of OAS column is an optional method for identifying hazardous materials on Bill of Lading 172.201(a)(1) 115 of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Amanda Deville/A Deville* Date: 09-02-21

702620

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91086-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7176 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70866
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASBYUNKAVE
EPA ID: PAC 048781 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (484) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 396-2100	
Acknowledgement of Receipt	
Per: <i>Joseph [Signature]</i>	Date: 9/11/2021

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

Handwritten number: 713000

WEIGHED BY

Bill of Lading (Page 1 of 2)

DOCUMENT# 91060-2A

762857

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SU1P|LJ|LA 70866
 Phone: (337) 883-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3114 PASEYUNKAVE
 EPA ID: PAD 019791 008
 City/State/Zip: PHILADELPHIA, PA 19148
 Phone: (480) 228-1574

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
Ticket 4882

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LT/M ...
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: 889843LA	CM	23.70	T
		1M CONTAINERS EPIU225183			
		RAIL CAR# EPX91080			
		EROP 171 H039			

NH

RECEIVED subject to the classification and title in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If at the date of delivery another carrier or carriers are to be used, this is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 9/4/21 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "RC" to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201(f)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemikal Waste Management, Inc Certification of receipt of materials

Per: *Carme Ambroseaux* Date: 9-14-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01080-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC.
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 090
City/State/Zip: PHILADELPHIA, PA 19148
Phone: (480) 228 1024

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 330-2169	
Acknowledgment of Receipt	
Per: <i>Doreen Carey</i>	Date: <i>9.19.21</i>

111
EPI422593

TICKET 12

ID 653375
GROSS 82040 lb INBOUND
09:06AM 09/14/2021

OUTBOUND TICKET 12

11
11
GROSS 82040 lb RECALLED
TARE 34740 lb
NET 47300 lb

NET 23.85 TON

11:05AM 09/14/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

9

RECEIVING TICKET #

762857

WEIGHED BY

8415

11.75.11.15 P.112

Bill of Lading (Page 1 of 2)

DOCUMENT# 91060-2B

762569

10

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN HANBON ROAD
 EPA ID: CADD0977201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 883-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 006
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (443) 228-1524

ADDITIONAL INFORMATION
 VNE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Tickets 48853

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WGT
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.9 (BENZENE) PROFILE: 969843LA	GM	24.38	T
		IM CONTAINER# EPH226353			
		RAIL CARN EPIX8109C			
		ERG# 171 H034			

NH

RECEIVED subject to the classifications and titles in effect on the date of the issue of this Bill of Lading the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above when said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination. If on the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification or the rules of shipment. Shipper hereby certifies that it is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC | Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: Luis Castro Date: 8/6/21

Mark with "R" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of Hazardous Materials. The use of this code is an optional method for identifying hazardous materials on bills of Lading 49 CFR 171.15(c)(1) (b) or Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certificate statement prescribed in section 172.204(a) of the Federal Regulations, as indicated in the Bill of Lading Code apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc | Certification of receipt of materials
 Per: *[Signature]* Date: 9-14-21

Bill of Lading (Continuation Sheet) 2 of 2

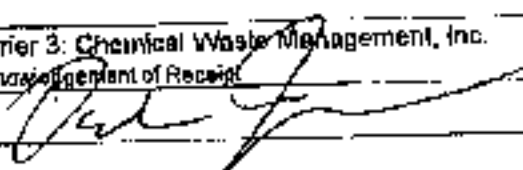
DOCUMENT# 91080-26

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077261
City/State/Zip: SULLPHUR LA 70891
Phone: (337) 693-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3146 PASSYUNK AVE
EPA ID: PAD048781088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 220-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA00001472 / 2 (800) 336-2169
Acknowledgement of Receipt	
Per: 	Date: 9.14.21

TICKET # 225353

ID 653168
GROSS 83640 1b INBOUND
12:05PM 09/14/2021

OUTBOUND TICKET 38

GROSS 83640 1b RECALLED
FARE 34360 1b
NET 49280 1b
NET 24.84 TON

02:11PM 09/14/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 262809

WEIGHED BY _____

415

Bill of Lading (Page 1 of 2)

70253

DOCUMENT # 91060-20

TO

FROM

Company: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANKIN ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR, LA 70855
 Phone: (337) 683-5188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 006
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 226-1824

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

T. Roberts *8/14/21*

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	TEMP
X	1	RO UN9077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 009543LA IM CONTAINER# RPIU225322 RAIL CAR# EPIX91000 ERG# 171 H039	CM	23.75	T

NH

RECEIVED subject to the classification and labels in effect on the date of this Bill of Lading, the property described above is apparent gross weight, except as noted (contents and contents of packages unknown), marked, consigned and certified as indicated above which said owner, (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or other destination, if on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and the tariffs and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/14/21 Per: Luis Castro Date: 8/16/21

Mark with "X" or "RC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this option is an optional method for identifying hazardous materials on Bills of Lading 49 CFR 172.201(a)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Chamberlain* Date: 9-14-21

Bill of Lading (Continuation Sheet) 2 of 2

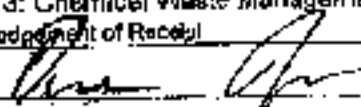
DOCUMENT# B1080-2C

TO

FROM

Company: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 008
City/State/Zip: PHILADELPHIA, PA 18145
Phone: (440) 228-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	LA0000147272 (800) 336-2189
Acknowledgement of Receipt	
Per: 	Date: ' / /

10/11/88

10/11/88

10/11/88

10/11/88

10/11/88

10/11/88

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

700853

WEIGHED BY

Bill of Lading (Page 1 of 2)

DOCUMENT # 91060-2D

Handwritten signature/initials

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYLUNG AVE
 EPA ID: PA0 048701 008
 City/State/Zip: PHILADELPHIA, PA 19149
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Handwritten: T. Webb 4/8/22

SHIPPER'S INSTRUCTIONS

Blank area for shipper's instructions.

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CLASS
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.II (BENZENE) PROFILE: 889843LA	CM	24.30	T
		IM CONTAINER# EPIU225185			
		RAIL CAR# EPKB1080			
		ERG# 171 H039			

NH

RECEIVED subject to the classification and limits in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unless noted), marked, counted and weighed as indicated above which said carrier (the said carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, it is necessary to deliver to another carrier on its route to said destination, it is hereby agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every action to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: Luis Castro Date: 8/6/21

Mark with "X" or "RC" if appropriate in design for Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) [19 of Title 49, Code of Federal Regulations]. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carme Dubordeaux* Date: 9-14-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81080-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&E LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 278-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc	LA0000147272 (800) 938-2160
Acknowledgement of Receipt	
Per: <i>[Signature]</i>	Date: 9/14/2021

EPI/422 > 100

TICKET 10

ID 652592
GROSS 81240 lb INBOUND
08:56AM 09/14/2021

OUTBOUND TICKET 10

GROSS 81240 lb RECALLED
YAREL 32120 lb
NET 49120 lb

NET 24.56 TON

10:29AM 09/14/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

762856

RECEIVING TICKET # _____

WEIGHED BY _____

*11/5

J. W. ... B712

Bill of Lading (Page 1 of 2)

DOCUMENT # 91060-2E

762876

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD30077201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 663-2186

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 5146 PASSYUNK AVE
 EPA ID: PAD 040791 098
 City/State/Zip: PHILADELPHIA, PA 19140
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

T. J. Davis 8/25/21

HAZARDOUS MATERIAL NO. EMITTING UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

HAZARDOUS MATERIAL	NO. EMITTING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 088843LA IN CONTAINERS EPIU226284 RAIL CARR EPIX91080 ERG# 171 H039	CM	24.25	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted and carrier (the word carrier being understood through this contract to include any person or corporation in possession of the property under the contract) agrees to carry to the consignee or delivery or other destination, if on its route, changing business to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in or over said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions to the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/4/21
 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "RQ" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(e)(3) (a) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designation: Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Cassie Ambrose* Date: 9-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91080-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70833
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD-049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 296-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2169
Acknowledgement of Receipt	
Per: <i>Daniel C. Cooney</i>	Date: <i>9-14-21</i>

EP14223207

TICKET 47

ID 653375
GROSS 83200 lb INBOUND
01:27PM 09/14/2021

OUTBOUND TICKET 47

GROSS 83200 lb RECALLED
FARE 30760 lb
NET 49160 lb

NET 24.58 TON

02:55PM 09/14/2021

10

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

702876

RECEIVING TICKET # _____

WEIGHED BY _____

7/15

762875

Bill of Lading (Page 1 of 2)

DOCUMENT # 91060-27

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Tided 4/9/21</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 8. III (BENZENE) PROFILE: 888843LA	GM	22.84	T
		1M CONTAINER# EPIU225358			
		RAIL CAR# EPIX01090			
		ERG# 171 H030			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: Luis Castro Date: 8/6/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management Inc Certification of receipt of materials

Per: *Carrie Dubouchaux* Date: 9-14-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91080-2F

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC.
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000717201
City/State/Zip: SULPHUR LA 70080
Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 098
City/State/Zip: PHILADELPHIA, PA 19143
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company Acknowledgement of Receipt	Date:
Per:	
Carrier 3: Chemical Waste Management, Inc. Acknowledgement of Receipt	LA0000147272 (800) 338-2189
Per: <i>Joseph</i>	Date: <i>9/7/14 (2014)</i>

EP1422224
TICKET 45

ID 652592
GROSS 78320 lb INBOUND
01:13PM 09/14/2021
OUTBOUND TICKET 45

GROSS 78320 lb RECALLED
TARE 32600 lb
NET 45720 lb

NET 22.86 TON
02:31PM 09/14/2021

⓪

1431

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

32600
45720

⓪

702875

RECEIVING TICKET # _____

WEIGHED BY _____

4415

1.105.14.2021

202036

Bill of Lading (Page 1 of 2)

DOCUMENT# 91506-2A

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7575 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SHU, PHUR LA 70065
 Phone: (337) 883-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PABSYUNKAVE
 EPA ID: PA0 049781 080
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 220-1624

ADDITIONAL INFORMATION
 VNE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Tickets 48875

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LDW
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.11 (BENZENE) PROFILE: 6608431A IM CONTAINER# EPIU226228 RAIL CAR# GPIX91508 ERG# 171 11038	GM	23.33	T

NH

RECEIVED subject to the classifications and limits in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (portions and condition of packages unknown), marked, counted and sealed as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the destination of delivery as said destination. If on the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/14/21
 Per: Luis Castro Date: 8/16/21

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Subject to 49 CFR as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this option is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of 49 CFR, Code of Federal Regulations, and, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(a) of the Federal Regulations, as indicated on the Bill of Lading form apply, unless a specific exception from the requirements provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials
 Per: *[Signature]* Date: 9-13-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# D1608-2A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: SULPHUR LA 70885	
Phone: (507) 683-2168	

FROM	
Shipper: PHILADELPHIA ENERGY 501 UTRONS R&M LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 048791 088	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 226-1624	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Conner</i>	Date: 9/13/2021

10/10/85

10/10/85

10/10/85

10/10/85

CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # 110285p

WEIGHED BY ...

Bill of Lading (Page 1 of 2)

762842

DOCUMENT # 91506-21

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 588-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 9144 PASSEYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1574

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.118 1241

Tiket 48876

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	TEMP
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.11 (BENZENE) PROFILE: 9088431 A IM CONTAINER# EPIU225200 RAIL CAR# ETIX91508 ERG# 111 1038	CM	23.98	T

NH

RECEIVED subject to the classification and labels in effect on the date of the issue of this Bill of Lading. The property described above is apparent, good order, except as stated (quantity and condition of packages unknown), marked, cubed and sealed as indicated above with said carrier who used carrier being understood through this contract as insuring any package or container in possession of the property under the contract upon to carry to the usual place of delivery or such destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, control or any portion of said route to destination and as to each party at any time incidental to or any said property, that every contract to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 2/4/21
 Per: *Luis Castro* Date: 2/10/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for marking hazardous materials on Bills of Lading 49 CFR 172.201(b)(1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper is required to comply with the provisions in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading that apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Manda Davis/O'Deville* Date: 02-13-21

76284

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91508-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3141 PASSYUNK AVE
EPA ID: PAD 019781 000
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 220-1924

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Derrick</i>	Date: <i>9.13.21</i>

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1003

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 1003
WEIGHED BY _____

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01506-20

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA0000777201	
City/State/Zip: BULPHUR LA 70086	
Phone: (837) 583-2169	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS RRM LLC	
Street: 3144 PASSYUNKAVE	
EPA ID: PAD 08791 DRB	
City/State/Zip: PHILADELPHIA, PA 19146	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgment of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2189
Acknowledgment of Receipt	
Per: <i>Dennis Casey</i>	Date: <i>9-13-21</i>

11/17/93

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100-1-1

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

100-1-1

RECEIVING TICKET #

100-1-1

WEIGHED BY

762820

Bill of Lading (Page 1 of 2)

DOCUMENT # 91506-2D

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
Address: 7170 JOHN BRANNON ROAD
EPA ID: LAJ006777201
City/State/Zip: SULPHUR LA 70663
Phone: (337) 589-2100

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASEYUNK AVE
EPA ID: PAD 049781 090
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1924

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241

Tichon

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & CAPTIONS	Type	Volume	COGS
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU225378 RAIL CAR# EPIXB1506 ERG# 171 H039	CM	24.03	T

NA

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (quantity and condition of packages unknown), marked, counted and certified as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or to the destination. If en route, otherwise to another carrier or to a place to said destination, it is mutually agreed as to each carrier at all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in at or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: Luis Castro Date: 8/6/21

Mark with "X" or "H" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper certifies statement prescribed in 172.201(a) of the Federal Regulations, as indicated on the Bill of Lading copy only, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials

Per: *Amanda Deutch Schultz* Date: 9-13-21

702820

Bill of Lading (Continuation Sheet) 2 of 2

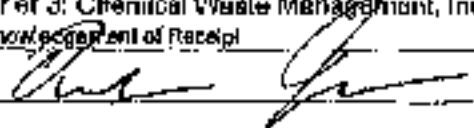
DOCUMENT# 91608-2D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7570 JOHN BRAINNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 583-2588

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 040781 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2169	
Acknowledgement of Receipt	
Per: 	Date: 9-13-21

7/6/21

Bill of Lading (Page 1 of 2)

DOCUMENT # 91506-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000772D1
 City/State/Zip: GULFPORT LA 70306
 Phone: (337) 583-2588

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 2144 PASSYUNK AVE
 EPA ID: PAD 649791 090
 City/State/Zip: PHILADELPHIA, PA 19148
 Phone: (480) 220-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241
 T. J. [Signature]

SHIPPER'S INSTRUCTIONS

[Empty box for shipper's instructions]

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	U.M.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.L. (BENZENE) PROFILE: 989843LA	GM	24.18	T
		IM CONTAINER# EPIU225204			
		RAIL CAR# EPIK91506			
		ERG# 171 H038			

NA

RECEIVED subject to the classification and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), packed, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on the route, otherwise to deliver to another carrier on the route to said destination, the carrier agrees as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: [Signature] Date: 8/4/21
 Per: Luis Castro Date: 8/6/21

Mark with "X" or "HC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column as an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper certifies statement provided in section 172.204(a) of the Federal Regulations, as included on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: [Signature] Date: 9-13-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01508-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777206
City/State/Zip: SULPHUR LA 70066
Phone: (337) 383-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&W LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 008
City/State/Zip: PHILADELPHIA, PA 10145
Phone: (410) 228-1824

Carrier 2: BNSF Railway Company Acknowledgement of Receipt	
Per: _____	Date: _____
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 386-2189	
Acknowledgement of Receipt	
Per: <i>Joseph C. [Signature]</i>	Date: <i>9/13/2021</i>

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

263818

WEIGHED BY _____



2025/1

Bill of Lading (Page 1 of 2)

DOCUMENT# 91506-25

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777207
City/State/Zip: SULPHUR LA 70085
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 068
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>1241</i> 48880

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	TYPE	VOLUME	UOM
X	1	RD UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 8.11 (BENZENE) PROFILE: 959849LA	CM	23.88	T
		IN CONTAINER# EPIU228208			
		RAIL CAR# EPIX91508			
		ERG# 171 11930			

NH

RECEIVED subject to the class, conditions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is received in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and weighed as indicated above with said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agree to carry for the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to as the Bill of Lading terms and conditions in the governing classification and tariff same and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp
Per: <i>[Signature]</i>	Date: 8/19/21
Per: Luis Castro	Date: 8/16/21

Mark with "X" or "RD" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading (49 CFR 172.201(b)(1)) (49 of Title 49, Code of Federal Regulations). Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Carrie Dubodreau</i>	Date: 9-10-21



Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1506-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADM0077201
City/State/Zip: SULPHUR, LA 70885
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 048781 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2189	
Acknowledgement of Receipt	
Per: <i>[Signature]</i>	Date: <i>9/10/21</i>

EP14225208

TICKET 62

ID 653375

GROSS 81440 1b INBOUND

01:35PM 09/10/2021

OUTBOUND TICKET 62

GROSS 81440 1b-RECALLED
TARE 32940 1b
NET 48500 1b

NET 24.25 TON

03:03PM 09/10/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

CP

RECEIVING TICKET # 762511

WEIGHED BY _____

4415

11.29 11/23/19 712

Bill of Lading (Page 1 of 2)

DOCUMENT# 91434-3A

703158

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70886
 Phone: (337) 583-2160

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 038781 088
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Tickets 48804

HAZARDOUS MATERIAL

NET SHIPPING UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

			Type	Volume	UOM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.U.S. 9.11 (BENZENE) PROFILE: 999843EA	CM	23 20	T
		IM CONTAINER# EPIU225143			
		RAIL CAR# EPIK91431			
		ERG# 171 HC36			

NH

RECEIVERS subject to the classification and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, weight as noted (gross and condition of packages unknown), marked, numbered and destined as indicated above which said carrier (the word carrier being understood through this contract to mean any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination, if en route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is in full compliance with all the Bill of Lading terms and conditions in the governing classification and the conditions and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

[Signature]

Date:

8/4/21

Per:

Luis Castro

Date:

8/16/21

mark with "X" or "R" is responsible to designate hazardous materials substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is optional method for designating hazardous materials on Bill of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's notification statement prescribed in section 172.203(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Ambodeaux

Date:

9-29-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01434-3A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70066
Phone: (537) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048701 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 278-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. A0000147272 (800) 336-2169	
Acknowledgement of Receipt	
Per: <i>Joseph Coville</i>	Date: <i>9/29/2021</i>

Bill of Lading (Page 1 of 2)

763159

DOCUMENT # 91434-3R

10

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777261
City/State/Zip: SULPHUR LA 70965
Phone: (337) 583-2188

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 036
City/State/Zip: PHILADELPHIA, PA 19140
Phone: (480) 228-1624

ADDITIONAL INFORMATION
VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(f) 1241
<i>Ticket 48845</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZENE) PROFILE: 8090431X	CM	23.75	T
		IM CONTAINER# EPU225327			
		RAIL CARN# EPXB1434			
		FROM 771 H030			

MM

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above with said carrier (the word carrier being understood through the context as including any person or corporation in possession of the property under the contract agreed to carry to the usual place of delivery as said destination, or on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier at all or any of said property, now or at any portion of said route to destination and as to each party at any time interrupted in and or any said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CEX Railroad Corp
Per: <i>C. Castro</i>	Date: <i>8/4/21</i>
Per: <i>Luis Castro</i>	Date: <i>8/6/21</i>

Mark with "X" or "NO" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(a) of the Federal Regulations, as indicated on this Bill of Lading shall apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Carmie Dumbodjay</i>	Date: <i>9-29-21</i>



Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91434-3B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 717D JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 593-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 8114 PASSYUNK AVE
EPA ID: PA0 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 228-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Lashon Bellan</i>	Date: <i>9-29-21</i>

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, VA 70665

RECEIVING TICKET #

263137

WEIGHED BY _____

763149

Bill of Lading (Page 1 of 2)

DOCUMENT # 91434-30

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LADD0077701
 City/State/Zip: SULPHUR LA 70666
 Phone: (337) 583-2100

Shipper PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASBYUNKAVE
 EPA ID: PAD 040781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1024

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 12A1

Treated 4/8/20

SHIPPER INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 180843LA IM CONTAINER# EPIU225338 RAIL CAR# EPIX91434 ERG# 171 1038	CM	23.86	Y

NA

RECEIVED subject to the conditions and terms in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order except as noted (contents and condition of packages unknown), packed, consigned and destined as indicated above which said carrier (who was carrier being unloaded through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier or to the usual place of destination, it is mutually agreed as to each party of said property, then every article to be so transported hereunder shall be subject to all the Bill of Lading laws and conditions in the governing jurisdiction on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading laws and conditions in the governing jurisdiction and the said laws and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "10" all applicable to designate Hazardous Materials as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.504(a)(1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as set forth on the Bill of Lading does apply, unless a specific exception from the requirement is provided to the Regulator for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Amanda Davis / G. DeWitt* Date: 09-28-21

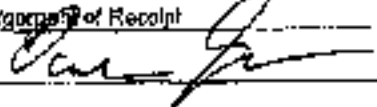
763149

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81434-30

TO
Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70066
Phone: (337) 583-2100

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PA0 048701 048
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2168	
Acknowledgement of Receipt	
Per: 	Date: 9-28-21

Bill of Lading (Page 1 of 2)

763150

DOCUMENT# 91434-311

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70065
 Phone: (337) 595-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 2144 PASSYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1521

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241

SHIPPER'S INSTRUCTIONS

Tanks 4884

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	MOU
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.10 (BENZENE) PROPILE: 000043CA	CM	23.80	T
		44 CONTAINERS# EPIR225346			
		RAIL CAR# EPIX81434			
		ERG# 171 H339			

NIP

RECEIVED subject to the descriptions and terms specified on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the ware carrier being understood) through this contract is making any person or corporation in possession of the property under the contract agree to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *8/4/21* Per: *Luca Castro* Date: *8/6/21*

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Exempt from the Department of Transportation Regulations governing the transportation of hazardous materials. This use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (3) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(g) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: *9-28-21*

Amended 16/19/21

7603150

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91434-3D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 040701 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 333-2168
Acknowledgement of Receipt	
Per: <i>Joshua Bellard</i>	Date: <i>9-28-21</i>

EP14 023 540
TICKET 40 A2

ID 653204
GROSS 82400 16 INBOUND
01:22PM 09/28/2021

(OUTBOUND TICKET) 40

GROSS 82400 16 RECALLED
TARE 35020 16
NET 47380 16

NET 23.73 TON

03:23PM 09/28/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763150

WEIGHED BY _____

21110

Bill of Lading (Page 1 of 2)

DOCUMENT # 91434-3E

763155

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LADD0077201
 City/State/Zip: SLUSHUR LA 70086
 Phone: (337) 683-2789

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 0407R1 088
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Totals: 48848

SHIPPER'S INSTRUCTIONS

Blank area for shipper's instructions.

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: 989843A IM CONTAINER# EPIU2261849 5189 (B) RAIL CAR# EPIX91434 ERG# 171 H030	GM	24.40	T

MH

RECEIVED subject to the classifications and bills of lading on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), method of packing and destined as indicated above and carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) is ready to carry to the usual place of delivery as indicated. If as its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed by the each carrier at all or any of said property, then all or any portion of said route is destination and as to each party at any time indicated in all or any said property, then every device to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the conditions and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: 8/4/21
 Per: Lucia Castro Date: 8/6/21

Mark with "X" or "RQ" if appropriate to designate hazardous materials substances as defined in the Department of Transportation Regulations governing the transport of hazardous materials. The use of this column is an optional method for identifying hazardous materials or HLE of Lading 172.201 (b)(1) (i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *[Signature]* Date: 9-29-21

Bill of Lading (Continuation Sheet) 2 of 2

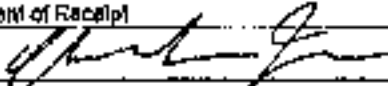
DOCUMENT# 91434-3E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2100

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA11 040701 020
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1824

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2160	
Acknowledgement of Receipt	
Per: 	Date: 9-29-21

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

263/83

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

703151

DOCUMENT # 91434-3F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRAINON ROAD
 EPA ID: LA0000777201
 City/State/Zip: BULPHUR LA 70085
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 006
 City/State/Zip: PHRADELPHIA, PA 19148
 Phone: (410) 229-1524

ADDITIONAL INFORMATION

SHIPPER'S INSTRUCTIONS

VNE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.11(a) 124f
 Ticked 4/24/21

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	COM
X	1	RD UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., B.II (BENZENE) PROFILE: 608643CA	GM	23.33	T
		IM CONTAINERS# EPIU225038			
		RAIL CAR# EPIX01434			
		ERG# 171 H339			

NH

RECEIVED subject to the specifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (quantity and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through the contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery, as so designated. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination, not be to each party at any time indicated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and special terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/14/21 Per: Luis Castro Date: 8/16/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of "RD" herein is an optional method for designating hazardous materials in Bills of Lading (172.201(a)(1)) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the appropriate certification statement provided in section 172.201(c) of the Federal Regulations, as indicated by the Bill of Lading does apply, unless a specific exception from the requirement is provided in the regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc. Certification of receipt of materials

Per: *[Signature]* Date: 9-28-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01484-3F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2160

Shipper: PHILADELPHIA ENERGY SOLUTIONS H&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 338-2160
Acknowledgement of Receipt	
Per: <i>Joseph Courville</i>	Date: <i>9/28/2021</i>

EP14223038

TICKET 41

TO 653153
GROSS 82260 lb INBOUND
01:25PM 09/28/2021

OUTBOUND TICKET 41

GROSS: 82260 lb RECALLED
FARE: 35200 lb
NET 46980 lb
NET 23.49 TON

03:50PM 09/28/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763151

WEIGHED BY _____

WBE 1108

DU 114310-211

763248

Bill of Lading (Page 1 of 2)

DOCUMENT# 91436-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULLY LA 70665
Phone: (837) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 226-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(d) 1241
<i>T. DeWitt 11/19/21</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 0, III (BENZENE) PROFILE: 088543LA	CM	23.78	T
		IN CONTAINER# EPIU226359			
		RAIL CAR# EPIX91436			
		ERG# 171 H330			

NH

RECEIVED subject in the conditions and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the stated place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that it is so certified with all the Bill of Lading terms and conditions to the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	Carrier: CSX Railroad Corp
Per: <i>[Signature]</i>	Date: 8/9/21
Per: <i>Luis Castro</i>	Date: 8/6/21

Mark with "X" or "RD" appropriate designations for Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201(a)(1) (2) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc	Certification of receipt of materials
Per: <i>Monica DeWitt / A DeWitt</i>	Date: 10-04-21

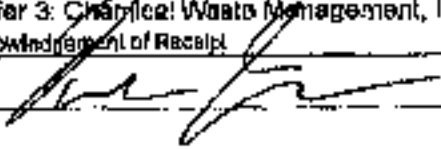
763248

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 61436-2A

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000077201	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 583-2160	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC	
Street: 3144 PAGBYUNWAVE	
EPA ID: PA0 046791 085	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (440) 228-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: 	Date: 10-4-81



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

053204

0091430-2B

703204

Bill of Lading (Page 1 of 2)

DOCUMENT # 91436-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7110 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SMITHUR LA 70885
Phone: (337) 805-2165

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3141 PASSYUNK AVE
EPA ID: PA17 048781 090
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.116 1241
<i>Trdat 8/19/21</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES (SPECIM. MARKS & EXCEPTIONS)	Type	Volume	WGK
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. (BENZENE) PROFILE: 958643LA	CM	24.28	T
		100 CONTAINERS/ EPIU226312			
		RAIL CARN EPIKB1436			
		ERG# 171 H030			

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this bill of lading, the property described above is approved for rail carrier, except as noted (contents and condition of packages unknown), marked, covered and dunnaged as indicated above which said carrier (the word carrier being understood through the contract as meaning any person or corporation in possession of the property under the contract) agrees to carry for the usual place of delivery and destination. If on the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of or any of said property, over all or any portion of said route to destination and as to each party of any line traversed in all or any said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the prevailing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the prevailing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *8/4/21* Per: *Luis Castro* Date: *8/6/21*

Mark with "X" or "RQ" appropriate to the article to be transported in accordance with the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of lading 172.201(e)(3) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.201(g) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from this requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carrie Dubodaux* Date: *10-4-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01430-2B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC.
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70605
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 588
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (BOO) 338-2188
Acknowledgement of Receipt	
Per: <i>Robert Bellard</i>	Date: <i>10-4-24</i>

5/2/21

0091436-2C

763239

Bill of Lading (Page 1 of 2)

DOCUMENT # 91436-2C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70085
 Phone: (337) 683-2108

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048721 008
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-4524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.404 1241

J. DeWitt 4/28/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPED UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 6.1h (BENZENE) PROFLE: 060343LA	CM	23.85	T
		IM CONTAINER# EPH1226288			
		RAIL CAR# EPIX91456			
		ERG# 171			
		FD39			

NH

RECEIVED subject to the conditions and terms in effect on the date of the issue of this Bill of Lading, the property described herein in approved good order, except as noted (contents and condition of packages unknown), weighed, counted and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or said destination. It on its route, otherwise to deliver to another place on the route to said destination. It is mutually agreed as to each parcel of or any of said property, over all or any portion of said route to destination and as to each party of any unit hereof in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 For: *Luis Castro* Date: 8/6/21

Mark with "X" or "RQ" to designate toxic or highly flammable materials as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.231(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading cover sheet, which is specific to each item, the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *[Signature]* Date: 10-01-21

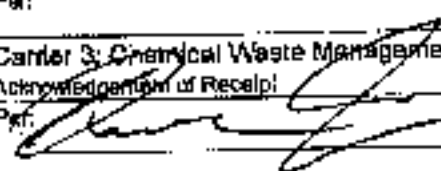
Bill of Lading (Continuation Sheet) 2 of 2

763239

DOCUMENT# 01430-20

TO	
Consignee: CHEMICAL WASTE MANAGEMENT INC	
Street: 7170 JOHN BRANNON ROAD	
EPA ID: LA000077201	
City/State/Zip: SULPHUR LA 70685	
Phone: (337) 683-2189	

FROM	
Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM LLC	
Street: 3144 PASSYUNK AVE	
EPA ID: PAD 040781 088	
City/State/Zip: PHILADELPHIA, PA 19145	
Phone: (480) 226-1524	

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	(000):
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (600) 335-2189
Acknowledgement of Receipt	
Per: 	Date: 10-1-21



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SUI PHUH, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

150512

DU11430-211

Bill of Lading (Page 1 of 2)

DOCUMENT # 91436-211

703246

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70895
Phone: (337) 883-2180

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 008
City/State/Zip: PHILADELPHIA, PA 19115
Phone: (480) 228 1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(m) 1241
<i>Tilado 8/29/21</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL NO SHIPPING UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume UOM

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.1 (BENZENE) PROFILE: 000043LA	CM	24.03	T
		IM CONTAINER# EPIU226385			
		RAIL CAR# EPIK91438			
		ERG# 171 HD30			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as set forth herein. If on route, otherwise to deliver to another carrier on the route to the destination. It is mutually agreed as to each carrier or all or any portion of said property, over all or any portion of said route to destination and as to each party of any consignment in all: any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: *Luis Castro* Date: 8/6/21

Mark with "X" or "RC" in appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.201(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carmie Ambrosiano* Date: 10-1-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# R1435-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70805
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 238-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Cowley</i>	Date: <i>10/01/2021</i>



CHEMICAL WASTE MANAGEMENT, INC
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____ *11* _____

WEIGHED BY _____

052108 0091430-DE 763258

Bill of Lading (Page 1 of 2)

DOCUMENT # 91436-2B

TO

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAN000777201
 City/State/Zip: SLA. PHUR LA 70685
 Phone: (337) 503-2199

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048781 C06
 City/State/Zip: PHILADELPHIA PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(b) 1241

Ticked 8/21/21

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	HOW
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. IR (BENZENE) PROFILE: 069943LA	GM	24.38	T
		IM CONTAINER# EPIU226205			
		RAIL CAR# EPIXG1438			
		ERG# 171 H03B			

RECEIVED subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (see word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated hereon. On its route, it agrees to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property, that every carrier so designated hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21
 Per: Luis Castro Date: 8/6/21

Mark with "X" or "TU" if appropriate to designate hazardous materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an approved method for identifying hazardous materials on Bills of Lading 171.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper description statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certificate of receipt of materials

By: *[Signature]* Date: 10-04-21

763258

Bill of Lading (Continuation Sheet) 2 of 2

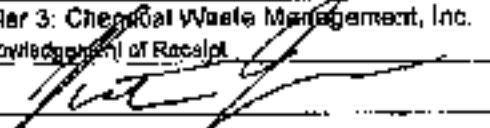
DOCUMENT# 81436-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777261
City/State/Zip: SULPHUR LA 70065
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M L.L.C
Street: 3144 PASSYUNK AVE
EPA ID: PA0 048781088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1525

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2188	
Acknowledgement of Receipt	
Per: 	Date: 10-4-21

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

100592

DO9114310-2F

Bill of Lading (Page 1 of 2)

INVOICE # 91436-2F

703250

TO

FROM

Consignee CHEMICAL WASTE MANAGEMENT INC
Street 7170 JOHN HIRAMON ROAD
EPA ID LA1000077201
City/State/Zip: SULPHUR LA 70886
Phone: (337) 689-2160

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 089
City/State/Zip: PHILADELPHIA, PA 19148
Phone: (483) 220-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
<i>Ticket #8897</i>

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UOM
X	1	RC, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. LIQ (BENZENE) PROFILE: 88849LA	CM	23.80	T
		MI CONTAINER# EPIU225808			
		RAIL CAR# EPIX01430			
		ERG# 171 H099			

NH

RECEIVED subject to the classifications and tariffs in effect on the date of this Bill of Lading, the property described above in shipment good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the vessel carrier being indicated through this contract as receiving any person or corporation in possession of the property under the contract) agrees to carry to the warehouse of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed upon each carrier of all or any of said property, over all or any portion of said route its destination and as to each party of any time indicated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification or the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/4/21 Per: *Luis Castro* Date: 8/4/21

Mark with "X" or "V" if applicable (to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 112.30 (h)(1) 48 of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 112.20 (k) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Came Embodaux* Date: 10-4-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01438-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: BULPHUR LA 70065
Phone: (337) 693-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS P&M LLC
Street: 3148 PASBYUNKAVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 226-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 338-2189	
Acknowledgement of Receipt	
Per: <i>Joseph Conville</i>	Date: <i>7/19/2021</i>



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

152204
Bill of Lading (Page 1 of 2)

0011004-2A
 703228

DOCUMENT# 91069-2A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: CAD00077201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 683-2788

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAO 049781 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (460) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50045

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	H.W.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.18 (BENZENE) PROFILE: 968843LA IM CONTAINER# EPIU225374 RAIL CAR# EPIX81089 ERG# 171 H038	CM	23.83	T

NK

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is apparent good order, except as noted (contents and condition of packages unknown). Marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the place of delivery as per destination. It on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the rate terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/18

Per:

Luis Castro

Date:

8/18/21

Mark with "X" or "NO" (appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 112.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certificate statement provided in section 112.203(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Amanda Deville / A Deville

Date:

10-01-21

Bill of Lading (Continuation Sheet) 2 of 2

763228

DOCUMENT# 81088-2A

TO

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 683-2188

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PA0 049781 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
 Acknowledgment of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
 Acknowledgment of Receipt

LA0000147272 (800) 336-2188

Per:

Lashon Bellard

Date:

10-1-21



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91069-2B

W3168

0091069-2B

703229

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2169

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(i) 1241

SHIPPER'S INSTRUCTIONS

Tried - 50546

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CLASS
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225056 RAIL CAR# EPIX91069	CM	24.10	T
		ERG# 171 H039			

NA

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: Luis Castro
 Date: 8/19/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: Carrie Duboulez
 Date: 10-1-21

Bill of Lading (Continuation Sheet) 2 of 2

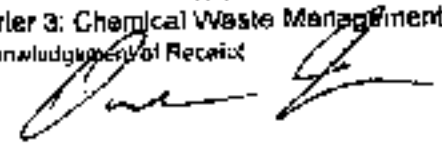
DOCUMENT# 01088-20

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 563-2169

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 228-1524

Carrier 2: BNSF Railway Company Acknowledgement of Receipt Per: _____ Date: _____	Carrier 3: Chemical Waste Management, Inc. Acknowledgement of Receipt Per:  Date: 10-1-21	LA0000147272 (800) 398-2169
--	---	-----------------------------



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

76321

DOCUMENT# 91069-2C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077204
City/State/Zip: SULPHUR LA 70885
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PA0 049791 080
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

T. J. Davis 30049

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CBT
X	1	RG UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE. SOLID, N.O.S., 9.1 (BENZENE) PROFILE 658843LA IM CONTAINER# EPIU225168 RAIL CAR# EPIX91089 ERG# 171 H030	GM	23 BS	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is, upon receipt, except as noted (contents and condition of packages unknown), marked, counted and destined as indicated above which said carrier (the word carrier being understood through this contract, as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, overall or any portion of said route to destination and as to each party in any time increased it all or any said property, that every service to be performed hereafter shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

12-21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RC" if applicable to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification/declaration prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Kimberly Davis / A. O'Neill

Date:

09-30-21

Bill of Lading (Continuation Sheet) 2 of 2

763217

DOCUMENT# 91068-2G

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 623-2168

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 0487B1 09B
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 226-4524

Carrier 2: BNSF Railway Company
 Acknowledgment of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
 Acknowledgment of Receipt

LA0000147272 (800) 336-2168

Per:

Date:

9-30-21

SPU 225/166

TICKET 51 AD

ID 653168
GROSS 82780 lb INBOUND
12:18PM 09/30/2021
OUTBOUND TICKET 51

GROSS 82780 lb RECALLED
TARE 35020 lb
NET 47760 lb

NET 23.88 ton
03:05PM 09/30/2021

90

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 76327

WEIGHED BY _____

10/1/2021

Bill of Lading (Page 1 of 2)

763218

DOCUMENT# 91069-2D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 683-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049791 088
 City/State/Zip: PHILADELPHIA, PA 19146
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(b) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50048

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	U.S.
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9, III (BENZENE) PROFILE: 868843LA IM CONTAINER# EPIU225120 RAIL CAR# EFXB1085 ERG# 171 H039	CM	29.98	T

PH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this bill of lading, the property described above in apparent good order, except as noted (contents and condition of packages unexamined), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of this property under the contract) agrees to carry to the usual place of delivery as now destination. If on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of a way-bill released in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *8/19/21*
 Per: *Lucas Castro* Date: *8/19/21*

Mark with "X" or "RG" if applicable to describe Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 49 CFR 172.201(b)(5) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Rec: *[Signature]* Date: *09-30-21*

Bill of Lading (Continuation Sheet) 2 of 2

763218

DOCUMENT# 81089-20

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70686
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2189

Per

Stephen Belland

Date:

9-30-21

911225120

NO

TICKET 53

ID 653204
GROSS 83560 lb INBOUND
12:28PM 09/30/2021

FORMS 35109 1b

03:01PM 09/30/2021

CP

CP net 418400

24.23

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763218

WEIGHED BY _____

103204
 0091004-AL
 103240

Bill of Lading (Page 1 of 2)

DOCUMENT # 91069-2R

TO

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PA0 0497B1 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (410) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Tanks Scoop

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES (SPECIAL MARKS & EXCEPTIONS)	Type	Volume	Weight
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B. III (BENZENE) PROFILE: D60943LA IM CONTAINER# EPIU225133 RAIL CAR# EPIX01088 ERG# 171 H059	CM	24.05	T

HH

RECEIVED subject to the class location and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is accepted in good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the local place of delivery as indicated above. If on its route, otherwise to deliver to another carrier on this route to said destination, it is mutually agreed as to each transfer of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *10-01-21* For: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) (a) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Amanda Deville* Date: *10-01-21*

Bill of Lading (Continuation Sheet) 2 of 2

763240

DOCUMENT# 81089-2E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70885
Phone: (937) 883-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LAD000147272 (800) 338-2168
Acknowledgement of Receipt	
Per: <i>Stephen Bellard</i>	Date: <i>10-1-21</i>



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

W. J. ...
Bill of Lading (Page 1 of 2)

DOCUMENT # 91069-27

263232

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC.
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 9144 PASSYUNKAVE
 EPA ID: PAD 040701 083
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 226-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Telco SODFO

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Class
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE: 9898431A IM CONTAINER# EPIU226214 RAIL CARN# EPIX91359 ERG# 171 H030	CM	23.53	T

NH

RECEIVED subject to the conditions and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the said carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the warehouse of delivery as said destination. If on his route, otherwise to deliver to another carrier on the route to said destination, he mutually agreed as to each carrier of all or any of said property, over all or any portion of said route in succession and as to each party at any time indicated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RO" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.303(a)(1) (i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on this Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Dubody

Date:

10-01-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91088-2F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70888
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 049791 096
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2169

Per:

Joseph Courville

Date:

10/1/2021



CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91475A

763033

TO

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SLUSHUR LA 70685
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA PA 19145
Phone: (440) 220-1824

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50141

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 988843LA IN CONTAINER# EPIU228191 RAIL CAR# EPIK91476 ERG# 171 H038	CM	23.13	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on its route to said destination, it is mutually agreed as to each carrier of all or any of said property, even if at any portion of said route to destination and as to each party of any line interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/11/21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RQ" if applicable to a specific hazardous material substance as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(d)(1)(i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Ombrello

Date:

9-22-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91475A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 333-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3141 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 328-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

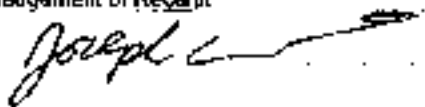
Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2169

Per:



Date:

01/22/2021

EP14225191

TICKET 14

ID 652592
GROSS 78900 1b INBOUND
OB: 33AM 09/22/2021

OUTBOUND TICKET 14

GROSS 78900 1b RECALLED
FARE 32260 1b
NET 46640 1b

NET 23.32/TON

10:12AM 09/22/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

763053

WEIGHED BY

LA 70665

Bill of Lading (Page 1 of 2)

763048

DOCUMENT # 914759

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 717D JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 9144 PASSYUNKAVE
EPA ID: PAD 043791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Tickets 5042

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LOD
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B, III (BENZENE) PROFILE: 988843LA IM CONTAINER# EPIU226204 RAIL CAR# EPIX81475 ERG# 171 H038	CM	24.40	T

NH

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on the route, otherwise together to another carrier on the route to said destination, the mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time incurred in all or any part of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an option method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification contained prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc.

Certification of receipt of materials

Per:

Amanda DeWitt / DeWitt

Date:

07-22-21

760048

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 814758

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19115
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LAD000147272 (BOD) 336-2169

Per:

Joseph. Courville

Date:

9/22/2021

SPUD 5367

TICKET 36 AD

ID 652592
GROSS 81620 1b THIRDLIND
12:23PM 09/22/2021

OUTBOUND TICKET 36

GROSS 81620-1b RECALLED
TARE 32280-1b
NET 49340-1b

NET 24.67 TON

03:30PM 09/22/2021

Bo

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

763048

RECEIVING TICKET # _____

WEIGHED BY _____

8115

5

Bill of Lading (Page 1 of 2)

DOCUMENT # 91475C

703021

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PABBYUNKAVE
 EPA ID: PA0046791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 201.4(a) 1241

Ticks 50143

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL NO SHIPPING NAME

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume Unit

HAZARDOUS MATERIAL	NO SHIPPING NAME	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RO UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9. III (BENZENE) PROFILE: 988643LA IN CONTAINER# EPIU225236 RAIL CAR# EPXS1475 ERG# 171 H030	CM	24.13	T

NH

RECEIVED subject to the specifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition in packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agreed to carry to the usual place of delivery as said application. If on the route alternative to defect to another carrier on the route to said destination. It is mutually agreed to be used either at or any of said property, over all or any portion of said route to destination and as to each party of any time interval in or on any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that this invoice was at the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *[Signature]* Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulation governing the transport of hazardous materials. The use of UN's system is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (i) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(g) of the Federal Regulations, as indicated by the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for particular materials.

Designated Consignee: Chem by Waste Management, Inc Certification of receipt of materials
 Per: *Carrie Ambroseaux* Date: *9-21-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91475C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2700

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 226-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (600) 335-2159

Per:

Joseph Courville

Date:

9/21/2021

EP14223236

TICKET 53

ID 652592
GROSS 80980 1b INBOUND
01:44PM 09/21/2021
OUTBOUND TICKET 53

GROSS 80980 1b RECALLED
FARE 32840 1b
NET 48140 1b

NET 24.07 TON

03:32PM 09/21/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763021

WEIGHED BY _____

*115

Bill of Lading (Page 1 of 2)

703037

DOCUMENT# 91475D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRAINSON ROAD
 EPA ID: LA006077201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 688-2180

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049781 085
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Tickets 50/144

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID N.O.S. 9, III (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225155 RAIL CAR# EPIX91475 ERG# 171 H029	GM	24.10	T

NH

RECEIVED subject to the descriptions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above or apparent good under, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above with each carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination, if on its route, or to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification of the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/18

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RQ" to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Dubocovich 9-22-21

Date:

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 914750

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SUICHR LA 70885
Phone: (337) 583-2188

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
I.C.
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2188

Per:

Derrick Gray

Date:

9-22-21

EP1422513

TICKET 19

ID 653375
GROSS 82500 1b INBOUND
09:11AM 09/22/2021
OUTBOUND TICKET 19

GROSS 82500 1b RECALLED
FARE 33000 1b
NET 49500 1b
NET 24.39 TON

10:29AM 09/22/2021

10

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

47
763037

RECEIVING TICKET # _____

WEIGHED BY _____

2115

Bill of Lading (Page 1 of 2)

263050

DOCUMENT# 91475E

10

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777301
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 883-2180

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049701 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 TRUCK SONS

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.11 (BENZENE) PROFILE: 968843LA IM CONTAINER# EPIU226282 RAIL CAR# EPIX91478 ERG# 171 H03B	CM	24.30	T

NH

RECEIVED subject to the instructions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract to mean any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or other destination, if on its route, otherwise to deliver to another carrier on its route to said destination. It is mutually agreed as to each carrier of or for any of said property, over all or any portion of said route to destination and as to each party of any item interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp
 Per: _____ Date: 8/18/21 Per: Luis Castro Date: 8/19/21

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.20 (b)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: Carrie Duboucheux Date: 9-22-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91475C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19115
Phone: (410) 228-1524

Carrier 2: BNSF Railway Company

Acknowledgment of Receipt:

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.

LA0000147272 (800) 336-2169

Acknowledgment of Receipt

Per:

Derrick Gray

Date:

9.22.21

LY14223290

TICKET 40

ID 653375
GROSS 83160 lb INBOUND
01:05PM 09/22/2021

OUTBOUND TICKET 40

GROSS 83160 lb RECALLED
TARE 33820 lb
NET 49340 lb

NET 24.67 TON

02:30PM 09/22/2021

①

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

4

763050

RECEIVING TICKET # _____

WEIGHED BY _____

51115

Bill of Lading (Page 1 of 2)

763038

DOCUMENT# 914751

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70986
Phone: (337) 683-2100

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048701 000
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

Trails 50146

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LDIC
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 088843LA IN CONTAINER# EPIU228180 RAIL CAR# EPIX91475 ERG# 171 H039	CM	23.88	T

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (quantity and condition of packages unknown), is being consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, the wife is delivered to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any portion of said route to destination and as to each party or any other interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/11/21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RQ" in appropriate designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(b)(1)(ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading that apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Mando Dentle/O'Neill

Date:

09-22-21

763038

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91475F

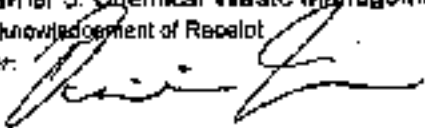
TO

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 533-2189

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 F.P.A. ID: PAD C48781 008
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 226-1524

Carrier 2: BNSF Railway Company
 Acknowledgment of Receipt
 Per: _____ Date: _____

Carrier 3: Chemical Waste Management, Inc.
 Acknowledgment of Receipt
 Per:  Date: 9-22-04

LAD000147272 (800) 335-2189

Handwritten notes and stamps in the top right corner, including a date stamp that appears to read "APR 19 1988".

Handwritten notes and stamps in the middle right section, including a date stamp that appears to read "APR 19 1988".

Handwritten mark or signature on the left side of the page.

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 703038

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91117A

763109

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 553-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

Trucks 50149

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RO, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 6.1k (BENZENE) PROFILE: 989843LA IM CONTAINER# EPIU225232 RAIL CAR# EPIX91117 ERG# 171 1038	CM	23.03	T

NH

RECEIVED subject to the classifications and labels in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and dispatched as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry by the usual mode of delivery as said destination. If on its route, otherwise to deliver to another carrier or the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

[Signature]

Date:

12/21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Cumbalean

Date:

9-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81117A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 683-2160

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2160

Per:

Derrick Gary

Date:

9-24-21

EPILL203030

TICKET 49

ID 653375
GROSS 79920 lb INBOUND
01:47PM 09/24/2021

OUTBOUND TICKET 49

GROSS 79920 lb RECALLED
TARE 33500 lb
NET 46420 lb
NET 23.21 TON
03:29PM 09/24/2021

CO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763109

WEIGHED BY _____

7115

11-5-2021

Bill of Lading (Page 1 of 2)

763112

DOCUMENT# 911178

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRE TANK SOI TUMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Trucks 5/11/18

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT.
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.C.S. B III (BENZENE) PROFILE. 080043LA IM CONTAINER# EPIU225257 RAIL CAR# EPIK91117 ERG# 174 -1039	CM	24.03	T

NH

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, counted and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, shipment is delivered to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all of any portion of said route to destination and as to each party of any time intermitted in all or any said property, that every service to be performed hereunder shall be subject in all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/19

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RC" if applicable to designate Hazardous Marine Substances as defined in the Department of Transportation regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading (49 CFR 172.201(a)(1)(ii)) of the U.S. Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's notification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirements is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Monica DeWitt / DeWitt

Date:

09-27-21

763112

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT # 011178

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 D9B
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

Per:

LAD000147272 (800) 336-2169

Date:

9-27-21

01

RECEIVED
DATE: 11/11/03
TIME: 10:00 AM
BY: [Signature]

RECEIVED
DATE: 11/11/03
TIME: 10:00 AM
BY: [Signature]

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 703112
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91117C

263101

TO
 Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAC000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 683-2163

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PA0-D49791-099
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1624

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

Tickets 50149

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 9. II (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU226179 RAIL CAR# EPIX91117 ERG# 171 H339	DM	23.18	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading. The property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, numbered and defined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the specified place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any part of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any part of said property, that every carrier to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: _____ Date: _____
 Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (a) (1) (3) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carmel Dubodaux* Date: *9-24-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 911170

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70588
Phone: (337) 693-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049701 088
City/State/Zip: PHILADELPHIA, PA 19143
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

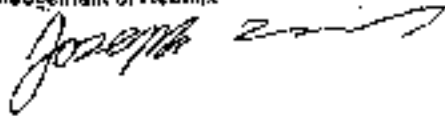
Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2169

Per:



Date:

9/24/2001

EP114225179

TICKET 34

ID 653153
GROSS 81500 lb INBOUND
11:40AM 09/24/2021

OUTBOUND TICKET 34

GROSS 81500 lb RECALLED
TARE 34860 lb
NET 46640 lb

NET 23.32 TON

02:38PM 09/24/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

CP

RECEIVING TICKET # 763101

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91117L1

763102

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70865
 Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 019791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 223-1624

ADDITIONAL INFORMATION

WRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

Tubs 50/50

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Weight
X	1	RO UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.III (BENZENE) PROFILE: 869843LA IM CONTAINER# EPIU225217 RAIL CAR# EPIX81117 ERG# 171 H039	CM	23.25	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is shipped in good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or to destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, prior to or any portion of said route to destination and as to each party at any time interested in all or any said property, that equal service to be performed hereunder shall be subject to all the B/L of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the B/L of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/18/21 Per: *Lucia Castro* Date: 8/19/21

Mark with "X" or "HCY" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on B/Ls of Lading 172.101(a)(1) (B) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certificate of shipment prescribed in section 172.204(a) of the Federal Regulations, as indicated on the B/L of Lading does apply, unless a specific exception from the requirements provided in the Regulation for a particular material.

Declarated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carmie Dubodeaux* Date: 9-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 311170

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 270-1524

Carrier 2: **BNSF Railway Company**
Acknowledgment of Receipt

Per:

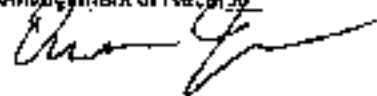
Date:

Carrier 3: Chemical Waste Management, Inc.

LA0000147272 (800) 336-2189

Acknowledgment of Receipt

Per:



Date:

7-24-21

EPI11222012

TICKET 36

ID 653168
GROSS 81300 lb INBOUND
11:56AM 09/24/2021

OUTBOUND TICKET 36

GROSS 81300 lb RECALLED
TARE 34420 lb
NET 46880 lb
NET 23.44 / TON

02:35PM 09/24/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 765102

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

763123

DOCUMENT # 91117E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1824

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) (24)

Tickets 50151

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO SHIPMENTS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Lot
X	1	RG, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.N. (BENZENE) PROFILE: 668843LA IM CONTAINER# EPIU224134 RAIL CAR# EPIX91117 ERG# 171 H039	GM	24.40	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is shipped in good order, except as noted (contents and condition of packages unknown), marked, counted, weighed and delivered as indicated above with each carrier (the word carrier being understood through the contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or other destination. If unable, or otherwise to deliver to another carrier or to a place to which destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route in destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the safe stowage and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp

Por: [Signature] Date: 7/21 Per: Luis Castro Date: 8/19/21

Mark with "X" or "RG" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.231(a)(1) (b) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

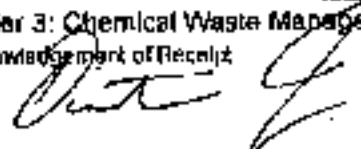
Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: Carrie Dubois Date: 9-27-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81117E

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS REM
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048781 C88
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgment of Receipt
Per: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc
Acknowledgment of Receipt
Per:  Date: 9.27.21
LA0000147272 (800) 336-2169

10/20/93
10/20/93
10/20/93
10/20/93
10/20/93

11

10/20/93
10/20/93
10/20/93
10/20/93
10/20/93

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

11

RECEIVING TICKET # 111111
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

763117

DOCUMENT# 91117F

9

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 593-2489

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 040701 008
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50152

HAZARDOUS MATERIAL NO. SHIPPING UNIT

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

HAZARDOUS MATERIAL	NO. SHIPPING UNIT	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Weight
X	1	RD, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. C. II (BENZENE) PROFILE: 080843LA IM CONTAINER# EPIU226147 RAIL CAR# EPIX91117 ERG# 171 H039	CM	23.85	T

NP

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading. The property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery or to the destination. If on its route, it wishes to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any line interested in all or any said property. Such every service to be performed hereunder shall be subject to all the B/L of Lading terms and conditions in the governing classification or the date of shipment. Shipper hereby certifies that he is familiar with all the B/L of Lading terms and conditions in the governing classification and the said terms and conditions.
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Per: _____ Date: 8/18/21 Carrier: CSX Railroad Corp
 Pst: Luis Castro Date: 8/19/21

Mark with "X" or "RD" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on B/Ls of Lading 172 201(a)(1) and (4) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172 204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulations for a particular material.

Designated Consignee, Chemical Waste Management, Inc
 Per: Carmel Dubreuil Date: 9-27-21
 Certification of receipt of materials

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91117F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049791 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company

Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.

LA0000147272 (800) 338-2189

Acknowledgement of Receipt

Per:

Joseph [Signature]

Date:

9/27/2027

EP114 225/4,

TICKET 21
OUTBOUND TICKET 21
ID 652592
GROSS: 806336 lb
TARE: 032400 lb
NET: 48140 lb
GROSS: 806336 lb
TARE: 032400 lb
NET: 48140 lb
01:02PM 09/27/2021

GROSS: 37250 lb
01:02PM 09/27/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763117
WEIGHED BY _____

#415

Bill of Lading (Page 1 of 2)

703003

DOCUMENT# 91111-3A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70886
Phone: (337) 583-2180

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
251.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50033

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Unit
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. S.H. (BENZENE) PROFILE: 909843LA IM CONTAINER# EPIU225346 RAIL CAR# EPIX91111 ERG# 171 H039	DM	23.25	T

RECEIVED subject to the classifications and fruits in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above with said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry for the usual place of delivery or said destination. If on the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. SHIPPER hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

Per:

Date:

Mark with "X" or "RQ" if applicable to identify Hazardous Materials or Substances as defined in the Department of Transportation Regulations governing the transportation of regulated materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading (49 CFR 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations, etc., when shipping hazardous materials. The shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as required on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Date:

763003

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91111-3A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049761 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (BOD) 336-2169

Per:

Joseph Cantrell

Date:

9/20/2021

EPIN 203 5/14
TICKET 9 PD

ID 653375
GROSS 81120 1b INBOUND
07:23AM 09/21/2021

OUTBOUND TICKET 9

GROSS 81120 1b RECALLED
TARE 34020 1b
NET 47100 1b
NET 23.55 TON
09:09AM 09/21/2021

CO

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763003

WEIGHED BY _____

9415

Bill of Lading (Page 1 of 2)

DOCUMENT# 91111-3B

763007

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: BULPHUR LA 70886
Phone: (337) 583-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19148
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

Tickets 50035

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S., Q. III (BENZENE) PROFILE: 069843A IM CONTAINER# EPIU226243 RAIL CAR# FPIX01111 ERG# 171 H030	CM	24.30	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through the contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as this destination. If enroute, otherwise to deliver to another office on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading forms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/19/21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RQ" if applicable to designated Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.301(a)(1) (b) of title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading form apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Quibodeaux

Date:

9-21-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81111-38

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70666
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3544 PASSYUNK AVE
EPA ID: PA0 048791 080
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 226-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

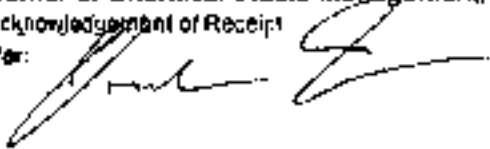
Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2169

Per:

Date:



9-21-21

511422524
TICKET 19

ID 653168
GROSS 83640 lb INBOUND
08:33AM 09/21/2021

OUTBOUND TICKET 19

GROSS 83640 lb RECALLED
TARE 34560 lb
NET 49080 lb

NET 24.54 TON

10:03AM 09/21/2021

CC

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 703007

WEIGHED BY _____

4115

4115

Bill of Lading (Page 1 of 2)

Ne 2983

DOCUMENT # 911113C

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 717D JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SU:PHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50036

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.1b (BENZENE) PROFILE: 968843LA IM CONTAINER# EPIU225381 RAIL CAR# EPIX91111 ERG# 171 H039	GM	23.95	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (notations and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word "carrier" being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *[Signature]* Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this notation is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(C) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exemption from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
Per: *Carrie Ambodeaux* Date: *9-20-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81111-30

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2488

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date

Carrier 3: Chemical Waste Management, Inc.

LAC000147272 (800) 338-2188

Acknowledgement of Receipt

Per:

Joseph [Signature]

Date:

9/20/2021

10/10/00

10/10/00

10/10/00

10/10/00

10/10/00

10/10/00

10/10/00

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # 700076

WEIGHED BY

Bill of Lading (Page 1 of 2)

763011

DOCUMENT# 91111-3D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: BULPHUR LA 70805
Phone: (337) 583-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAID 046791 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1624

ADDITIONAL INFORMATION

VRF TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Tank 50037

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UNSP
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9.11 (BENZENE) PROFILE: 800843LA 1M CONTAINER# EPIU226068 RAIL CAR# EPIX91511 FRQ# 171 H038	CM	24.03	T

NH

RECEIVED subject to the specifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination, if any route, otherwise to deliver to another carrier on the route to said destination if it is mutually agreed as to such carrier, of all or any of said property, over all or any portion of said route to destination and as to each party of any thing interdicted in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification and to said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
Carrier: CSX Railroad Corp
Per: *[Signature]* Date: *8/17/11*
Per: *Luis Castro* Date: *8/19/11*

Mark with "X" or "RQ" if paper (law), test data hazardous materials substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 372.201(a)(1)(ii) of the Code of Federal Regulations. Also, when shipping hazardous wastes, the shipper's certification statement prescribed in section 372.206(b) of the Federal Regulations, as indicated on the Bill of Lading does not apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Per: *Carmie Dubodreau* Date: *9-21-11*
Certification of receipt of materials

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81111-30

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA, 70665
Phone: (337) 683-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 086
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 536-2169

Per:

Joseph ...

Date:

9/21/2021

EPI4223068

TICKET 23

II 652592

GRUSS 79000 1b INBOUND

09:01AM 09/21/2021

OUTBOUND TICKET 23

GRUSS 79000 1b RECALLED

TARE 32960 1b

NET 46140 1b

NET 23.07 TON

11:23AM 09/21/2021

CC

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET #

763011

WEIGHED BY

2415

Bill of Lading (Page 1 of 2)

763019

DOCUMENT # 91112-3E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 717D JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70665
 Phone: (337) 583-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 040701 098
 City/State/Zip: PHILADELPHIA, PA 19148
 Phone: (440) 226-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(b) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50038

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WG
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFILE: 980943LA IM CONTAINER# EPIU225070 RAIL CAR# EPIX01111 ERG# 171 H039	GM	24.35	T

AKF

RECEIVED subject to the conditions and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted
 good order, except as noted (condition and condition of packages unknown, marked consigned and destined to indicated above which each carrier
 (the word carrier being understood through this contract to include any person or corporation in possession of the property under the contract)
 agrees to carry to the usual place of delivery as indicated hereon, if such route, manner or place (over to another carrier on the route to said destination
 if it is mutually agreed to in each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any
 time interposed in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions
 to the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in
 the governing classification and it reads terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/18/21 Per: *Luis Castro* Date: 8/19/21

Mark with "X" or "NOX" appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations
 governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of
 Lading 172.201(a)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement
 prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply unless a specific exemption from the
 requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Amanda Smith/O'Quill* Date: 09-21-21

Bill of Lading (Continuation Sheet) 2 of 2

763019

DOCUMENT# 91111-3E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LADC00777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048791 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 220-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LAD000147272 (800) 336-2169

Per:



Date:

9-21-21

701 4325013

TICKET 40

ID 653168
GROSS 83480 lb INBOUND
12:18PM 09/21/2021

OUTBOUND TICKET 40

~~GROSS 83480 lb RECALLED
FARE 33140 lb
NET 50340 lb
NET 25.17 TDN
02:47PM 09/21/2021~~

✓

GROSS 34280 lb
02:44PM 09/21/2021

49200
24.60
net

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763019

WEIGHED BY _____

✓

Bill of Lading (Page 1 of 2)

DOCUMENT # 91111-3P

763018

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 863-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION
 THE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(m) 1241

SHIPPER'S INSTRUCTIONS

Tickets 50039

HAZARDOUS MATERIAL NO. SHIPPING UNITS

DESCRIPTION OF ARTICLES
 SPECIAL MARKS & EXCEPTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Value	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.M. (BENZENE) PROFILE: 968843LA IM CONTAINER# EPIU225283 RAIL CARN EPIX91111 ERG# 171 H039	CM	23.93	T

11/11

RECEIVED subject to the classifications and titles in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, compressed and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If shifts route, otherwise to deliver to another carrier on the route to said destination, if it mutually agrees as to each carrier of piece or any of said property, over all or any portion of said route in destination and as to each party at any time indicated in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: Luis Castro
 Date: 8/19/11

Mark with "X" or "HQ" appropriate to designate hazardous materials as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(2) (b) or Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(b) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from this requirement is provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Per: Carrie Ambodeaux
 Certification of receipt of materials
 Date: 9-21-11

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81111-3F

TO	FROM
Consignee: CHEMICAL WASTE MANAGEMENT INC Street: 7178 JOHN BRANNON ROAD EPA ID: LA0000777201 City/State/Zip: SULLPHUR LA 70685 Phone: (337) 593-2189	Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M L.L.C. Street: 3144 PASSYUNKAVE EPA ID: PAD 0497B1 098 City/State/Zip: PHILADELPHIA, PA 19145 Phone: (480) 228-1524

Carrier 2: BNSF Railway Company	
Acknowledgement of Receipt	
Per:	Date:
Carrier 3: Chemical Waste Management, Inc.	LA0000147272 (800) 336-2189
Acknowledgement of Receipt	
Per: <i>Derrick Conway</i>	Date: <i>9.21.21</i>

EPH 225273

TICKET 36

ID 653375
GROSS 82600 lb INBOUND
11:39AM 09/21/2021

OUTBOUND TICKET 36

GROSS 82600 lb RECALLED
TARE 34480 lb
NET 48120 lb
NET 24.06 TON
01:40PM 09/21/2021

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763018

WEIGHED BY _____

415

Bill of Lading (Page 1 of 2)

703073

DOCUMENT # 9105BA

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70066
Phone: (957) 683-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a)1241

SHIPPER'S INSTRUCTIONS

Ticket 50135

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	LCM
X	1	RQ UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S. 9. III (BENZENE) PROFILE: 868843LA M CONTAINER# EPIU226082 RAIL CAR# EPIX81058 ERD# 171 H098	GM	26.13	Y

NH

RECEIVED Subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is a certain good order, except as noted (contents and condition of packages unknown) marked, counted and described as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. It on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in or on any said property, that every service to be performed hereunder shall be subject to as the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the tariff terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

Date:

8/18/21

Per:

Louis Coates

Date:

8/19/21

Mark with "H" or "RQ" if appropriate designate Hazardous Materials substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1)(ii) of title 49, Code of Federal Regulations, Also, when shipping hazardous materials, the shipper's certification statement specified in section 172.204(f) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

By: *Shande Deville*

Date:

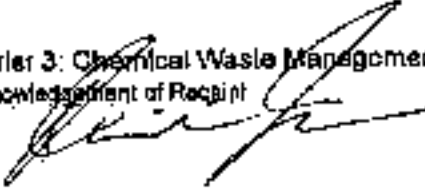
09-23-21

Bill of Lading (Continuation Sheet) 2 of 2

703073
DOCUMENT# 91058A

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC.
Street: 7770 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 553-2168

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 049781 098
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt
Per: _____ Date: _____
Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2168
Acknowledgement of Receipt
Per:  Date: 9-23-01

6/1/01

UNITED STATES OF AMERICA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
REGIONAL OFFICE
500 WESTERN AVENUE
SUITE 100
HOUSTON, TEXAS 77002

OFFICE OF THE REGIONAL ADMINISTRATOR
REGIONAL OFFICE
500 WESTERN AVENUE
SUITE 100
HOUSTON, TEXAS 77002
TEL. (713) 289-1234
FAX (713) 289-1234

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 77-3074

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

763079

DOCUMENT# 91058B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70683
Phone: (337) 683-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 038
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1624

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

Tickets ST36

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	HOW
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B.III (BENZENE) PROFILE: 888643LA IM CONTAINERS EPIU225161 RAIL CAR# EPIX91050 ERG# 171 H039	CM	24.30	T

NA

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, or enroute to deliver to another carrier on the route to said destination it is mutually agreed by the said carrier of all or any of said property, and all or any portion of said route to destination and as to each party of any time involved in at or any said property, that every service to be performed hereunder shall be subject to the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: 8/11/21 Per: *Luis Castro* Date: 8/19/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.204(e)(1) (10 of Title 49 U.S. Code of Federal Regulations, 49 CFR, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *[Signature]* Date: 09-23-21

763078

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 910588

TO

Consignee: CHEMICAL WASTE MANAGEMEN
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70885
 Phone: (337) 583-2168

FROM

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 328-1624

Carrier 2: BNSF Railway Company
 Acknowledgement of Receipt
 Per: _____ Date: _____

Carrier 3: Chemical Waste Management, Inc. LA0000147272 (800) 336-2188
 Acknowledgement of Receipt
 Per: *Joseph [Signature]* Date: *9/27/2021*

215225101
AD

TICKET 35

ID 652592
GROSS 81800 lb INBOUND
11:24AM 09/23/2021

OUTBOUND TICKET 35

GROSS 81800 lb RECALLED
FARE 32480 lb
NET 49320 lb

NET 24.66 TON

02:36PM 09/23/2021

AD

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763079

WEIGHED BY _____

4115

215225101

Bill of Lading (Page 1 of 2)

DOCUMENT # 9105RC

703052

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70865
Phone: (337) 593-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 048731 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50137

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, BOLID. N.O.S. 8.111 (BENZENE) PROFILE: 988643LA IN CONTAINER# EPIU224060 RAIL CAR# EPX8105B ERG# 171 H039	CM	24.20	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the destination of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in it or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and its applicable tariffs and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: CSX Railroad Corp

Per:

[Signature]

Date:

8/19/21

Per:

Luis Castro

Date:

8/19/21

Mark with "X" or "RD" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.101(a)(1) (ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc

Certification of receipt of materials

Per:

Carrie Ambodeaux

Date:

9-22-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 91058C

TO
Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 883-2169

FROM
Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 008
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1824

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

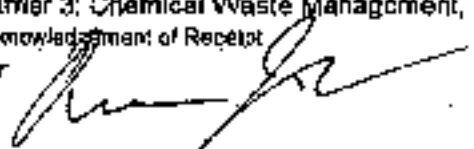
Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147277 (800) 336-2169

Per:

Date:



9-21-01

10/10/00
10/10/00
10/10/00

10/10/00
10/10/00
10/10/00

10/10/00
10/10/00
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10/10/00
10/10/00

10

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

10/10/00

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

763077

DOCUMENT# 91058D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 663-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.41(d) 1241

SHIPPER'S INSTRUCTIONS

Empty box for shipper's instructions.

Ticket 50138

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UCM
X	1	RG UN3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFID: D80843LA IN CONTAINER# EPIU226207 RAIL CAR# EPLX91058 ERG# 171 H038	CM	24.33	T

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted
good order, except as noted (contents and condition of packages unknown), marked, counted and destined as indicated above which said carrier
(the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract)
agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier en route to said destination,
it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party in any
time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions
in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in
the governing classification on the date of shipment.

Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM LLC
Carrier: CSX Railroad Corp
Per: [Signature] Date: 8/19/21
Per: Lisa Castro Date: 8/19/21

Mark with "X" or "HQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations
governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of
Lading 172.301(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement
prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply. Unless a specific exception from the
requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
Certification of receipt of materials
Per: Amanda DeWitt / A DeWitt Date: 09-23-21

763077

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81056D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC.
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70885
Phone: (337) 503-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0 048791 068
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1824

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2169

Per:

Dennis Gray

Date:

9-23-21

UNIVERSITY OF MISSISSIPPI
SCHOOL OF CHEMISTRY
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF MISSISSIPPI
38776

RECEIVED BY _____
DATE _____
TIME _____
WEIGHT _____
DESCRIPTION _____

10/1

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 208077
WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT # 91638E

263094

To

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2189

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 098
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 124f

SHIPPER'S INSTRUCTIONS

[Empty box for shipper's instructions]

Tanks 50139

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID N.O.S. 0. III (BENZENE) PROFILE 989843LA IN CONTAINER# EPIJ225315 RAIL CAR# EPIXR1056 FRG# 171 H039	CM	24.33	T

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is accepted
good order, except as noted (contents and condition of package unknown), marked, certified and classified as indicated above which said carrier
the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract
agree to carry to the usual place of delivery as said destination. If on the route, otherwise to deliver to another carrier on the route to said destination,
it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any
time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions
in the governing classification or on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in
the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: [Signature] Date: [Signature] Per: Luis Castro Date: 8/19/21

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations
governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of
Lading 172.203(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement
provided in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the
requirements provided in the Regulations for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: [Signature] Date: 9-24-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01058E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 049791 085
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company

Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.

LA0000147272 (800) 336-2169

Acknowledgement of Receipt

Per:

Date:

Daniel H. Gray

9-24-21

EMILY JOY 113

TICKET 19

ID 653375
GROSS 82680 lb INBOUND
09:23AM 09/24/2021

OUTBOUND TICKET 19

GROSS 82680 lb RECALLED
TARE ~~33400 lb~~
NET 49280 lb

NET 24.64 TON

10:40AM 09/24/2021

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

Q

RECEIVING TICKET # _____

703094

WEIGHED BY _____

4115

11/27/21

Bill of Lading (Page 1 of 2)

DOCUMENT # 91058F

703092

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LAD000777201
 City/State/Zip: SULPHUR LA 70685
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNKAVE
 EPA ID: PAD 049791 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

SHIPPER'S INSTRUCTIONS

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4/1211

Tickets 50/40

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	UTM
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE. SOLID. N.O.S. 9. III (BENZENE) PROFILE: 669843LA IM CONTAINER# EPIU225077 RAIL CAR# EPIX9105B ERG# 171 H039	CM	23.83	T

PH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *8/18/21*
 Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (b) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Dubodaux* Date: *9-24-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81058F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
NC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAB000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2159

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048791 068
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 226-1524

Carrier 2: BNSF Railway Company
Acknowledgment of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgment of Receipt

LACOU0147272 (800) 336-2169

Per:

Date:

9-23-21

STATE OF LOUISIANA

DEPARTMENT OF REVENUE

Handwritten notes:
01110000
25.52

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # No 3072

WEIGHED BY

Page

Bill of Lading (Page 1 of 2)

263177

DOCUMENT # 91431A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70085
 Phone: (337) 503-2168

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 048781 068
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

SHIPPER'S INSTRUCTIONS

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241

Totals 50153

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CM
X	1	RC, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9, III (BENZENE) PROFILE: 988843LA IM CONTAINER# EPIU226011 RAIL CAR# EPIX81431 ERG# 171 H039	CM	23.00	T

NH

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery or to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification on the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *[Signature]*
 Per: Luis Castro Date: 8/19/21

Mark with "X" or "RC" as appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this return is an optional method for identifying hazardous materials as Bill of Lading 172.201(a)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Carrie Dubodreaux* Date: 9-29-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1431A

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70066
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS RBM
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PA0 048781 008
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (440) 228-1624

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 336-2169

Per:

Lashin Bellard

Date:

9-29-21

10/11/01

10/11/01

10/11/01
10/11/01
10/11/01

10/11/01

10/11/01
10/11/01
10/11/01
10/11/01

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 10/11/01

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

763174

DOCUMENT # 9143113

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7175 JOHN BRANNON ROAD
 EPA ID: LA0000777201
 City/State/Zip: SULPHUR LA 70866
 Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 0497B1 098
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 49CFR 261.4(b) 1241

SHIPPER'S INSTRUCTIONS

Empty box for shipper's instructions.

Ticket 50155

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	CGM
X	1	RQ UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9, III (BENZENE) PROFILE: 988643LA IM CONTAINER# EP11225904 <i>EP1 0225203</i> RAIL CAR# EPX81431 ERG# 171 H900	CM	23.78	T

NH

RECEIVED subject to the classifications and limits in effect on the date of the issue of this Bill of Lading, the property described above is approved good order, except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated above, if such route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the RCM of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the end terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CSX Railroad Corp
 Per: *[Signature]* Date: *[Signature]*
 Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" if applicable to Corrosive Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(g) of the Federal Regulations, as included on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Aminda Deville / A Deville* Date: *9-29-21*

Bill of Lading (Continuation Sheet) 2 of 2

763174

DOCUMENT# B1431B

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2109

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PA0046791088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147277 (800) 336-2189

Per:

Date:

[Signature] *[Signature]* 27-04

7/11/03 11:23
USDA 6 (X)

13 05406
0303 05701 H 030025
12:1201 04297001

6/13/03 11:23 50
0303 05701 H 030025
1301 04400 H
0301 04400 H
0301 04400 H
0303 05701 H 030025

(X)

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70666

RECEIVING TICKET # 2103174
WEIGHED BY _____

0303

Bill of Lading (Page 1 of 2)

DOCUMENT# 91431C

763187

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LAD00077201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 588-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 098
City/State/Zip: PHILADELPHIA, PA 19148
Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
DEFINITION OF SOLID WASTE UNDER 40CFR
261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Tickets 50156

HAZARDOUS MATERIAL NO. SHIPPING UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	Liab.
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9. III (BENZENE) PROFILE: 969843LA IM CONTAINER# EPIU225266- RAIL CAR# EPIX01431 ERG# 171 H038	CM	23.98	T

5664 LB

NH

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and destined as indicated above which each carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the consignment agreement to carry to the usual place of delivery or said destination. It is its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that in its transfer with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC

Carrier: GSX Railroad Corp

Per:

Date: 8/19/21

Per: Lucia Castro

Date: 8/19/21

Mark with "X" or "RQ" if appropriate designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of the column is an optional method for identifying hazardous materials on Bills of Lading 172.201(a)(1) (B) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management Inc

Certification of receipt of materials

Per: Carrie Dubois Date: 9-30-21

ET 4

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 014310

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70685
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS RSM
LLC
Street: 3144 PABSYUNKAVE
EPA ID: PAD 040701 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (480) 225-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2169

Per:



Date:

5-30-23

7/11/05
102410

U.S. DEPARTMENT OF ENERGY
OFFICE OF REGULATORY AFFAIRS
WASHINGTON, DC 20545

OFFICE OF REGULATORY AFFAIRS

DATE: 7/11/05
TIME: 10:00 AM
BY: [Signature]
WEIGHT: 25.50 LBS
CITY: [Signature]

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # 763187

WEIGHED BY _____

1000

Waste Management

7/11/05 10:00 AM

Bill of Lading (Page 1 of 2)

DOCUMENT# 91431D

763128

<p>TO</p> <p>Consignee: CHEMICAL WASTE MANAGEMENT INC Street: 7170 JOHN BRANNON ROAD EPA ID: LAC009777201 City/State/Zip: SULPHUR LA 70865 Phone: (337) 683-2168</p>	<p>FROM</p> <p>Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Street: 3144 PASSYUNK AVE EPA ID: PAD 049791 088 City/State/Zip: PHILADELPHIA, PA 19145 Phone: (440) 228-1624</p>
--	---

<p>ADDITIONAL INFORMATION</p> <p>VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(b) 1241</p> <p><i>Tides 5057</i></p>	<p>SHIPPER'S INSTRUCTIONS</p>
--	-------------------------------

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. B, III (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU225109 RAIL CAR# EPIX81431 ERG# 171 H038	CM	20.70	T

RECEIVED subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above is apparent good order, except as noted (nature and condition of packages unknown), marked, consigned and delivered as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as said destination. If on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to such carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time involved in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: *[Signature]* Date: *7/12/21* Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RQ" if appropriate to designate Hazardous materials substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 472.204(e)(1)(ii) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(e) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials

Per: *Carmel Ambrosciano* Date: *9-29-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# B1431D

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70665
Phone: (337) 563-2188

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 088
City/State/Zip: PHILADELPHIA, PA 19145
Phone: (410) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2169

Per:

Joseph [Signature]

Date:

9/28/2021

10/27/99 10:00 AM
10/27/99

10/27/99 10:00 AM
10/27/99

10/27/99

10/27/99 10:00 AM
10/27/99 10:00 AM
10/27/99 10:00 AM

10/27/99 10:00 AM

10/27/99 10:00 AM

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHNS BRANNON ROAD
SULPHUR, LA 70685

RECEIVING TICKET # _____

WEIGHED BY _____

Bill of Lading (Page 1 of 2)

DOCUMENT# 91431R

763193

TO
 Consignee: CHEMICAL WASTE MANAGEMENT INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70066
 Phone: (337) 583-2188

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 049781 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (480) 228-1524

ADDITIONAL INFORMATION
 VRE TANK BOTTOMS EXCLUDED FROM THE DEFINITION OF SOLID WASTE UNDER 40CFR 261.4(a) 1241
 Tickets 50/58

SHIPPER'S INSTRUCTIONS

HAZARDOUS MATERIAL	NO. SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	U.S. LBS
X	1	RC, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. D.M. (BENZENE) PROFILE: 068043LA IM CONTAINER# EPIU225188 RAIL CAR# EPIX91431 ERG# 171 H039	CM	23.80	T

NH

RECEIVED subject to the stipulations and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked consigned and certified as indicated above which said carrier (the word carrier being understood through this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to the usual place of delivery or safe destination. If on its route, otherwise known as another carrier on the route to said destination, it is mutually agreed as to each carrier as to or any of said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC
 Carrier: CBX Railroad Corp
 Per: *[Signature]* Date: *8/19/21*
 Per: *Luis Castro* Date: *8/19/21*

Mark with "X" or "RC" if appropriate to designate Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bill of Lading 172.201(a)(1) (ii) of Title 49 Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc
 Certification of receipt of materials
 Per: *Camie Dumbaulx* Date: *9-30-21*

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 81431E

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA000077201
City/State/Zip: SULPHUR LA 70965
Phone: (337) 583-2169

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNK AVE
EPA ID: PAD 048781 008
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (480) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

Per:

LA0000147272 (800) 336-2169

Date: 9/30/2021

Joseph Cook

1-11-00 (S.S.) (S.S.)

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11/25/00 10/20/00
11/25/00 10/20/00

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11/25/00 10/20/00

CP

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70665

RECEIVING TICKET # 763193
WEIGHED BY _____

V U

Bill of Lading (Page 1 of 2)

DOCUMENT# 91431F

763158

Consignee: CHEMICAL WASTE MANAGEMENT
 INC
 Street: 7170 JOHN BRANNON ROAD
 EPA ID: LA000077201
 City/State/Zip: SULPHUR LA 70886
 Phone: (337) 663-2189

FROM
 Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
 LLC
 Street: 3144 PASSYUNK AVE
 EPA ID: PAD 046791 088
 City/State/Zip: PHILADELPHIA, PA 19145
 Phone: (440) 228-1524

ADDITIONAL INFORMATION

VRE TANK BOTTOMS EXCLUDED FROM THE
 DEFINITION OF SOLID WASTE UNDER 40CFR
 261.4(a) 1241

SHIPPER'S INSTRUCTIONS

Ticket 50159

HAZARDOUS MATERIAL NO SHIPPING UNITS

DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS

Type Volume

HAZARDOUS MATERIAL	NO SHIPPING UNITS	DESCRIPTION OF ARTICLES SPECIAL MARKS & EXCEPTIONS	Type	Volume	WT
X	1	RQ, UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. 9 III (BENZENE) PROFILE: 888843LA IM CONTAINER# EPIU225289 RAIL CAR# EPIX01431 ERG# 171 H03B	CM	23.83	T

114

RECEIVED subject to the classifications and terms in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of packages unknown), marked, numbered and certified as indicated above which said carrier (the word carrier being understood through his contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to the usual place of delivery as indicated above. If at the route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed as to each carrier of all or any of said property, over all or any portion of said route to destination and as to each party of any time interested in either way said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the rate terms and conditions.

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M LLC Carrier: CSX Railroad Corp

Per: _____ Date: 8/18/21 Per: Luis Castro Date: 8/19/21

Mark with "X" or "NO" if applicable to the smaller Hazardous Materials Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on Bills of Lading 172.201 (p)(1) of Title 49, Code of Federal Regulations. Also, when shipping hazardous materials, the shipper's certification statement prescribed in section 172.204(a) of the Federal Regulations, as indicated on the Bill of Lading does apply, unless a specific exception from the requirement is provided in the Regulation for a particular material.

Designated Consignee: Chemical Waste Management, Inc Certification of receipt of materials
 Per: *Carmie Embodreau* Date: 9-30-21

Bill of Lading (Continuation Sheet) 2 of 2

DOCUMENT# 01431F

TO

FROM

Consignee: CHEMICAL WASTE MANAGEMENT
INC
Street: 7170 JOHN BRANNON ROAD
EPA ID: LA0000777201
City/State/Zip: SULPHUR LA 70085
Phone: (337) 583-2180

Shipper: PHILADELPHIA ENERGY SOLUTIONS R&M
LLC
Street: 3144 PASSYUNKAVE
EPA ID: PAD 046791 088
City/State/Zip: PHILADELPHIA, PA 19146
Phone: (440) 228-1524

Carrier 2: BNSF Railway Company
Acknowledgement of Receipt

Per:

Date:

Carrier 3: Chemical Waste Management, Inc.
Acknowledgement of Receipt

LA0000147272 (800) 338-2169

Per:

Joshua Ballant

Date:

9-30-21

1/14/2008

1.00 10

01/20/08
0301.3 4/206 10/01/08
0.133294 07/07/2001

01/18/08 10/01/08

01/18/08 02/20/08 10/01/08
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VCC

CHEMICAL WASTE MANAGEMENT, INC.
7170 JOHN BRANNON ROAD
SULPHUR, LA 70865

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RECEIVING TICKET # 203158

WEIGHED BY _____

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ANALYTICAL REPORT

PREPARED FOR

Attn: Mr. William Schmidt
Ransom Consulting LLC
2127 Hamilton Ave
Hamilton New Jersey 08619

JOB DESCRIPTION

PES Refinery

JOB NUMBER

680-223928-1

Definitions/Glossary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Sample Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-223928-1	GPR794-01R-SS01	Solid	10/21/22 12:00	10/25/22 10:30
680-223928-2	GPR794-02R-SS01	Solid	10/21/22 12:10	10/25/22 10:30
680-223928-3	GPR794-03R-SS01	Solid	10/21/22 12:20	10/25/22 10:30
680-223928-4	GPR794-04R-SS01	Solid	10/21/22 12:30	10/25/22 10:30
680-223928-5	GPR794-05R-SS01	Solid	10/21/22 12:40	10/25/22 10:30
680-223928-6	GPR794-06R-SS01	Solid	10/21/22 12:50	10/25/22 10:30
680-223928-7	GPR794-07R-SS01	Solid	10/21/22 13:00	10/25/22 10:30
680-223928-8	GPR794-08R-SS01	Solid	10/21/22 13:10	10/25/22 10:30

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Case Narrative

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Job ID: 680-223928-1

Laboratory: Eurofins Savannah

Narrative

**Job Narrative
680-223928-1**

Revision

Per client request, the sample ID's have been revised.

Comments

No additional comments.

Receipt

The samples were received on 10/25/2022 10:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.7° C.

GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-01R-SS01

Lab Sample ID: 680-223928-1

Date Collected: 10/21/22 12:00

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.8	U	9.5	2.8	mg/Kg			11/04/22 14:58	1

Client Sample ID: GPR794-02R-SS01

Lab Sample ID: 680-223928-2

Date Collected: 10/21/22 12:10

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 15:20	1

Client Sample ID: GPR794-03R-SS01

Lab Sample ID: 680-223928-3

Date Collected: 10/21/22 12:20

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 15:43	1

Client Sample ID: GPR794-04R-SS01

Lab Sample ID: 680-223928-4

Date Collected: 10/21/22 12:30

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 16:06	1

Client Sample ID: GPR794-05R-SS01

Lab Sample ID: 680-223928-5

Date Collected: 10/21/22 12:40

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.7	U	9.3	2.7	mg/Kg			11/04/22 16:29	1

Client Sample ID: GPR794-06R-SS01

Lab Sample ID: 680-223928-6

Date Collected: 10/21/22 12:50

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.6	U	9.1	2.6	mg/Kg			11/04/22 16:51	1

Client Sample ID: GPR794-07R-SS01

Lab Sample ID: 680-223928-7

Date Collected: 10/21/22 13:00

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.8	U	9.7	2.8	mg/Kg			11/04/22 17:14	1

Eurofins Savannah

Client Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-08R-SS01

Lab Sample ID: 680-223928-8

Date Collected: 10/21/22 13:10

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.7	U	9.3	2.7	mg/Kg			11/04/22 17:37	1

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QC Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 680-748612/1-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.8	2.9	mg/Kg			11/04/22 14:35	1

Lab Sample ID: LCS 680-748612/2-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Tetraethylene Glycol	39.6	41.7		mg/Kg		105	10 - 197

Lab Sample ID: LCSD 680-748612/3-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Tetraethylene Glycol	37.2	34.8		mg/Kg		94	10 - 197	18	50

Lab Sample ID: 680-223928-7 MS
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: GPR794-07R-SS01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Tetraethylene Glycol	2.8	U	38.8	12.3		mg/Kg		32	10 - 197

Lab Sample ID: 680-223928-7 MSD
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: GPR794-07R-SS01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Tetraethylene Glycol	2.8	U	40.0	20.2		mg/Kg		51	10 - 197	48	50

QC Association Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

GC Semi VOA

Leach Batch: 748612

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Soluble	Solid	DI Leach	
680-223928-2	GPR794-02R-SS01	Soluble	Solid	DI Leach	
680-223928-3	GPR794-03R-SS01	Soluble	Solid	DI Leach	
680-223928-4	GPR794-04R-SS01	Soluble	Solid	DI Leach	
680-223928-5	GPR794-05R-SS01	Soluble	Solid	DI Leach	
680-223928-6	GPR794-06R-SS01	Soluble	Solid	DI Leach	
680-223928-7	GPR794-07R-SS01	Soluble	Solid	DI Leach	
680-223928-8	GPR794-08R-SS01	Soluble	Solid	DI Leach	
MB 680-748612/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 680-748612/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 680-748612/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
680-223928-7 MS	GPR794-07R-SS01	Soluble	Solid	DI Leach	
680-223928-7 MSD	GPR794-07R-SS01	Soluble	Solid	DI Leach	

Analysis Batch: 748845

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Soluble	Solid	8015D	748612
680-223928-2	GPR794-02R-SS01	Soluble	Solid	8015D	748612
680-223928-3	GPR794-03R-SS01	Soluble	Solid	8015D	748612
680-223928-4	GPR794-04R-SS01	Soluble	Solid	8015D	748612
680-223928-5	GPR794-05R-SS01	Soluble	Solid	8015D	748612
680-223928-6	GPR794-06R-SS01	Soluble	Solid	8015D	748612
680-223928-7	GPR794-07R-SS01	Soluble	Solid	8015D	748612
680-223928-8	GPR794-08R-SS01	Soluble	Solid	8015D	748612
MB 680-748612/1-A	Method Blank	Soluble	Solid	8015D	748612
LCS 680-748612/2-A	Lab Control Sample	Soluble	Solid	8015D	748612
LCSD 680-748612/3-A	Lab Control Sample Dup	Soluble	Solid	8015D	748612
680-223928-7 MS	GPR794-07R-SS01	Soluble	Solid	8015D	748612
680-223928-7 MSD	GPR794-07R-SS01	Soluble	Solid	8015D	748612

General Chemistry

Analysis Batch: 748590

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Total/NA	Solid	Moisture	
680-223928-2	GPR794-02R-SS01	Total/NA	Solid	Moisture	
680-223928-3	GPR794-03R-SS01	Total/NA	Solid	Moisture	
680-223928-4	GPR794-04R-SS01	Total/NA	Solid	Moisture	
680-223928-5	GPR794-05R-SS01	Total/NA	Solid	Moisture	
680-223928-6	GPR794-06R-SS01	Total/NA	Solid	Moisture	
680-223928-7	GPR794-07R-SS01	Total/NA	Solid	Moisture	
680-223928-8	GPR794-08R-SS01	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-01R-SS01

Lab Sample ID: 680-223928-1

Date Collected: 10/21/22 12:00

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.26 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 14:58	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-02R-SS01

Lab Sample ID: 680-223928-2

Date Collected: 10/21/22 12:10

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 15:20	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-03R-SS01

Lab Sample ID: 680-223928-3

Date Collected: 10/21/22 12:20

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.07 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 15:43	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-04R-SS01

Lab Sample ID: 680-223928-4

Date Collected: 10/21/22 12:30

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:06	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Lab Chronicle

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-05R-SS01

Lab Sample ID: 680-223928-5

Date Collected: 10/21/22 12:40

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.36 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:29	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-06R-SS01

Lab Sample ID: 680-223928-6

Date Collected: 10/21/22 12:50

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.48 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:51	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-07R-SS01

Lab Sample ID: 680-223928-7

Date Collected: 10/21/22 13:00

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.14 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 17:14	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-08R-SS01

Lab Sample ID: 680-223928-8

Date Collected: 10/21/22 13:10

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.37 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 17:37	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Laboratory References:

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-23
ANAB	Dept. of Defense ELAP	L2463	09-22-24
Arkansas DEQ	State	19-015-0	02-01-23
California	State	2939	06-30-22 *
Connecticut	State	PH-0161	03-31-23
Florida	NELAP	E87052	06-23-23
Georgia	State	E87052	06-30-23
Georgia (DW)	State	803	06-30-23
Guam	State	19-007R	04-17-23
Hawaii	State	<cert No.>	06-30-23
Illinois	NELAP	200022	11-30-22
Indiana	State	C-GA-02	06-30-23
Iowa	State	353	07-01-23
Kentucky (UST)	State	NA	06-30-23
Louisiana	NELAP	30690	06-30-23
Louisiana (All)	NELAP	30690	06-30-23
Louisiana (DW)	State	LA009	12-31-22
Maine	State	GA00006	09-25-24
Maryland	State	250	12-31-22
Massachusetts	State	M-GA006	07-30-23
Michigan	State	9925	06-30-23
Mississippi	State	<cert No.>	06-30-23
Nebraska	State	NE-OS-7-04	06-30-23
New Jersey	NELAP	GA769	06-30-23
New Mexico	State	GA00006	06-30-23
New York	NELAP	10842	04-01-23
North Carolina (DW)	State	13701	07-31-23
North Carolina (WW/SW)	State	269	12-31-22
Pennsylvania	NELAP	68-00474	06-30-23
Puerto Rico	State	GA00006	01-01-23
South Carolina	State	98001	06-30-22 *
Tennessee	State	TN02961	06-30-23
Texas	NELAP	T1047004185-19-14	11-30-22
Texas	TCEQ Water Supply	T104704185	06-30-23
USDA	US Federal Programs	P330-18-00313	09-03-24
Virginia	NELAP	460161	06-14-23
Wisconsin	State	999819810	08-31-23
Wyoming	State	8TMS-L	06-30-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Savannah

Method Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Method	Method Description	Protocol	Laboratory
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	EET SAV
Moisture	Percent Moisture	EPA	EET SAV
DI Leach	Deionized Water Leaching Procedure	ASTM	EET SAV

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



Chain of Custody Record

550316



ENVIRONMENTAL
TESTING

Address _____

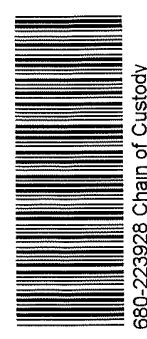
TAL-111

Regulatory Program: DW NPDES RCRA Other

Client Contact
 Company Name: RANSOM CONSULTING
 Address: 2127 HAMILTON AVE
 City/State/Zip: PRINCE HARRISON, NJ 08619
 Phone: (609) 584-0090
 Fax: _____
 Project Name: YES REFUELV - TANK CROPPOT
 Site: YES REFUELV
 PO#: 200 00135

Project Manager: WALTER SCARFONE
 Tel/Email: WALTER SCARFONE @ BURNS&MCDONNELL.COM
 Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below: STD
 2 weeks
 1 week
 2 days
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)
G-PR794-01R-5501	10/21	1200	G	S	1		
G-PR794-02R-5501		1210			1		
G-PR794-03R-5501		1220			1		
G-PR794-04R-5501		1230			1		
G-PR794-05R-5501		1240			1		
G-PR794-06R-5501		1250			1		
G-PR794-07R-5501		1300			1		
G-PR794-08R-5501		1310			1		



Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other _____
 Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample
 Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:
SHIP TO SAVANNAH LAB
Temp 4.7 - 4.7
 Custody Seal No: _____
 Relinquished by: _____
 Relinquished by: APR 15/07 17:30
 Relinquished by: _____
 Received by: TYNISHA HENNEY
 Received in Laboratory by: _____
 Date/Time: 10/24/07
 Date/Time: 10/24/07 17:30
 Date/Time: 10/24/07 17:27
 Date/Time: 10/24/07 17:30
 Company: RANSOM CONSULTING
 Company: Company
 Company: Company
 Company: Company



Login Sample Receipt Checklist

Client: Ransom Consulting LLC

Job Number: 680-223928-1

Login Number: 223928

List Source: Eurofins Savannah

List Number: 1

Creator: Harley, Tynisha

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Eurofins Savannah

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the {0} Project Manager.

Authorization



Generated
11/15/2022 2:27:07 PM
Revision 1

Authorized for release by
Sheila Hoffman, Project Manager II
Sheila.Hoffman@et.eurofinsus.com
Designee for
Grace Chang, Project Manager II
Grace.Chang@et.eurofinsus.com
(732)593-2579



ANALYTICAL REPORT

Lab Number:	L2238159
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	07/25/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238159

Report Date: 07/25/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2238159-01	GPR799-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:30	07/18/22
L2238159-02	GPR799-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:40	07/18/22
L2238159-03	GPR799-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:50	07/18/22
L2238159-04	GPR799-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:00	07/18/22
L2238159-05	GPR799-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:10	07/18/22
L2238159-06	GPR799-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:20	07/18/22
L2238159-07	GPR799-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:30	07/18/22
L2238159-08	GPR798-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:40	07/18/22
L2238159-09	GPR798-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:50	07/18/22
L2238159-10	GPR798-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:00	07/18/22
L2238159-11	GPR798-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:10	07/18/22
L2238159-12	GPR798-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:20	07/18/22
L2238159-13	GPR798-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:30	07/18/22
L2238159-14	GPR798-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:40	07/18/22
L2238159-15	FB-071822-01	WATER	PHILADELPHIA, PA	07/18/22 14:00	07/18/22
L2238159-16	FB-071822-02	WATER	PHILADELPHIA, PA	07/18/22 14:10	07/18/22
L2238159-17	DUP-47	SOIL	PHILADELPHIA, PA	07/18/22 00:00	07/18/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative (continued)

Report Revision

July 25, 2022: The Client IDs were amended on L2238159-01 through -14.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2238159-01D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (131%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-02: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (156%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-03D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (65%) due to interference with the Internal Standard.

L2238159-07D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (166%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-08D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (136%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-09: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (232%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-09: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (68%) due to interference with the Internal Standard.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative (continued)

L2238159-10: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (216%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-11D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (63%) due to interference with the Internal Standard.

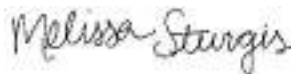
L2238159-12: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (249%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-13D: The surrogate recovery is outside the acceptance criteria for toluene-d8 (146%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-13D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (46%) due to interference with the Internal Standard.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 07/25/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-01 D
 Client ID: GPR799-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 00:07
 Analyst: JC
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	2.2		mg/kg	0.27	0.089	5
---------	-----	--	-------	------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	131	Q	70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-02
 Client ID: GPR799-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 18:24
 Analyst: JC
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	1.6		mg/kg	0.056	0.018	1
---------	-----	--	-------	-------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	156	Q	70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-03 D
 Client ID: GPR799-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:50
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:00
 Analyst: JC
 Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	16.		mg/kg	0.45	0.15	5
---------	-----	--	-------	------	------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	84		70-130
Toluene-d8	114		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	65	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-04 D
 Client ID: GPR799-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:41
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	22.		mg/kg	0.22	0.073	4
---------	-----	--	-------	------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	130		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-05
 Client ID: GPR799-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 19:17
 Analyst: JC
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2.7		mg/kg	0.046	0.015	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-06
 Client ID: GPR799-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 19:44
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	1.3		mg/kg	0.052	0.017	1
---------	-----	--	-------	-------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-07 D
 Client ID: GPR799-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 22:49
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	0.71		mg/kg	0.10	0.034	2
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	166	Q	70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-08 D
 Client ID: GPR798-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:15
 Analyst: JC
 Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	3.4		mg/kg	0.094	0.031	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	136	Q	70-130
Dibromofluoromethane	86		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-09
 Client ID: GPR798-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:50
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 20:11
 Analyst: JC
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	6.2		mg/kg	0.12	0.040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	232	Q	70-130
Dibromofluoromethane	68	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-10
 Client ID: GPR798-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 20:37
 Analyst: JC
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	0.40		mg/kg	0.069	0.023	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	116		70-130
4-Bromofluorobenzene	216	Q	70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-11 D
 Client ID: GPR798-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:26
 Analyst: JC
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	14.		mg/kg	0.43	0.14	5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	117		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	63	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-12
 Client ID: GPR798-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 21:30
 Analyst: JC
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	1.4		mg/kg	0.052	0.017	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	109		70-130
4-Bromofluorobenzene	249	Q	70-130
Dibromofluoromethane	76		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-13 D
 Client ID: GPR798-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:53
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2.2		mg/kg	0.13	0.043	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	146	Q	70-130
4-Bromofluorobenzene	128		70-130
Dibromofluoromethane	46	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-14 D
 Client ID: GPR798-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 22:23
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	7.8		mg/kg	0.10	0.035	2
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	128		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-15
 Client ID: FB-071822-01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:01
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-16
 Client ID: FB-071822-02
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:25
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	109		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-17 D
 Client ID: DUP-47
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 00:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 00:33
 Analyst: JC
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	5900		mg/kg	58	19.	1000
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/19/22 16:38
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,04-10,12,14,17 Batch: WG1665199-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	100		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:29
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 15-16 Batch: WG1665431-5					
Benzene	ND		ug/l	0.50	0.16

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:50
Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03,11,13 Batch: WG1665578-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	89		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	91		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-10,12,14,17 Batch: WG1665199-3 WG1665199-4								
Benzene	77		80		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	96		96		70-130
4-Bromofluorobenzene	98		97		70-130
Dibromofluoromethane	102		101		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 15-16 Batch: WG1665431-3 WG1665431-4								
Benzene	100		100		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	98		95		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03,11,13 Batch: WG1665578-3 WG1665578-4								
Benzene	88		84		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	76		75		70-130
Toluene-d8	102		101		70-130
4-Bromofluorobenzene	104		103		70-130
Dibromofluoromethane	78		77		70-130



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-01
Client ID: GPR799-01-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:30
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.0		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-02
Client ID: GPR799-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:40
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.0		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-03
Client ID: GPR799-03-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:50
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.8		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-04

Date Collected: 07/18/22 10:00

Client ID: GPR799-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.3		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-05
Client ID: GPR799-05-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:10
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.7		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-06

Date Collected: 07/18/22 10:20

Client ID: GPR799-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-07
 Client ID: GPR799-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-08
Client ID: GPR798-01-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:40
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	93.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-09
Client ID: GPR798-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:50
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-10
 Client ID: GPR798-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	70.3		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-11
Client ID: GPR798-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:10
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	69.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-12
Client ID: GPR798-05-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:20
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.4		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-13

Date Collected: 07/18/22 11:30

Client ID: GPR798-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-14

Date Collected: 07/18/22 11:40

Client ID: GPR798-07-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.1		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-17

Date Collected: 07/18/22 00:00

Client ID: DUP-47

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238159

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-14,17 QC Batch ID: WG1664527-1 QC Sample: L2238159-01 Client ID: GPR799-01-SS01						
Solids, Total	88.0	87.2	%	1		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-01A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-01B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-01C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-01D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-02A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-02B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-02C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-02D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-03A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-03B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-03C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-03D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-04A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-04B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-04C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-04D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-05A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-05B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-05C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-05D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-06A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-06B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-06C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-06D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-07A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-07B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-07C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-07D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-08A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-08B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-08C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-08D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-09A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-09B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-09C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-09D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-10A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-10B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-10C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-10D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-11A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-11B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-11C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-11D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-12A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-12B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-12C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-12D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-13A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-13B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-13C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-13D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-14A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-14B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-14C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-14D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-15A	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-15B	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-15C	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16A	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16B	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16C	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-17A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-17B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-17C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-17D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Project Name: PHILADELPHIA REFINERY
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

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Report Date: 07/25/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 2 OF 2



Westborough, MA
 TEL: 508-898-9220
 FAX: 508-898-9193

Mansfield, MA
 TEL: 508-822-9300
 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: Standard Rush (ONLY IF PRE-APPROVED)

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Due Date: _____ Time: _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
38159-1	GPR-798-04-5501	7/19/22	1110	S	an
-12	GPR-798-05-5501		1120		
-13	GPR-798-06-5501		1130		
-14	GPR-798-07-5501		1140		
-15	FB-071822-01		1400	W	
-16	FB-071822-02		1410	↓	
-17	DUP-47			S	

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Date Rec'd in Lab: 7/19/22 ALPHA Job #: L2238159

Report Information **Data Deliverables** **Billing Information**

FAX EMAIL Same as Client info PO #: 3562

ADEx Add'l Deliverables

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

ANALYSIS	SAMPLE HANDLING																TOTAL # BOTTLES	
	Filtration <input type="checkbox"/> Done <input checked="" type="checkbox"/> Not Needed Preservation <input type="checkbox"/> Lab to do <input type="checkbox"/> Lab to do (Please specify below)																	
Benzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Container Type: G Preservative: -

Relinquished By: *[Signature]* Date/Time: 7/18/22 14:58
 Received By: *[Signature]* Date/Time: 7/18/22 14:58

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

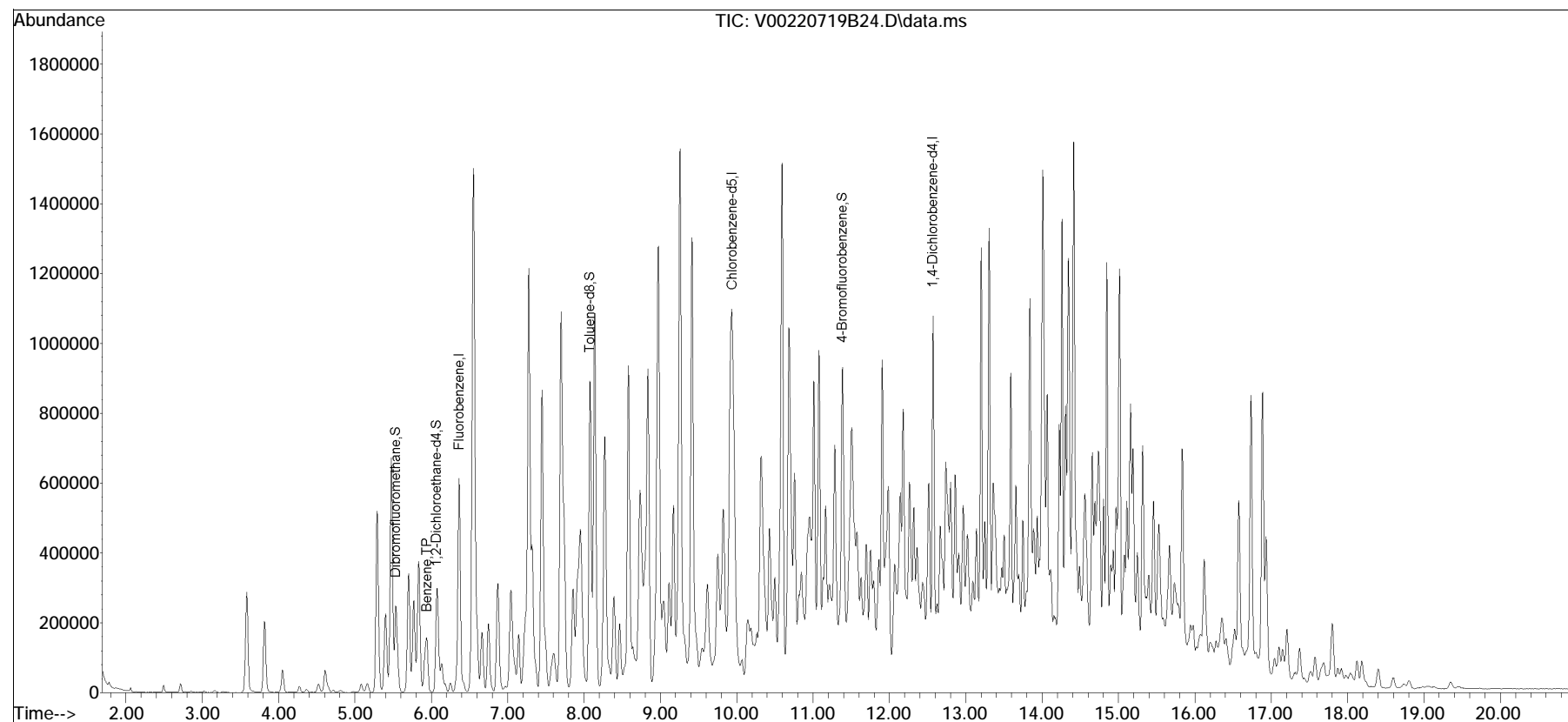
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B24.D
Acq On : 20 Jul 2022 12:07 am
Operator : VOA100:JC
Sample : 12238159-01d,31h,5.67,10,0.02,,a
Misc : WG1665199,ICAL19178
ALS Vial : 24 Sample Multiplier: 1

Quant Time: Jul 20 06:14:53 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

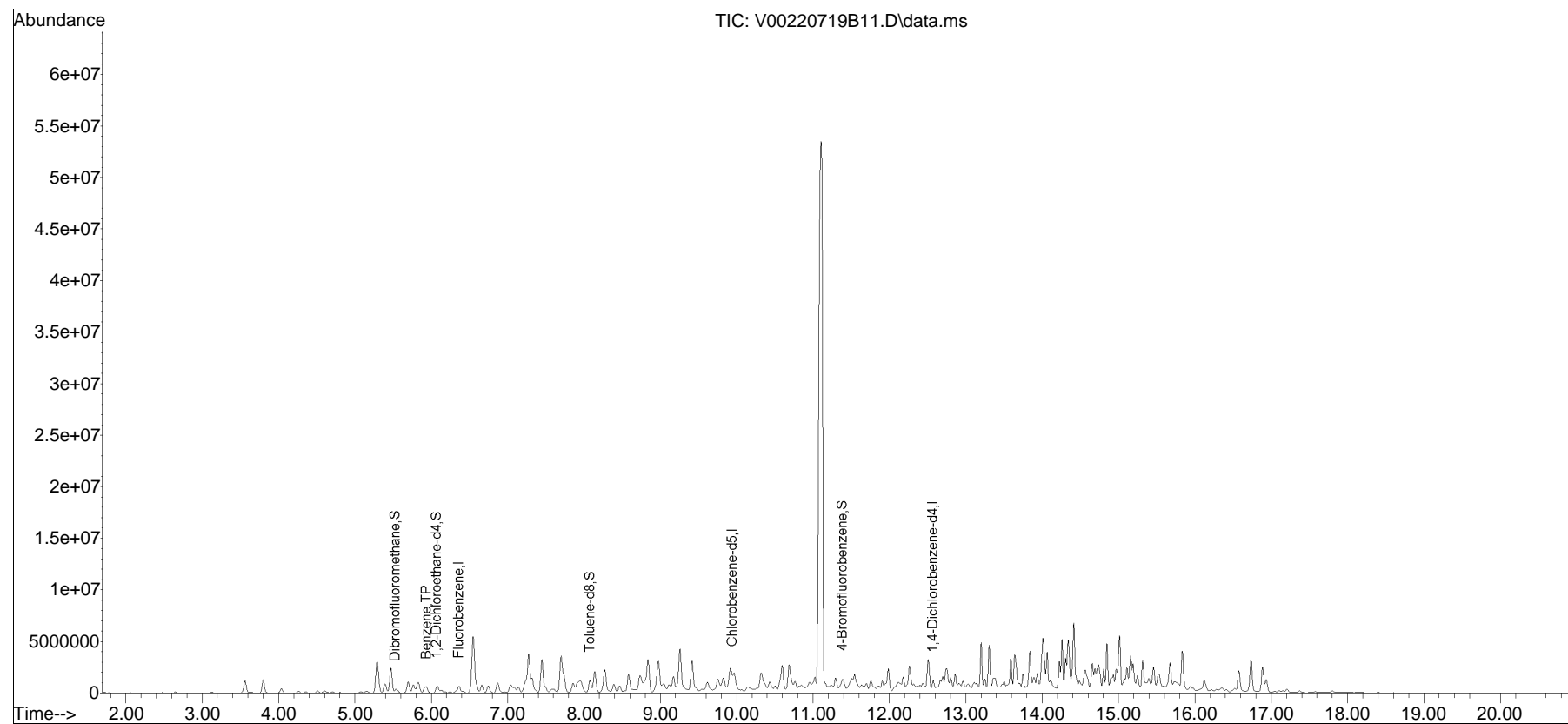


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B11.D
Acq On : 19 Jul 2022 6:24 pm
Operator : VOA100:JC
Sample : 12238159-02,31h,6.21,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Jul 20 06:14:01 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

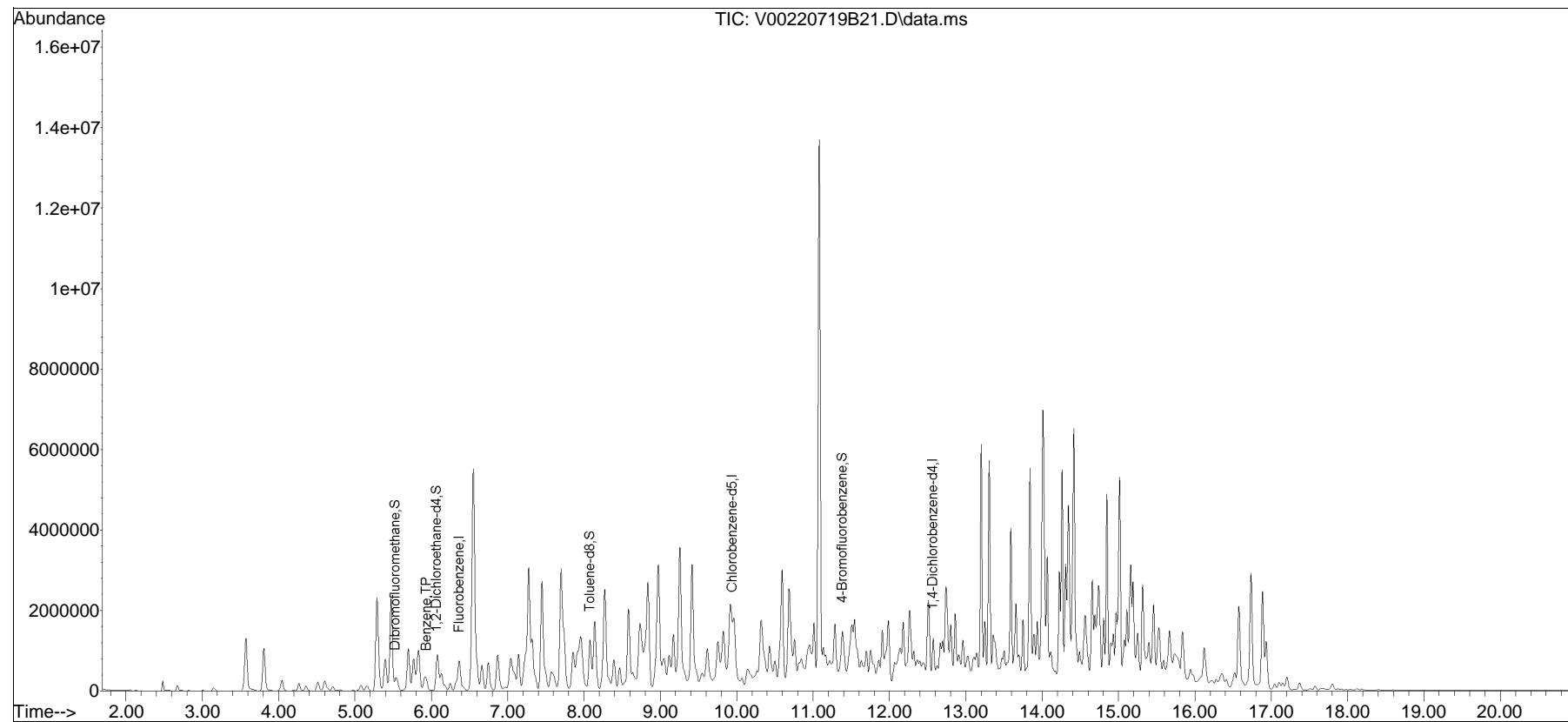


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B21.D
Acq On : 19 Jul 2022 10:49 pm
Operator : VOA100:JC
Sample : 12238159-07d,31h,6.23,10,0.05,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 20 06:14:41 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

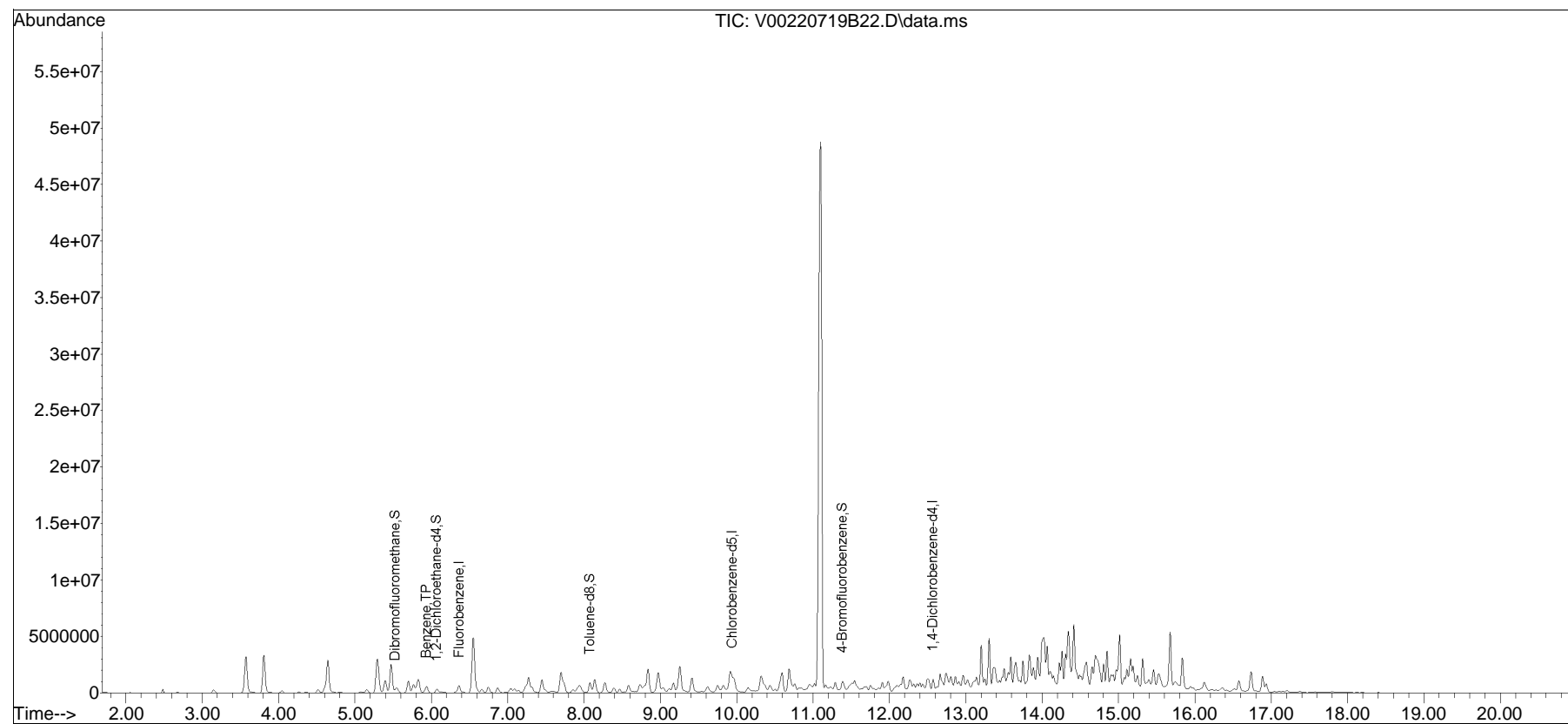


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B22.D
Acq On : 19 Jul 2022 11:15 pm
Operator : VOA100:JC
Sample : 12238159-08d,31h,5.93,10,0.05,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 22 Sample Multiplier: 1

Quant Time: Jul 20 06:14:45 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

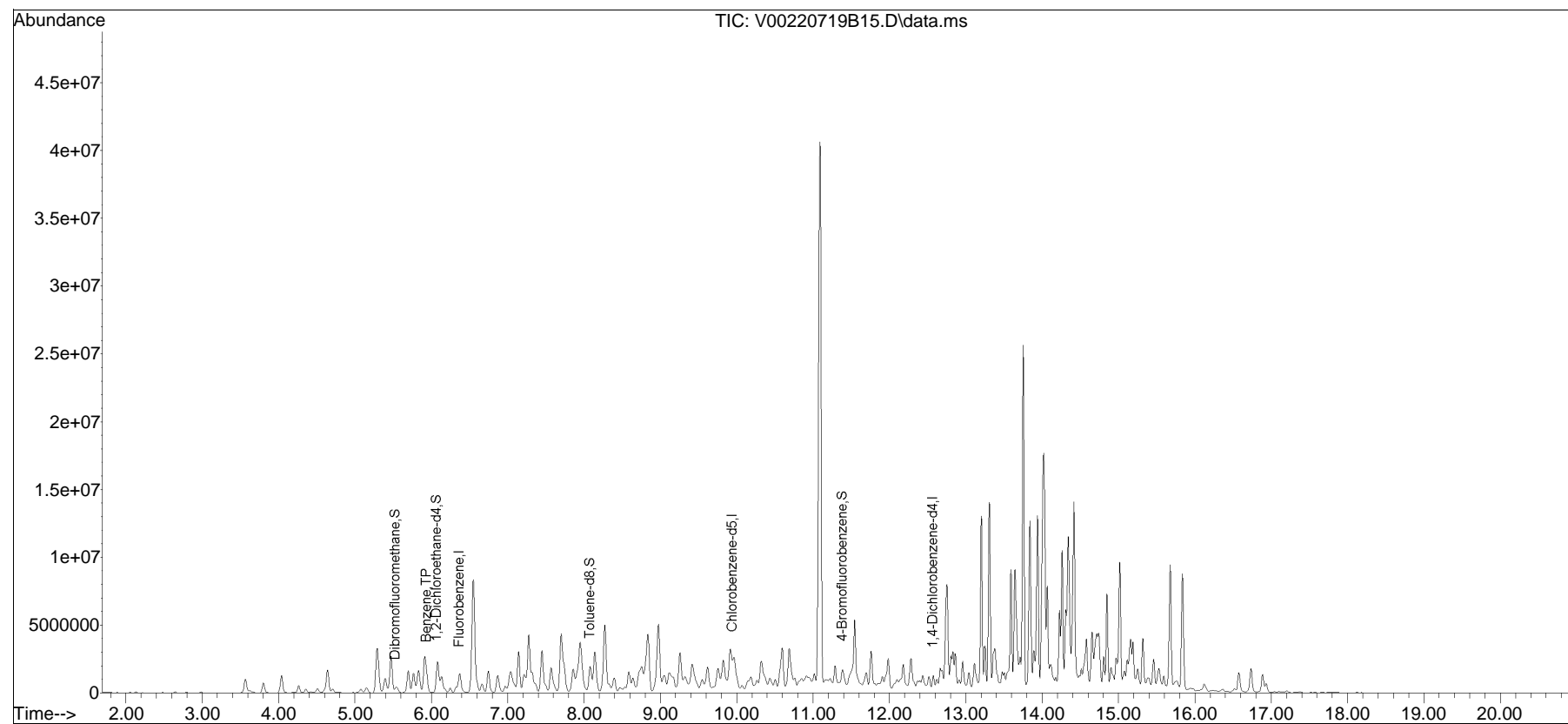


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B15.D
Acq On : 19 Jul 2022 8:11 pm
Operator : VOA100:JC
Sample : 12238159-09,31h,2.99,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 15 Sample Multiplier: 1

Quant Time: Jul 20 06:14:17 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

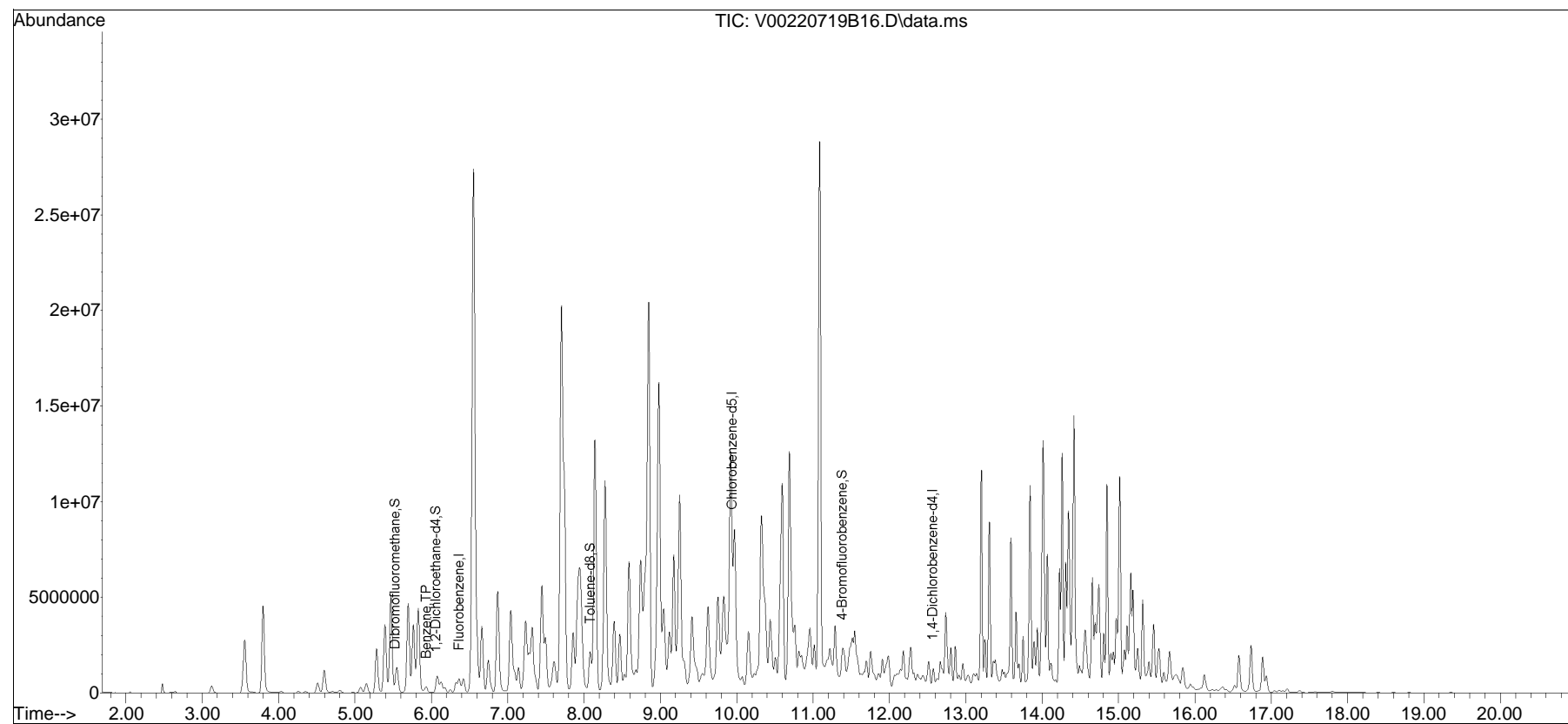


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B16.D
Acq On : 19 Jul 2022 8:37 pm
Operator : VOA100:JC
Sample : 12238159-10,31h,6.08,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 16 Sample Multiplier: 1

Quant Time: Jul 20 06:14:21 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

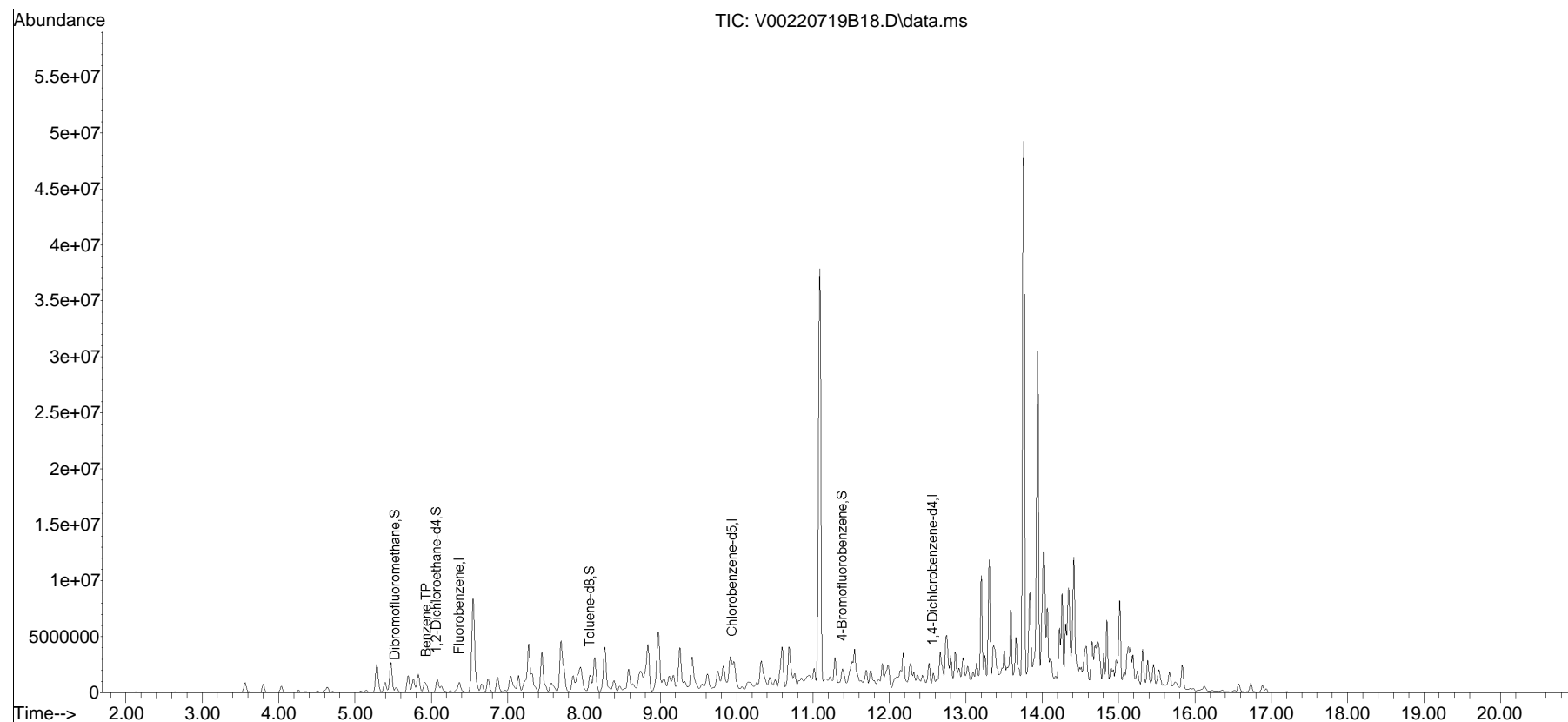


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B18.D
Acq On : 19 Jul 2022 9:30 pm
Operator : VOA100:JC
Sample : 12238159-12,31h,6.50,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Jul 20 06:14:29 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

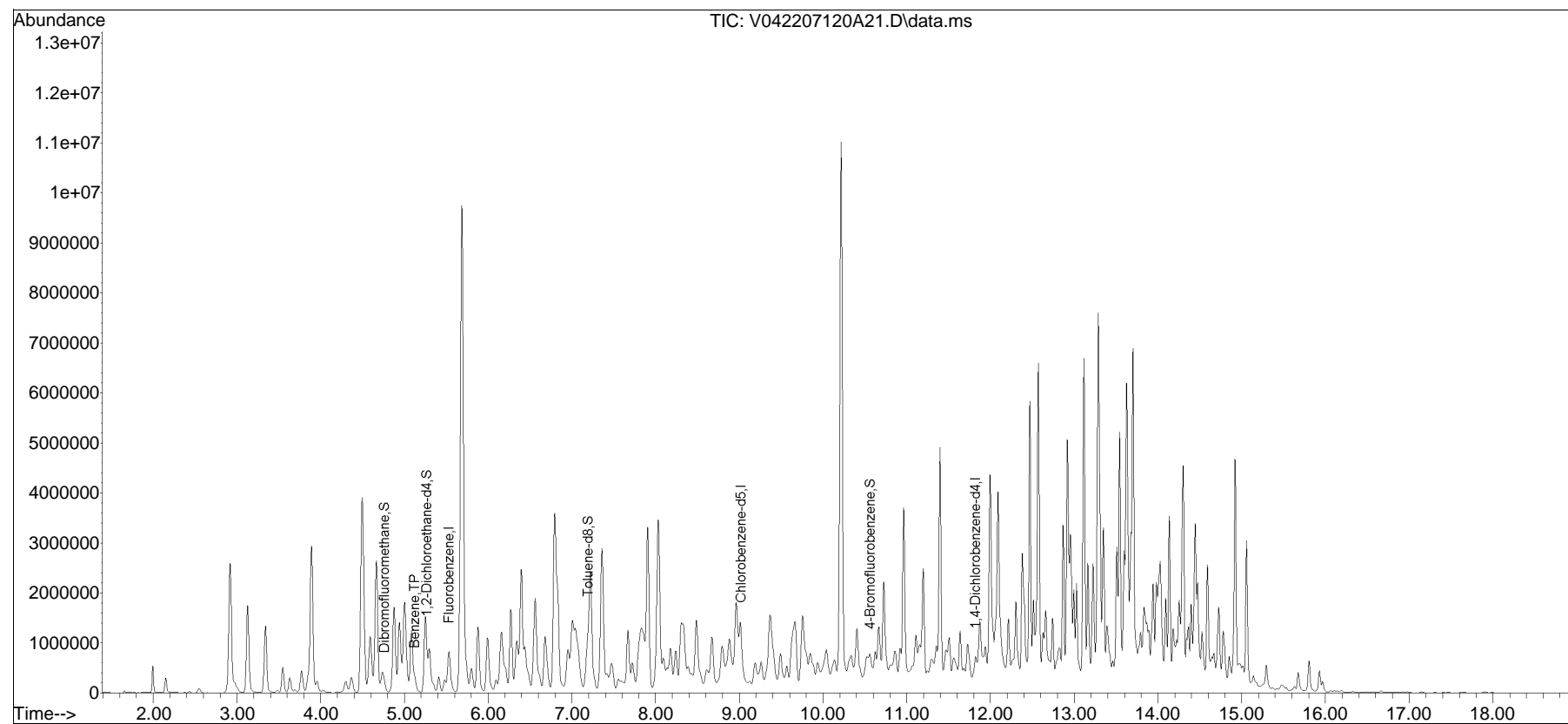


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA104\2022\2207120A\
Data File : V042207120A21.D
Acq On : 20 Jul 2022 3:53 pm
Operator : VOA104:JC
Sample : L2238159-13D,31H,5.73,10,0.050,,A
Misc : WG1665578,ICAL19119
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 21 06:56:55 2022
Quant Method : I:\VOLATILES\VOA104\2022\2207120A\V104_220621A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Wed Jun 22 06:56:43 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\2207120A\V042207120A01.D•





ANALYTICAL REPORT

Lab Number:	L2238160
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	07/25/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2238160-01	GPR1117-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:00	07/18/22
L2238160-02	GPR1117-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:30	07/18/22
L2238160-03	GPR1117-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:00	07/18/22
L2238160-04	GPR1117-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:15	07/18/22
L2238160-05	GPR1117-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:30	07/18/22
L2238160-06	GPR1117-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:45	07/18/22
L2238160-07	GPR1117-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:00	07/18/22
L2238160-08	GPR1117-08-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:15	07/18/22
L2238160-09	GPR1116-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:30	07/18/22
L2238160-10	GPR1116-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 13:00	07/18/22
L2238160-11	GPR1116-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 13:30	07/18/22
L2238160-12	GPR1116-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 14:00	07/18/22
L2238160-13	FB-071822-3	WATER	PHILADELPHIA, PA	07/18/22 14:10	07/18/22
L2238160-14	FB-071822-4	WATER	PHILADELPHIA, PA	07/18/22 14:20	07/18/22
L2238160-15	TB-071822	WATER	PHILADELPHIA, PA	07/18/22 00:00	07/18/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2238160-15: A sample identified as "TB-071822" was listed on the Chain of Custody, but not received. This was verified by the client.

Volatile Organics

L2238160-04D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

L2238160-04D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (216%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-06: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (1300%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-09: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (194%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-11: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (318%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

Total Metals

L2238160-01-03: The sample has an elevated detection limit for lead due to the dilution required by matrix interferences encountered during analysis.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 07/25/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01
 Client ID: GPR1117-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 02:08
 Analyst: JC
 Percent Solids: 59%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0035	0.00035	1
Benzene	ND		mg/kg	0.00087	0.00029	1
1,2-Dichloroethane	ND		mg/kg	0.0017	0.00045	1
Toluene	ND		mg/kg	0.0017	0.00094	1
1,2-Dibromoethane	ND		mg/kg	0.00087	0.00051	1
Ethylbenzene	ND		mg/kg	0.0017	0.00024	1
p/m-Xylene	ND		mg/kg	0.0035	0.00098	1
o-Xylene	0.0014	J	mg/kg	0.0017	0.00051	1
Xylenes, Total	0.0014	J	mg/kg	0.0017	0.00051	1
Isopropylbenzene	0.0055		mg/kg	0.0017	0.00019	1
1,3,5-Trimethylbenzene	0.0016	J	mg/kg	0.0035	0.00034	1
1,2,4-Trimethylbenzene	0.0023	J	mg/kg	0.0035	0.00058	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	121		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02
 Client ID: GPR1117-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 02:36
 Analyst: JC
 Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0033	0.00033	1
Benzene	ND		mg/kg	0.00083	0.00028	1
1,2-Dichloroethane	ND		mg/kg	0.0017	0.00043	1
Toluene	ND		mg/kg	0.0017	0.00090	1
1,2-Dibromoethane	ND		mg/kg	0.00083	0.00049	1
Ethylbenzene	ND		mg/kg	0.0017	0.00023	1
p/m-Xylene	ND		mg/kg	0.0033	0.00093	1
o-Xylene	0.00098	J	mg/kg	0.0017	0.00048	1
Xylenes, Total	0.00098	J	mg/kg	0.0017	0.00048	1
Isopropylbenzene	0.0010	J	mg/kg	0.0017	0.00018	1
1,3,5-Trimethylbenzene	0.0015	J	mg/kg	0.0033	0.00032	1
1,2,4-Trimethylbenzene	0.0017	J	mg/kg	0.0033	0.00055	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03
 Client ID: GPR1117-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 03:04
 Analyst: JC
 Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00029	1
Benzene	0.00024	J	mg/kg	0.00071	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00037	1
Toluene	ND		mg/kg	0.0014	0.00077	1
1,2-Dibromoethane	ND		mg/kg	0.00071	0.00042	1
Ethylbenzene	ND		mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00080	1
o-Xylene	0.00048	J	mg/kg	0.0014	0.00042	1
Xylenes, Total	0.00048	J	mg/kg	0.0014	0.00042	1
Isopropylbenzene	0.00049	J	mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00028	1
1,2,4-Trimethylbenzene	0.00085	J	mg/kg	0.0028	0.00048	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	119		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04 D
 Client ID: GPR1117-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 07:19
 Analyst: JC
 Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.1	0.11	2
Benzene	0.11	J	mg/kg	0.28	0.093	2
1,2-Dichloroethane	ND		mg/kg	0.56	0.14	2
Toluene	0.34	J	mg/kg	0.56	0.30	2
1,2-Dibromoethane	ND		mg/kg	0.28	0.16	2
Ethylbenzene	0.23	J	mg/kg	0.56	0.079	2
p/m-Xylene	0.92	J	mg/kg	1.1	0.31	2
o-Xylene	0.20	J	mg/kg	0.56	0.16	2
Xylenes, Total	1.1	J	mg/kg	0.56	0.16	2
Isopropylbenzene	3.7		mg/kg	0.56	0.061	2
1,3,5-Trimethylbenzene	0.41	J	mg/kg	1.1	0.11	2
1,2,4-Trimethylbenzene	1.3		mg/kg	1.1	0.19	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	108		70-130
4-Bromofluorobenzene	216	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
 Client ID: GPR1117-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 03:33
 Analyst: JC
 Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0044	0.00045	1
Benzene	0.0011		mg/kg	0.0011	0.00037	1
1,2-Dichloroethane	ND		mg/kg	0.0022	0.00057	1
Toluene	ND		mg/kg	0.0022	0.0012	1
1,2-Dibromoethane	ND		mg/kg	0.0011	0.00065	1
Ethylbenzene	ND		mg/kg	0.0022	0.00031	1
p/m-Xylene	ND		mg/kg	0.0044	0.0012	1
o-Xylene	ND		mg/kg	0.0022	0.00064	1
Xylenes, Total	ND		mg/kg	0.0022	0.00064	1
Isopropylbenzene	ND		mg/kg	0.0022	0.00024	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0044	0.00043	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0044	0.00074	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06
 Client ID: GPR1117-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:45
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:01
 Analyst: JC
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0038	0.00038	1
Benzene	0.0012		mg/kg	0.00094	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00048	1
Toluene	0.0020		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00094	0.00055	1
Ethylbenzene	ND		mg/kg	0.0019	0.00026	1
p/m-Xylene	0.0036	J	mg/kg	0.0038	0.0010	1
o-Xylene	0.0012	J	mg/kg	0.0019	0.00055	1
Xylenes, Total	0.0048	J	mg/kg	0.0019	0.00055	1
Isopropylbenzene	0.0012	J	mg/kg	0.0019	0.00020	1
1,3,5-Trimethylbenzene	0.0025	J	mg/kg	0.0038	0.00036	1
1,2,4-Trimethylbenzene	0.0090		mg/kg	0.0038	0.00063	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	111		70-130
4-Bromofluorobenzene	1300	Q	70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
 Client ID: GPR1117-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:29
 Analyst: JC
 Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0039	0.00039	1
Benzene	0.00049	J	mg/kg	0.00097	0.00032	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00050	1
Toluene	ND		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00097	0.00057	1
Ethylbenzene	ND		mg/kg	0.0019	0.00027	1
p/m-Xylene	ND		mg/kg	0.0039	0.0011	1
o-Xylene	ND		mg/kg	0.0019	0.00056	1
Xylenes, Total	ND		mg/kg	0.0019	0.00056	1
Isopropylbenzene	ND		mg/kg	0.0019	0.00021	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0039	0.00037	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0039	0.00064	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:57
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.0054		mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	ND		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	ND		mg/kg	0.0012	0.00017	1
p/m-Xylene	ND		mg/kg	0.0024	0.00066	1
o-Xylene	ND		mg/kg	0.0012	0.00034	1
Xylenes, Total	ND		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.00028	J	mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0024	0.00039	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 05:54
 Analyst: JC
 Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0029	0.00029	1
Benzene	ND		mg/kg	0.00073	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0015	0.00038	1
Toluene	0.00081	J	mg/kg	0.0015	0.00080	1
1,2-Dibromoethane	ND		mg/kg	0.00073	0.00043	1
Ethylbenzene	0.0012	J	mg/kg	0.0015	0.00021	1
p/m-Xylene	0.030		mg/kg	0.0029	0.00082	1
o-Xylene	0.012		mg/kg	0.0015	0.00043	1
Xylenes, Total	0.042		mg/kg	0.0015	0.00043	1
Isopropylbenzene	0.028		mg/kg	0.0015	0.00016	1
1,3,5-Trimethylbenzene	0.016		mg/kg	0.0029	0.00028	1
1,2,4-Trimethylbenzene	0.026		mg/kg	0.0029	0.00049	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	123		70-130
4-Bromofluorobenzene	194	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10
 Client ID: GPR1116-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 06:22
 Analyst: JC
 Percent Solids: 54%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.017		mg/kg	0.00092	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00048	1
Toluene	0.020		mg/kg	0.0018	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00092	0.00054	1
Ethylbenzene	0.0031		mg/kg	0.0018	0.00026	1
p/m-Xylene	0.016		mg/kg	0.0037	0.0010	1
o-Xylene	0.0055		mg/kg	0.0018	0.00054	1
Xylenes, Total	0.022		mg/kg	0.0018	0.00054	1
Isopropylbenzene	0.0091		mg/kg	0.0018	0.00020	1
1,3,5-Trimethylbenzene	0.00097	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.029		mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	121		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11
 Client ID: GPR1116-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 06:51
 Analyst: JC
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0029	0.00029	1
Benzene	0.0012		mg/kg	0.00072	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00037	1
Toluene	0.00080	J	mg/kg	0.0014	0.00078	1
1,2-Dibromoethane	ND		mg/kg	0.00072	0.00042	1
Ethylbenzene	0.00040	J	mg/kg	0.0014	0.00020	1
p/m-Xylene	0.00085	J	mg/kg	0.0029	0.00080	1
o-Xylene	0.0031		mg/kg	0.0014	0.00042	1
Xylenes, Total	0.0040	J	mg/kg	0.0014	0.00042	1
Isopropylbenzene	0.015		mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	0.00056	J	mg/kg	0.0029	0.00028	1
1,2,4-Trimethylbenzene	0.0095		mg/kg	0.0029	0.00048	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	121		70-130
4-Bromofluorobenzene	318	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
 Client ID: GPR1116-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 05:25
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0023	0.00024	1
Benzene	0.00056	J	mg/kg	0.00059	0.00019	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.0017		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00034	1
Ethylbenzene	0.0010	J	mg/kg	0.0012	0.00016	1
p/m-Xylene	0.0082		mg/kg	0.0023	0.00066	1
o-Xylene	0.0068		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.015		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.024		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0089		mg/kg	0.0023	0.00023	1
1,2,4-Trimethylbenzene	0.022		mg/kg	0.0023	0.00039	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:17
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:49
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	110		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:23
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 13:13
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	109		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-15
 Client ID: TB-071822
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 00:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:30
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 07/20/22 14:35
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 13-15 Batch: WG1664686-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:46
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03,05-12 Batch: WG1665206-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 07/19/22 23:46
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04 Batch: WG1665207-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:29
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 13-14 Batch: WG1665431-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	103		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 13-15 Batch: WG1664686-2									
1,2-Dibromoethane	93		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03,05-12 Batch: WG1665206-3 WG1665206-4								
Methyl tert butyl ether	116		115		66-130	1		30
Benzene	107		106		70-130	1		30
1,2-Dichloroethane	98		98		70-130	0		30
Toluene	105		105		70-130	0		30
1,2-Dibromoethane	104		104		70-130	0		30
Ethylbenzene	104		104		70-130	0		30
p/m-Xylene	105		105		70-130	0		30
o-Xylene	105		104		70-130	1		30
Isopropylbenzene	108		108		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		105		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	101		102		70-130
4-Bromofluorobenzene	106		105		70-130
Dibromofluoromethane	91		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04 Batch: WG1665207-3 WG1665207-4								
Methyl tert butyl ether	116		115		66-130	1		30
Benzene	107		106		70-130	1		30
1,2-Dichloroethane	98		98		70-130	0		30
Toluene	105		105		70-130	0		30
1,2-Dibromoethane	104		104		70-130	0		30
Ethylbenzene	104		104		70-130	0		30
p/m-Xylene	105		105		70-130	0		30
o-Xylene	105		104		70-130	1		30
Isopropylbenzene	108		108		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		105		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	101		102		70-130
4-Bromofluorobenzene	106		104		70-130
Dibromofluoromethane	91		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 13-14 Batch: WG1665431-3 WG1665431-4								
Methyl tert butyl ether	100		110		63-130	10		20
Benzene	100		100		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	100		100		70-130	0		20
Ethylbenzene	100		100		70-130	0		20
p/m-Xylene	105		100		70-130	5		20
o-Xylene	100		100		70-130	0		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	98		95		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01
 Client ID: GPR1117-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 06:49
 Analyst: SLR
 Percent Solids: 59%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.1		mg/kg	0.28	0.034	1
Fluorene	0.26	J	mg/kg	0.28	0.027	1
Phenanthrene	0.86		mg/kg	0.17	0.034	1
Anthracene	0.22		mg/kg	0.17	0.054	1
Pyrene	1.2		mg/kg	0.17	0.028	1
Benzo(a)anthracene	0.72		mg/kg	0.17	0.031	1
Chrysene	0.79		mg/kg	0.17	0.029	1
Benzo(b)fluoranthene	0.97		mg/kg	0.17	0.047	1
Benzo(a)pyrene	1.0		mg/kg	0.22	0.068	1
Benzo(ghi)perylene	0.50		mg/kg	0.22	0.033	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	39		30-120
4-Terphenyl-d14	33		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02
 Client ID: GPR1117-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 05:15
 Analyst: SLR
 Percent Solids: 67%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.24	0.030	1
Fluorene	0.27		mg/kg	0.24	0.024	1
Phenanthrene	0.80		mg/kg	0.14	0.029	1
Anthracene	0.29		mg/kg	0.14	0.047	1
Pyrene	1.5		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.76		mg/kg	0.14	0.027	1
Chrysene	0.88		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	1.0		mg/kg	0.14	0.041	1
Benzo(a)pyrene	1.1		mg/kg	0.19	0.059	1
Benzo(ghi)perylene	0.58		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	114		23-120
2-Fluorobiphenyl	60		30-120
4-Terphenyl-d14	59		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03
 Client ID: GPR1117-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 03:18
 Analyst: SLR
 Percent Solids: 68%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	6.3		mg/kg	0.24	0.029	1
Fluorene	2.7		mg/kg	0.24	0.023	1
Phenanthrene	8.9		mg/kg	0.14	0.029	1
Anthracene	1.4		mg/kg	0.14	0.046	1
Pyrene	3.2		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.88		mg/kg	0.14	0.027	1
Chrysene	1.0		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	0.79		mg/kg	0.14	0.040	1
Benzo(a)pyrene	0.84		mg/kg	0.19	0.058	1
Benzo(ghi)perylene	0.41		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	101		23-120
2-Fluorobiphenyl	54		30-120
4-Terphenyl-d14	53		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04
 Client ID: GPR1117-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 07:35
 Analyst: SLR
 Percent Solids: 79%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.20	0.025	1
Fluorene	1.0		mg/kg	0.20	0.020	1
Phenanthrene	3.5		mg/kg	0.12	0.025	1
Anthracene	0.96		mg/kg	0.12	0.040	1
Pyrene	4.8		mg/kg	0.12	0.020	1
Benzo(a)anthracene	2.9		mg/kg	0.12	0.023	1
Chrysene	2.8		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	3.4		mg/kg	0.12	0.035	1
Benzo(a)pyrene	3.1		mg/kg	0.16	0.050	1
Benzo(ghi)perylene	1.6		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	360	Q	23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	61		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
 Client ID: GPR1117-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:28
 Analyst: SLR
 Percent Solids: 44%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.32	J	mg/kg	0.37	0.045	1
Fluorene	0.19	J	mg/kg	0.37	0.036	1
Phenanthrene	1.2		mg/kg	0.22	0.045	1
Anthracene	0.54		mg/kg	0.22	0.072	1
Pyrene	1.1		mg/kg	0.22	0.037	1
Benzo(a)anthracene	0.67		mg/kg	0.22	0.042	1
Chrysene	0.66		mg/kg	0.22	0.039	1
Benzo(b)fluoranthene	0.75		mg/kg	0.22	0.062	1
Benzo(a)pyrene	0.64		mg/kg	0.30	0.091	1
Benzo(ghi)perylene	0.36		mg/kg	0.30	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	125	Q	23-120
2-Fluorobiphenyl	64		30-120
4-Terphenyl-d14	65		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06
 Client ID: GPR1117-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:45
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:52
 Analyst: SLR
 Percent Solids: 69%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.2		mg/kg	0.24	0.029	1
Fluorene	0.12	J	mg/kg	0.24	0.023	1
Phenanthrene	0.52		mg/kg	0.14	0.029	1
Anthracene	0.22		mg/kg	0.14	0.047	1
Pyrene	0.76		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.53		mg/kg	0.14	0.027	1
Chrysene	0.74		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	0.76		mg/kg	0.14	0.041	1
Benzo(a)pyrene	0.72		mg/kg	0.19	0.059	1
Benzo(ghi)perylene	0.49		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	102		23-120
2-Fluorobiphenyl	48		30-120
4-Terphenyl-d14	36		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
 Client ID: GPR1117-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 06:02
 Analyst: SLR
 Percent Solids: 60%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.45		mg/kg	0.28	0.034	1
Fluorene	0.11	J	mg/kg	0.28	0.027	1
Phenanthrene	0.39		mg/kg	0.17	0.034	1
Anthracene	0.098	J	mg/kg	0.17	0.054	1
Pyrene	0.39		mg/kg	0.17	0.028	1
Benzo(a)anthracene	0.26		mg/kg	0.17	0.031	1
Chrysene	0.27		mg/kg	0.17	0.029	1
Benzo(b)fluoranthene	0.36		mg/kg	0.17	0.047	1
Benzo(a)pyrene	0.30		mg/kg	0.22	0.068	1
Benzo(ghi)perylene	0.20	J	mg/kg	0.22	0.032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	30		30-120
4-Terphenyl-d14	27		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 08:23
 Analyst: SLR
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.14	J	mg/kg	0.21	0.026	1
Fluorene	0.12	J	mg/kg	0.21	0.021	1
Phenanthrene	1.1		mg/kg	0.13	0.026	1
Anthracene	0.30		mg/kg	0.13	0.042	1
Pyrene	1.0		mg/kg	0.13	0.021	1
Benzo(a)anthracene	0.59		mg/kg	0.13	0.024	1
Chrysene	0.58		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	0.61		mg/kg	0.13	0.036	1
Benzo(a)pyrene	0.54		mg/kg	0.17	0.052	1
Benzo(ghi)perylene	0.26		mg/kg	0.17	0.025	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	54		23-120
2-Fluorobiphenyl	31		30-120
4-Terphenyl-d14	31		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 03:41
 Analyst: SLR
 Percent Solids: 67%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.94		mg/kg	0.24	0.030	1
Fluorene	0.11	J	mg/kg	0.24	0.024	1
Phenanthrene	0.32		mg/kg	0.15	0.030	1
Anthracene	0.14	J	mg/kg	0.15	0.048	1
Pyrene	0.49		mg/kg	0.15	0.024	1
Benzo(a)anthracene	0.38		mg/kg	0.15	0.027	1
Chrysene	0.42		mg/kg	0.15	0.025	1
Benzo(b)fluoranthene	0.57		mg/kg	0.15	0.041	1
Benzo(a)pyrene	0.58		mg/kg	0.20	0.060	1
Benzo(ghi)perylene	0.33		mg/kg	0.20	0.029	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	56		23-120
2-Fluorobiphenyl	28	Q	30-120
4-Terphenyl-d14	27		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10
 Client ID: GPR1116-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:05
 Analyst: SLR
 Percent Solids: 54%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.30	0.037	1
Fluorene	0.35		mg/kg	0.30	0.030	1
Phenanthrene	0.94		mg/kg	0.18	0.037	1
Anthracene	0.34		mg/kg	0.18	0.059	1
Pyrene	1.2		mg/kg	0.18	0.030	1
Benzo(a)anthracene	0.81		mg/kg	0.18	0.034	1
Chrysene	0.92		mg/kg	0.18	0.032	1
Benzo(b)fluoranthene	1.1		mg/kg	0.18	0.051	1
Benzo(a)pyrene	1.2		mg/kg	0.24	0.074	1
Benzo(ghi)perylene	0.54		mg/kg	0.24	0.036	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	57		23-120
2-Fluorobiphenyl	29	Q	30-120
4-Terphenyl-d14	26		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11
 Client ID: GPR1116-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 10:21
 Analyst: SLR
 Percent Solids: 69%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.52		mg/kg	0.24	0.029	1
Fluorene	0.75		mg/kg	0.24	0.023	1
Phenanthrene	1.5		mg/kg	0.14	0.029	1
Anthracene	0.30		mg/kg	0.14	0.046	1
Pyrene	0.68		mg/kg	0.14	0.023	1
Benzo(a)anthracene	0.39		mg/kg	0.14	0.026	1
Chrysene	0.77		mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	0.49		mg/kg	0.14	0.040	1
Benzo(a)pyrene	0.42		mg/kg	0.19	0.058	1
Benzo(ghi)perylene	0.22		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	29	Q	30-120
4-Terphenyl-d14	28		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
 Client ID: GPR1116-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 18:55
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.8		mg/kg	0.20	0.024	1
Fluorene	0.16	J	mg/kg	0.20	0.019	1
Phenanthrene	0.52		mg/kg	0.12	0.024	1
Anthracene	0.28		mg/kg	0.12	0.038	1
Pyrene	0.54		mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.49		mg/kg	0.12	0.022	1
Chrysene	0.52		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.67		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.66		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.52		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	34		23-120
2-Fluorobiphenyl	36		30-120
4-Terphenyl-d14	30		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 07/21/22 11:19
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	36		23-120
2-Fluorobiphenyl	38		15-120
4-Terphenyl-d14	38	Q	41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 07/21/22 11:35
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	38		23-120
2-Fluorobiphenyl	40		15-120
4-Terphenyl-d14	39	Q	41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 07/19/22 23:24
Analyst: SLR

Extraction Method: EPA 3546
Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-12 Batch: WG1664828-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.099	0.020
Anthracene	ND		mg/kg	0.099	0.032
Pyrene	ND		mg/kg	0.099	0.016
Benzo(a)anthracene	ND		mg/kg	0.099	0.019
Chrysene	ND		mg/kg	0.099	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.099	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	112		23-120
2-Fluorobiphenyl	65		30-120
4-Terphenyl-d14	69		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 07/21/22 10:15
Analyst: RP

Extraction Method: EPA 3510C
Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 13-14 Batch: WG1665023-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	33		23-120
2-Fluorobiphenyl	35		15-120
4-Terphenyl-d14	34	Q	41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-12 Batch: WG1664828-2 WG1664828-3								
Naphthalene	51		63		40-140	21		50
Fluorene	50		64		40-140	25		50
Phenanthrene	50		63		40-140	23		50
Anthracene	51		66		40-140	26		50
Pyrene	49		63		35-142	25		50
Benzo(a)anthracene	50		64		40-140	25		50
Chrysene	51		64		40-140	23		50
Benzo(b)fluoranthene	48		63		40-140	27		50
Benzo(a)pyrene	50		65		40-140	26		50
Benzo(ghi)perylene	46		60		40-140	26		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	80		102		23-120
2-Fluorobiphenyl	46		57		30-120
4-Terphenyl-d14	47		60		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 13-14 Batch: WG1665023-2 WG1665023-3								
Naphthalene	73		65		40-140	12		40
Fluorene	71		65		40-140	9		40
Phenanthrene	73		67		40-140	9		40
Anthracene	71		66		40-140	7		40
Pyrene	68		65		26-127	5		40
Benzo(a)anthracene	70		65		40-140	7		40
Chrysene	74		69		40-140	7		40
Benzo(b)fluoranthene	74		70		40-140	6		40
Benzo(a)pyrene	73		69		40-140	6		40
Benzo(ghi)perylene	82		82		40-140	0		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	36		32		23-120
2-Fluorobiphenyl	37		33		15-120
4-Terphenyl-d14	36	Q	35	Q	41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01

Date Collected: 07/18/22 10:00

Client ID: GPR1117-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 59%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	157		mg/kg	6.55	0.351	2	07/19/22 09:10	07/20/22 16:06	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02

Date Collected: 07/18/22 10:30

Client ID: GPR1117-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	125		mg/kg	5.59	0.300	2	07/19/22 09:10	07/20/22 16:11	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03
 Client ID: GPR1117-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	133		mg/kg	5.80	0.311	2	07/19/22 09:10	07/20/22 16:15	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04

Date Collected: 07/18/22 11:15

Client ID: GPR1117-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	66.9		mg/kg	2.44	0.130	1	07/19/22 09:10	07/20/22 14:04	EPA 3050B	1,6010D	SB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
 Client ID: GPR1117-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	619		mg/kg	4.42	0.237	1	07/19/22 09:10	07/20/22 14:09	EPA 3050B	1,6010D	SB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06

Date Collected: 07/18/22 11:45

Client ID: GPR1117-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	687		mg/kg	2.85	0.153	1	07/19/22 09:10	07/20/22 14:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07

Date Collected: 07/18/22 12:00

Client ID: GPR1117-07-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	981		mg/kg	3.24	0.173	1	07/19/22 09:10	07/20/22 14:18	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08

Date Collected: 07/18/22 12:15

Client ID: GPR1117-08-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	20.4		mg/kg	2.46	0.132	1	07/19/22 09:10	07/20/22 14:55	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09

Date Collected: 07/18/22 12:30

Client ID: GPR1116-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	19.4		mg/kg	2.87	0.154	1	07/19/22 09:10	07/20/22 14:59	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10

Date Collected: 07/18/22 13:00

Client ID: GPR1116-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 54%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	97.8		mg/kg	3.52	0.189	1	07/19/22 09:10	07/20/22 15:04	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11
 Client ID: GPR1116-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	1360		mg/kg	2.83	0.152	1	07/19/22 09:10	07/20/22 15:09	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
 Client ID: GPR1116-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	20.2		mg/kg	2.31	0.124	1	07/19/22 09:10	07/20/22 15:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13

Date Collected: 07/18/22 14:10

Client ID: FB-071822-3

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 20:23	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14

Date Collected: 07/18/22 14:20

Client ID: FB-071822-4

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 20:28	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-12 Batch: WG1664552-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	07/19/22 09:10	07/20/22 09:38	1,6010D	SB

Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 13-14 Batch: WG1664652-1									
Lead, Total	ND	ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 19:15	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 Batch: WG1664552-2 SRM Lot Number: D113-540								
Lead, Total	90		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 13-14 Batch: WG1664652-2								
Lead, Total	96		-		80-120	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1664552-3 QC Sample: L2238152-01 Client ID: MS Sample												
Lead, Total	16.8	45.6	41.9	55	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1664652-3 WG1664652-4 QC Sample: L2238192-01 Client ID: MS Sample												
Lead, Total	10.88	530	549.9	102		505.6	93		75-125	8		20
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1664652-7 WG1664652-8 QC Sample: L2238192-03 Client ID: MS Sample												
Lead, Total	ND	530	506.0	95		507.2	96		75-125	0		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1664552-4 QC Sample: L2238152-01 Client ID: DUP Sample						
Lead, Total	16.8	12.3	mg/kg	31	Q	20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-01

Date Collected: 07/18/22 10:00

Client ID: GPR1117-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	58.7		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02

Date Collected: 07/18/22 10:30

Client ID: GPR1117-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-03

Date Collected: 07/18/22 11:00

Client ID: GPR1117-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	68.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-04

Date Collected: 07/18/22 11:15

Client ID: GPR1117-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	78.9		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
Client ID: GPR1117-05-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	43.5		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06

Date Collected: 07/18/22 11:45

Client ID: GPR1117-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	68.5		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07

Date Collected: 07/18/22 12:00

Client ID: GPR1117-07-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	59.6		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.1		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-09

Date Collected: 07/18/22 12:30

Client ID: GPR1116-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.4		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10

Date Collected: 07/18/22 13:00

Client ID: GPR1116-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	53.9		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-11

Date Collected: 07/18/22 13:30

Client ID: GPR1116-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	69.3		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
Client ID: GPR1116-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-12 QC Batch ID: WG1664529-1 QC Sample: L2238160-01 Client ID: GPR1117-01-SS01						
Solids, Total	58.7	62.1	%	6		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-01A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-01B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-01C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-01D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-01F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-02A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-02B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-02C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-02D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-02E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-02F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-03A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)
L2238160-03B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-03C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-03D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-03E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-03F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-04A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-04B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-04C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-04D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-04F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-05A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-05B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-05C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-05D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-05E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-05F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-06A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-06B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-06C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-06D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-06F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-07A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-07B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-07C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-07D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-07F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-08A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-08B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-08C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-08D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-08E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-08F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-09A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-09B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-09C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-09D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-09E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-09F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-10A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-10B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-10C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-10D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-10E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-10F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-11A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)
L2238160-11B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-11C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-11D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-11E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-11F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-12A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-12B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-12C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-12D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-12E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-12F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-13A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13D	Vial Na2S2O3 preserved	A	NA		3.5	Y	Absent		8011(14)
L2238160-13E	Vial Na2S2O3 preserved	A	NA		3.5	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-13F	Plastic 250ml HNO3 preserved	A	<2	<2	3.5	Y	Absent		PB-6020T-PPB(180)
L2238160-13G	Amber 250ml unpreserved	A	7	7	3.5	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-13H	Amber 250ml unpreserved	A	7	7	3.5	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-14A	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14B	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14C	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14D	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-14E	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-14F	Plastic 250ml HNO3 preserved	B	<2	<2	4.9	Y	Absent		PB-6020T-PPB(180)
L2238160-14G	Amber 250ml unpreserved	B	7	7	4.9	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-14H	Amber 250ml unpreserved	B	7	7	4.9	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-15A	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-15B	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA Mansfield, MA
TEL: 508-898-9220 TEL: 508-822-9300
FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 7/19/22

ALPHA Job #: L2238160

Report Information Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program: Criteria:

ANALYSIS

5-1 SHORTLIST

SAMPLE HANDLING

Filtration
 Done
 Not Needed
 Lab to do
Preservation
 Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
38160-01	CPR1117-01-SS01	7/18	1000	TS ↔ S	
02	CPR1117-02-SS01		1030		
03	CPR1117-03-SS01		1100		
04	CPR1117-04-SS01		1115		
05	CPR1117-05-SS01		1130		
06	CPR1117-06-SS01		1145		
07	CPR1117-07-SS01		1200		
08	CPR1117-08-SS01		1215		
09	CPR1116-01-SS01		1230		
10	CPR1116-02-SS01		1300		

Container Type

Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	7/18/22 14:58	<i>[Signature]</i>	7/18/22 14:58
<i>[Signature]</i>	7/18/22 14:00	<i>[Signature]</i>	7/18/22 14:00
<i>[Signature]</i>	7/18/22 2:00	<i>[Signature]</i>	7/18/22 2:35

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 of 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Westborough, MA Mansfield, MA
TEL: 508-898-9220 TEL: 508-822-9300
FAX: 508-898-8193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

ALPHA Lab ID
(Lab Use Only)

Sample ID

Collection

Date

Time

Sample Matrix

Sampler's Initials

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Time	Sample Matrix	Sampler's Initials
381160-11	GPR1116-03-5501	7/18	1330	S	TS
12	GPR1116-04-5501		1400	S	TS
13	FB-071822-3		1410	W	
14	FB-071822-4		1420	W	
15	FB-071822		-	W	

Date Rec'd in Lab: 7/19/22

ALPHA Job #: L2238160

Report Information Data Deliverables Billing Information

FAX EMAIL
 ADEx Add'l Deliverables

Same as Client Info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

SHORTLIST 1-5
VOC PORTION of SL1-5
EOD (8-11)

ALPHA Lab ID	Sample ID	Collection Date	Time	Sample Matrix	Sampler's Initials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
381160-11	GPR1116-03-5501	7/18	1330	S	TS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	GPR1116-04-5501		1400	S	TS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	FB-071822-3		1410	W		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	FB-071822-4		1420	W		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	FB-071822		-	W		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING
Filtration
 Done
 Not Needed
 Lab to do
Preservation
 Lab to do
(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Relinquished By: *[Signature]* Date/Time: 7/18 14:58
 Received By: *[Signature]* Date/Time: 7/18/22 14:58
[Signature] 7/18/22 14:58
[Signature] 7/18/22 14:58

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

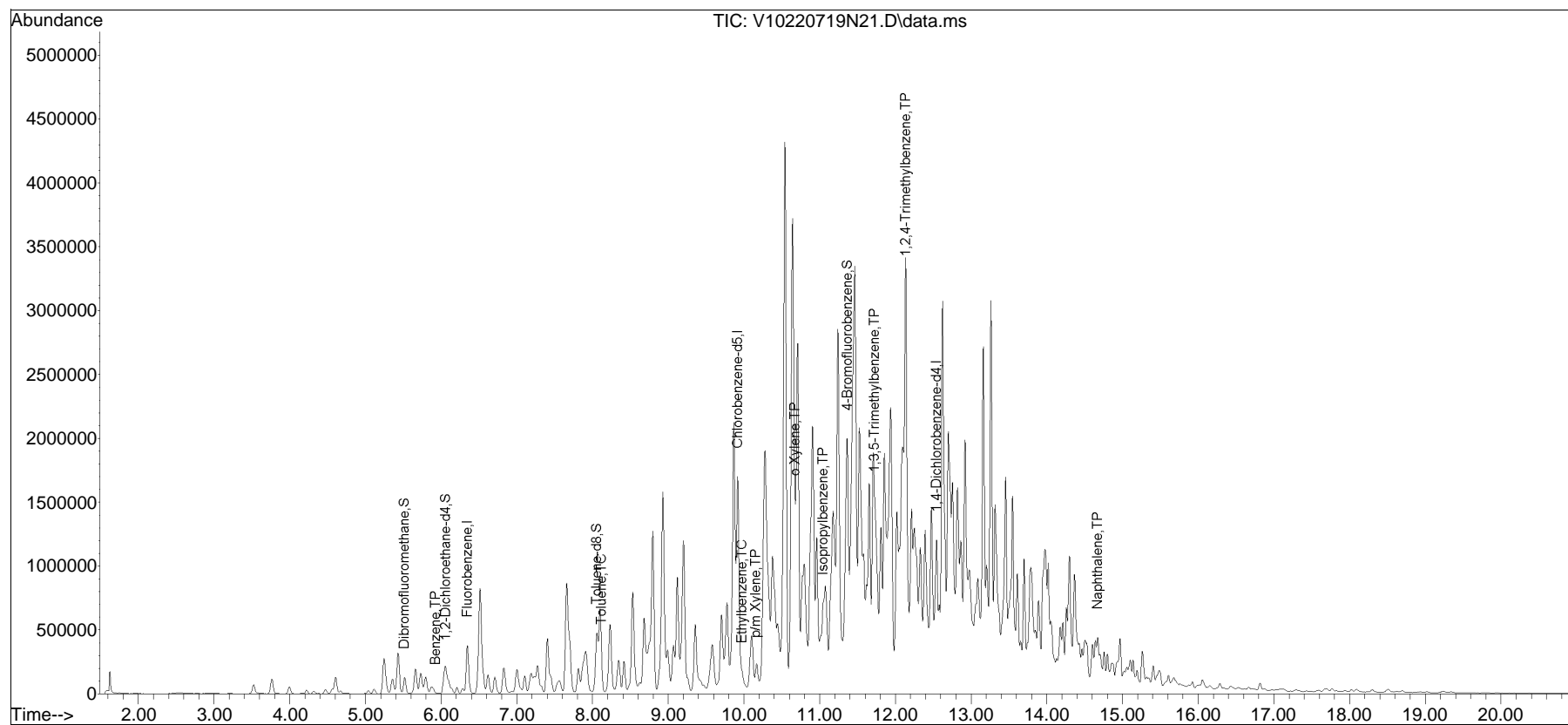
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N21.D
Acq On : 20 Jul 2022 7:19 am
Operator : VOA110:JC
Sample : 12238160-04d,31h,1.19,5,0.05,,a,r2f
Misc : WG1665207,ICAL18890
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 20 07:46:26 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N01.D•

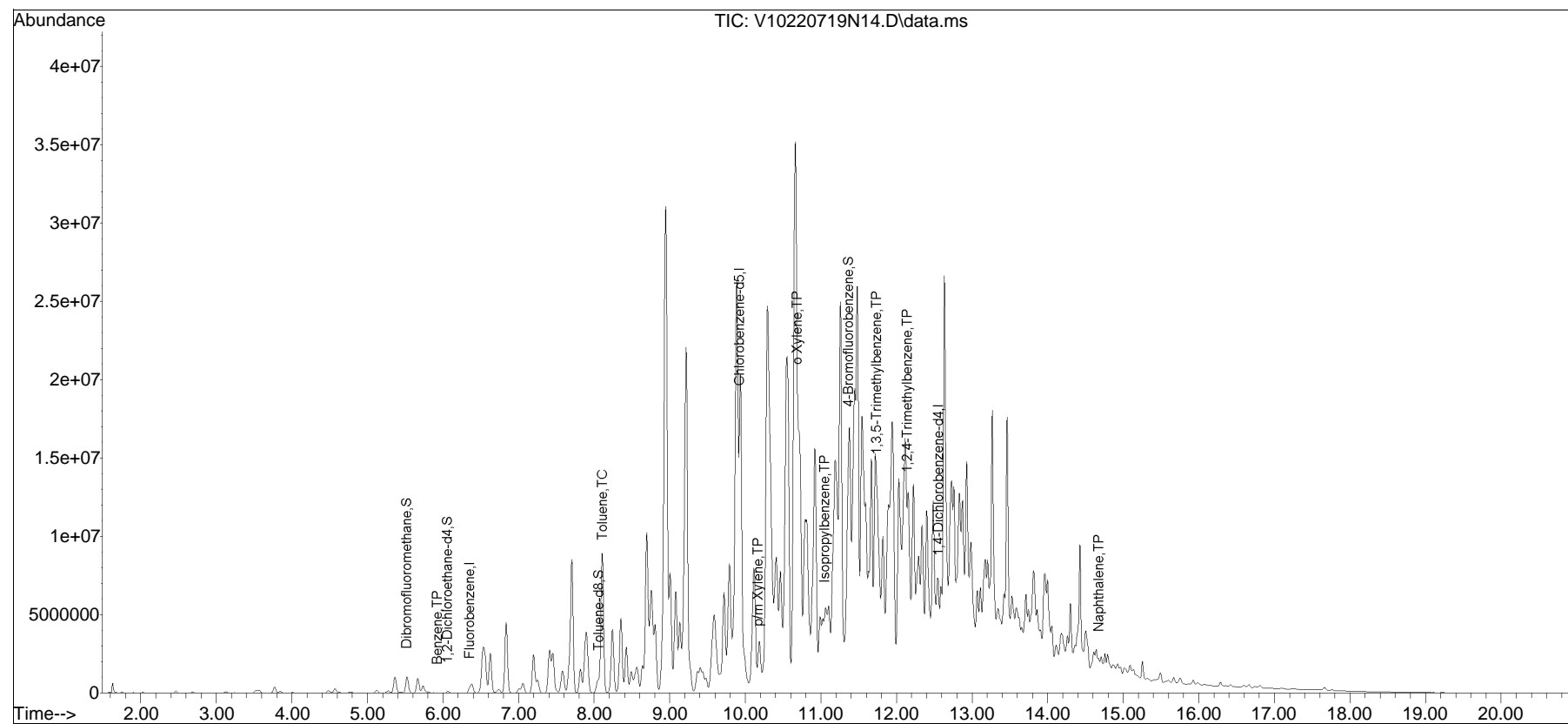


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N14.D
Acq On : 20 Jul 2022 4:01 am
Operator : VOA110:JC
Sample : 12238160-06,31,3.87,5,,b,r2f
Misc : WG1665206,ICAL18890
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Jul 20 07:26:44 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N02.D•

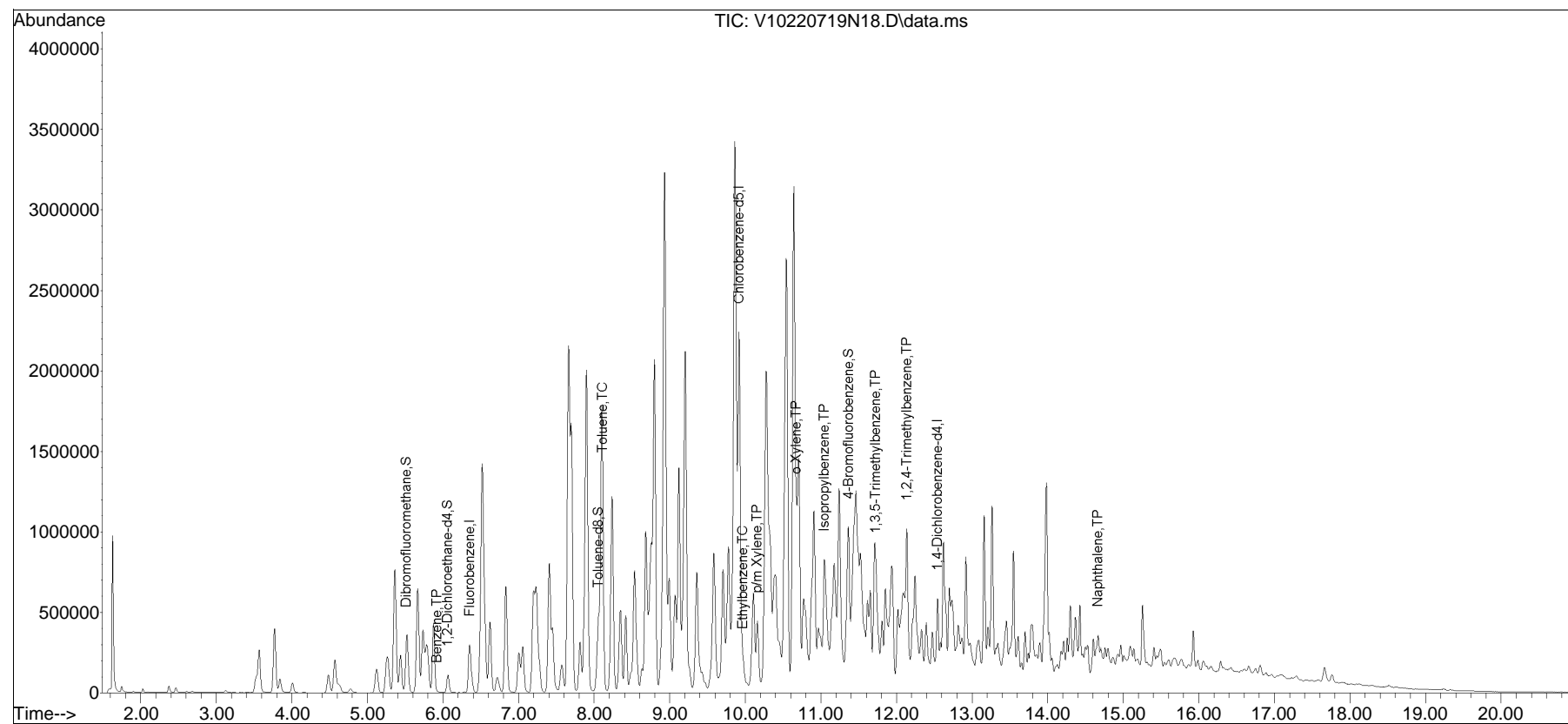


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N18.D
Acq On : 20 Jul 2022 5:54 am
Operator : VOA110:JC
Sample : 12238160-09,31,5.06,5,,b,r2f
Misc : WG1665206,ICAL18890
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Jul 20 06:17:13 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N02.D•

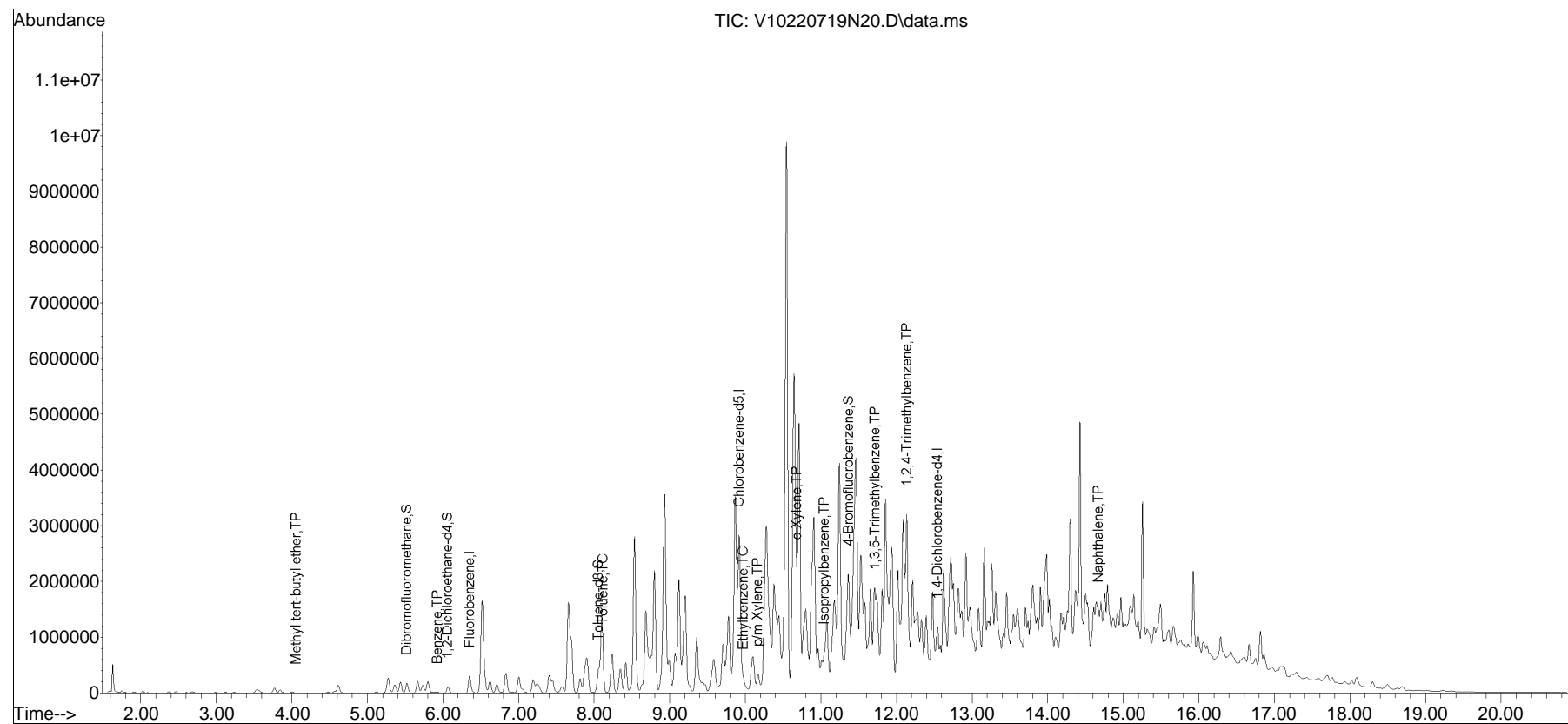


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
 Data File : V10220719N20.D
 Acq On : 20 Jul 2022 6:51 am
 Operator : VOA110:JC
 Sample : 12238160-11,31,5.03,5,,b,r2f
 Misc : WG1665206,ICAL18890
 ALS Vial : 20 Sample Multiplier: 1

Quant Time: Jul 20 07:28:16 2022
 Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Mon Apr 04 06:52:50 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N01.D•





ANALYTICAL REPORT

Lab Number:	L2241030
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/05/22

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241030-01	GPR790-01-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:00	08/01/22
L2241030-02	GPR790-02-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:10	08/01/22
L2241030-03	GPR790-03-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:20	08/01/22
L2241030-04	GPR790-04-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:30	08/01/22
L2241030-05	GPR790-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:40	08/01/22
L2241030-06	GPR790-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:50	08/01/22
L2241030-07	GPR790-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:00	08/01/22
L2241030-08	GPR791-01-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:00	08/01/22
L2241030-09	GPR791-02-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:10	08/01/22
L2241030-10	GPR791-03-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:20	08/01/22
L2241030-11	GPR791-04-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:30	08/01/22
L2241030-12	GPR791-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:40	08/01/22
L2241030-13	GPR791-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:50	08/01/22
L2241030-14	GPR791-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 14:00	08/01/22
L2241030-15	GPR791-08-SS01	SOIL	PHILADELPHIA, PA	08/01/22 14:10	08/01/22
L2241030-16	FB-080122-1	WATER	PHILADELPHIA, PA	08/01/22 14:30	08/01/22
L2241030-17	FB-080122-2	WATER	PHILADELPHIA, PA	08/01/22 14:40	08/01/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2241030-06: The collection date and time on the chain of custody was 01-AUG-22 11:50; however, the collection date/time on the container label was 01-AUG-22 17:50. At the client's request, the collection date/time is reported as 01-AUG-22 11:50.

L2241030-07: The collection date and time on the chain of custody was 01-AUG-22 12:00; however, the collection date/time on the container label was 01-AUG-22 12:30. At the client's request, the collection date/time is reported as 01-AUG-22 12:00.

L2241030-14: The collection date and time on the chain of custody was 01-AUG-22 14:00; however, the collection date/time on the container label was 01-AUG-22 14:50. At the client's request, the collection date/time is reported as 01-AUG-22 14:00.

Volatile Organics

L2241030-04D and -09D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 08/05/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-01 D
 Client ID: GPR790-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:07
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	520		mg/kg	3.4	1.1	100
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-02 D
 Client ID: GPR790-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:27
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	130		mg/kg	0.30	0.10	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-03 D
 Client ID: GPR790-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:46
 Analyst: NLK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2.8		mg/kg	0.26	0.086	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-04 D
 Client ID: GPR790-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:06
 Analyst: NLK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	0.20	J	mg/kg	0.59	0.20	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-05 D
 Client ID: GPR790-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:26
 Analyst: NLK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	3000		mg/kg	26	8.6	1000
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-06 D
 Client ID: GPR790-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:45
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	4.6		mg/kg	0.42	0.14	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-07 D
 Client ID: GPR790-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:05
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	34.		mg/kg	6.5	2.2	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-08 D
 Client ID: GPR791-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:25
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	1200		mg/kg	2.4	0.81	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-09 D
 Client ID: GPR791-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:44
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	4.0	J	mg/kg	4.5	1.5	100
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-10 D
 Client ID: GPR791-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:04
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	160		mg/kg	0.49	0.16	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-11 D
 Client ID: GPR791-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:24
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	1300		mg/kg	5.0	1.6	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-12 D
 Client ID: GPR791-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:44
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	9.8		mg/kg	0.60	0.20	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-13 D
 Client ID: GPR791-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:04
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	380		mg/kg	1.8	0.61	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-14 D
 Client ID: GPR791-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:23
 Analyst: NLK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	13.		mg/kg	0.29	0.097	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-15 D
 Client ID: GPR791-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:43
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	7.1		mg/kg	0.36	0.12	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-16
 Client ID: FB-080122-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 11:39
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	85		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-17
 Client ID: FB-080122-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 12:03
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	113		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-15 Batch: WG1671226-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/02/22 08:32
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 16-17 Batch: WG1671475-5					
Benzene	ND		ug/l	0.50	0.16

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	97		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-15 Batch: WG1671226-3 WG1671226-4								
Benzene	82		87		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 16-17 Batch: WG1671475-3 WG1671475-4								
Benzene	92		95		70-130	3		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	80		82		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	121		117		70-130
Dibromofluoromethane	90		91		70-130



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-01

Date Collected: 08/01/22 11:00

Client ID: GPR790-01-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-02

Date Collected: 08/01/22 11:10

Client ID: GPR790-02-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.2		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-03

Date Collected: 08/01/22 11:20

Client ID: GPR790-03-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-04

Date Collected: 08/01/22 11:30

Client ID: GPR790-04-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-05

Date Collected: 08/01/22 11:40

Client ID: GPR790-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-06

Date Collected: 08/01/22 11:50

Client ID: GPR790-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.4		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-07
 Client ID: GPR790-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-08

Date Collected: 08/01/22 13:00

Client ID: GPR791-01-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.1		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-09

Date Collected: 08/01/22 13:10

Client ID: GPR791-02-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.3		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-10

Date Collected: 08/01/22 13:20

Client ID: GPR791-03-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-11

Date Collected: 08/01/22 13:30

Client ID: GPR791-04-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.8		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-12

Date Collected: 08/01/22 13:40

Client ID: GPR791-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.8		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-13

Date Collected: 08/01/22 13:50

Client ID: GPR791-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-14

Date Collected: 08/01/22 14:00

Client ID: GPR791-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	87.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-15

Date Collected: 08/01/22 14:10

Client ID: GPR791-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241030

Report Date: 08/05/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-15 QC Batch ID: WG1670051-1 QC Sample: L2241030-01 Client ID: GPR790-01-SS01						
Solids, Total	77.6	76.5	%	1		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-01A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-01B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-01C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-01D	Plastic 2oz unreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-02A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-02B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-02C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-02D	Plastic 2oz unreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-03A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-03B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-03C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-03D	Plastic 2oz unreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-04A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-04B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-04C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-04D	Plastic 2oz unreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-05A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-05B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-05C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-05D	Plastic 2oz unreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-06A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-06B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-06C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-06D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-07A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-07B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-07C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-07D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-08A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-08B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-08C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-08D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-09A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-09B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-09C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-09D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-10A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-10B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-10C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-10D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-11A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-11B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-11C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-11D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-12A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-12B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-12C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-12D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-13A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-13B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-13C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-13D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-14A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-14B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-14C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-14D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-15A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-15B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-15C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-15D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-16A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-16B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-16C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: _____ Time: _____

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: _____ Standard Rush (ONLY IF PRE-APPROVED)

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Napthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/2/22

ALPHA Job #: L2241030

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

Benzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

Sample Specific Comments

TOTAL # BOTTLES

4

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41030 01	GPR-790-01-SS01	8/1/22	1100	S	an
	02 GPR-790-02-SS01		1110		
	03 GPR-790-03-SS01		1120		
	04 GPR-790-04-SS01		1130		
	05 GPR-790-05-SS01		1140		
	06 GPR-790-06-SS01		1150		
	07 GPR-790-07-SS01		1200		
	08 GPR-791-01-SS01		1300		
	09 GPR-791-02-SS01		1310		
	10 GPR-791-03-SS01		1320		

Container Type	-	-	G	-	-	-	-	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/1/22	<i>[Signature]</i>	8/1/22 14:48
<i>[Signature]</i>	8/1/22 10:00	<i>[Signature]</i>	8/1/22 10:00
<i>[Signature]</i>	8/1/22 2:00	<i>[Signature]</i>	8/1/22 5:00



ANALYTICAL REPORT

Lab Number:	L2241031
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/08/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241031-01	GPR1116-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 08:45	08/01/22
L2241031-02	GPR1116-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:00	08/01/22
L2241031-03	GPR1116-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:10	08/01/22
L2241031-04	GPR1116-08-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:50	08/01/22
L2241031-05	GPR1116-09-SS01	SOIL	PHILADELPHIA, PA	08/01/22 10:10	08/01/22
L2241031-06	GPR1116-10-SS01	SOIL	PHILADELPHIA, PA	08/01/22 10:30	08/01/22
L2241031-07	GPR1116-11-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:00	08/01/22
L2241031-08	GPR1116-12-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:30	08/01/22
L2241031-09	GPR1116-13-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:45	08/01/22
L2241031-10	GPR1116-14-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:20	08/01/22
L2241031-11	GPR1116-15-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:35	08/01/22
L2241031-12	FB-080122-3	WATER	PHILADELPHIA, PA	08/01/22 14:35	08/01/22
L2241031-13	FB-080122-4	WATER	PHILADELPHIA, PA	08/01/22 14:40	08/01/22
L2241031-14	TB-080122	WATER	PHILADELPHIA, PA	08/01/22 00:00	08/01/22
L2241031-15	DUP-48	SOIL	PHILADELPHIA, PA	08/01/22 00:00	08/01/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241031-01: The sample was analyzed as a High Level Methanol based upon screen results. The sample was then analyzed as a Low Level in order to achieve lower reporting limits. The results of both analyses are reported. Differences were noted between the results of the analyses which have been attributed to vial discrepancies.

L2241031-01: The internal standard (IS) responses for chlorobenzene-d5 (44%) and 1,4-dichlorobenzene-d4 (27%) and the surrogate recoveries for toluene-d8 (146%) and 4-bromofluorobenzene (410%) were outside the acceptance criteria; however, re-analysis achieved the following result: 1,2-dichloroethane-d4 (148%). The results of both analyses are reported.

L2241031-02D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

The surrogate recovery for the following samples is outside the acceptance criteria for 4-bromofluorobenzene; however, the samples were not re-analyzed due to coelution with an obvious interference. Copies of the chromatograms are included as an attachment to this report:

L2241031-02D: 169%

L2241031-03: 217%

L2241031-08: 152%

L2241031-09: 142%

L2241031-10: 167%

L2241031-11: 192%

L2241031-07: The internal standard (IS) responses for 1,4-dichlorobenzene-d4 (48%) and the surrogate recovery for 4-bromofluorobenzene (581%) were outside the acceptance criteria due to obvious interferences.

Project Name: PHILADELPHIA REFINERY
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Case Narrative (continued)

A copy of the chromatogram is included as an attachment to this report. A high-level analysis was performed, and those results are also reported.

L2241031-11: The analysis of Volatile Organics by EPA Method 5035/8260 Low Level could not be performed due to the elevated concentrations of non-target compounds in the sample.

Semivolatile Organics

L2241031-03D: The sample has elevated detection limits due to the limited sample volume utilized during extraction and the dilution required by the sample matrix.

L2241031-03D: The surrogate recoveries are below the acceptance criteria for nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

Total Metals

L2241031-04 and -15: The sample has an elevated detection limit for lead due to the dilution required by matrix interferences encountered during analysis.

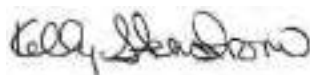
The WG1670165-3 MS recovery, performed on L2241031-01, is outside the acceptance criteria for lead (65%). A post digestion spike was performed and yielded an unacceptable recovery of 52%. The serial dilution recovery was not acceptable; therefore, this element fails the matrix test and the result reported in the native sample should be considered estimated.

The WG1670165-4 Laboratory Duplicate RPD for lead (35%), performed on L2241031-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1670165-6 serial dilution analysis, associated with L2241031-01, had a %D above the acceptance criteria for lead (47%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 08/08/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:03
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.19	0.019	1
Benzene	0.053		mg/kg	0.047	0.016	1
1,2-Dichloroethane	ND		mg/kg	0.094	0.024	1
Toluene	0.078	J	mg/kg	0.094	0.051	1
1,2-Dibromoethane	ND		mg/kg	0.047	0.028	1
Ethylbenzene	0.022	J	mg/kg	0.094	0.013	1
p/m-Xylene	0.063	J	mg/kg	0.19	0.053	1
o-Xylene	0.056	J	mg/kg	0.094	0.027	1
Xylenes, Total	0.12	J	mg/kg	0.094	0.027	1
Isopropylbenzene	0.80		mg/kg	0.094	0.010	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.19	0.018	1
1,2,4-Trimethylbenzene	0.78		mg/kg	0.19	0.031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 14:24
 Analyst: AJK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0036	0.00036	1
Benzene	0.0027		mg/kg	0.00089	0.00030	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00046	1
Toluene	0.0021		mg/kg	0.0018	0.00097	1
1,2-Dibromoethane	ND		mg/kg	0.00089	0.00052	1
Ethylbenzene	0.0016	J	mg/kg	0.0018	0.00025	1
p/m-Xylene	0.0041		mg/kg	0.0036	0.0010	1
o-Xylene	0.014		mg/kg	0.0018	0.00052	1
Xylenes, Total	0.018		mg/kg	0.0018	0.00052	1
Isopropylbenzene	0.046		mg/kg	0.0018	0.00019	1
1,3,5-Trimethylbenzene	0.0022	J	mg/kg	0.0036	0.00034	1
1,2,4-Trimethylbenzene	0.32		mg/kg	0.0036	0.00060	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	146	Q	70-130
4-Bromofluorobenzene	410	Q	70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01 R
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 00:27
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	0.00064	J	mg/kg	0.00071	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00077	1
1,2-Dibromoethane	ND		mg/kg	0.00071	0.00042	1
Ethylbenzene	0.00024	J	mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00080	1
o-Xylene	0.00082	J	mg/kg	0.0014	0.00041	1
Xylenes, Total	0.00082	J	mg/kg	0.0014	0.00041	1
Isopropylbenzene	0.00069	J	mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	0.0033		mg/kg	0.0028	0.00047	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	148	Q	70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	121		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02 D
 Client ID: GPR1116-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:23
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.5	0.15	10
Benzene	ND		mg/kg	0.38	0.13	10
1,2-Dichloroethane	ND		mg/kg	0.77	0.20	10
Toluene	ND		mg/kg	0.77	0.42	10
1,2-Dibromoethane	ND		mg/kg	0.38	0.22	10
Ethylbenzene	0.19	J	mg/kg	0.77	0.11	10
p/m-Xylene	0.92	J	mg/kg	1.5	0.43	10
o-Xylene	0.24	J	mg/kg	0.77	0.22	10
Xylenes, Total	1.2	J	mg/kg	0.77	0.22	10
Isopropylbenzene	18.		mg/kg	0.77	0.084	10
1,3,5-Trimethylbenzene	0.15	J	mg/kg	1.5	0.15	10
1,2,4-Trimethylbenzene	1.2	J	mg/kg	1.5	0.26	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	169	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03
 Client ID: GPR1116-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:43
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.18	0.019	1
Benzene	0.037	J	mg/kg	0.046	0.015	1
1,2-Dichloroethane	ND		mg/kg	0.093	0.024	1
Toluene	0.17		mg/kg	0.093	0.050	1
1,2-Dibromoethane	ND		mg/kg	0.046	0.027	1
Ethylbenzene	0.087	J	mg/kg	0.093	0.013	1
p/m-Xylene	0.30		mg/kg	0.18	0.052	1
o-Xylene	0.13		mg/kg	0.093	0.027	1
Xylenes, Total	0.43		mg/kg	0.093	0.027	1
Isopropylbenzene	8.4		mg/kg	0.093	0.010	1
1,3,5-Trimethylbenzene	0.12	J	mg/kg	0.18	0.018	1
1,2,4-Trimethylbenzene	2.7		mg/kg	0.18	0.031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	117		70-130
4-Bromofluorobenzene	217	Q	70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 14:02
 Analyst: AJK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.16	0.016	1
Benzene	35.	E	mg/kg	0.039	0.013	1
1,2-Dichloroethane	ND		mg/kg	0.078	0.020	1
Toluene	6.8		mg/kg	0.078	0.042	1
1,2-Dibromoethane	ND		mg/kg	0.039	0.023	1
Ethylbenzene	0.34		mg/kg	0.078	0.011	1
p/m-Xylene	1.0		mg/kg	0.16	0.043	1
o-Xylene	0.075	J	mg/kg	0.078	0.022	1
Xylenes, Total	1.1	J	mg/kg	0.078	0.022	1
Isopropylbenzene	0.022	J	mg/kg	0.078	0.0084	1
1,3,5-Trimethylbenzene	0.025	J	mg/kg	0.16	0.015	1
1,2,4-Trimethylbenzene	0.10	J	mg/kg	0.16	0.026	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04 D
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 15:03
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	28.		mg/kg	0.19	0.064	5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	93		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05
 Client ID: GPR1116-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 15:23
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	ND		mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	ND		mg/kg	0.0010	0.00055	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	ND		mg/kg	0.0010	0.00014	1
p/m-Xylene	ND		mg/kg	0.0020	0.00057	1
o-Xylene	ND		mg/kg	0.0010	0.00030	1
Xylenes, Total	ND		mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.00064	J	mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
 Client ID: GPR1116-10-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:04
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	0.00030	J	mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	0.00084	J	mg/kg	0.0010	0.00055	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	0.00022	J	mg/kg	0.0010	0.00014	1
p/m-Xylene	0.0010	J	mg/kg	0.0020	0.00057	1
o-Xylene	0.00056	J	mg/kg	0.0010	0.00029	1
Xylenes, Total	0.0016	J	mg/kg	0.0010	0.00029	1
Isopropylbenzene	0.00054	J	mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	0.00025	J	mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	0.00072	J	mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:24
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.16	0.017	1
Benzene	ND		mg/kg	0.041	0.014	1
1,2-Dichloroethane	ND		mg/kg	0.083	0.021	1
Toluene	ND		mg/kg	0.083	0.045	1
1,2-Dibromoethane	ND		mg/kg	0.041	0.024	1
Ethylbenzene	0.015	J	mg/kg	0.083	0.012	1
p/m-Xylene	0.084	J	mg/kg	0.16	0.046	1
o-Xylene	0.026	J	mg/kg	0.083	0.024	1
Xylenes, Total	0.11	J	mg/kg	0.083	0.024	1
Isopropylbenzene	0.068	J	mg/kg	0.083	0.0090	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.16	0.016	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.16	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	117		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 01:08
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	ND		mg/kg	0.00060	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.00090	J	mg/kg	0.0012	0.00065	1
1,2-Dibromoethane	ND		mg/kg	0.00060	0.00035	1
Ethylbenzene	ND		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.0017	J	mg/kg	0.0024	0.00067	1
o-Xylene	0.0032		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.0049	J	mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.017		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0016	J	mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0037		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	113		70-130
4-Bromofluorobenzene	581	Q	70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08
 Client ID: GPR1116-12-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 03:56
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.13	0.013	1
Benzene	0.052		mg/kg	0.033	0.011	1
1,2-Dichloroethane	ND		mg/kg	0.066	0.017	1
Toluene	0.29		mg/kg	0.066	0.036	1
1,2-Dibromoethane	ND		mg/kg	0.033	0.019	1
Ethylbenzene	0.12		mg/kg	0.066	0.0093	1
p/m-Xylene	1.1		mg/kg	0.13	0.037	1
o-Xylene	0.16		mg/kg	0.066	0.019	1
Xylenes, Total	1.3		mg/kg	0.066	0.019	1
Isopropylbenzene	3.8		mg/kg	0.066	0.0072	1
1,3,5-Trimethylbenzene	3.8		mg/kg	0.13	0.013	1
1,2,4-Trimethylbenzene	16.		mg/kg	0.13	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	126		70-130
4-Bromofluorobenzene	152	Q	70-130
Dibromofluoromethane	78		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09
 Client ID: GPR1116-13-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:06
 Analyst: NLK
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0026	0.00026	1
Benzene	0.00064	J	mg/kg	0.00065	0.00022	1
1,2-Dichloroethane	ND		mg/kg	0.0013	0.00034	1
Toluene	0.0029		mg/kg	0.0013	0.00071	1
1,2-Dibromoethane	ND		mg/kg	0.00065	0.00038	1
Ethylbenzene	0.0011	J	mg/kg	0.0013	0.00018	1
p/m-Xylene	0.0086		mg/kg	0.0026	0.00073	1
o-Xylene	0.0056		mg/kg	0.0013	0.00038	1
Xylenes, Total	0.014		mg/kg	0.0013	0.00038	1
Isopropylbenzene	0.0034		mg/kg	0.0013	0.00014	1
1,3,5-Trimethylbenzene	0.0018	J	mg/kg	0.0026	0.00025	1
1,2,4-Trimethylbenzene	0.0048		mg/kg	0.0026	0.00044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	114		70-130
4-Bromofluorobenzene	142	Q	70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10
 Client ID: GPR1116-14-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:27
 Analyst: NLK
 Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.0012		mg/kg	0.00093	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00048	1
Toluene	ND		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00093	0.00054	1
Ethylbenzene	0.00041	J	mg/kg	0.0019	0.00026	1
p/m-Xylene	0.0012	J	mg/kg	0.0037	0.0010	1
o-Xylene	0.0013	J	mg/kg	0.0019	0.00054	1
Xylenes, Total	0.0025	J	mg/kg	0.0019	0.00054	1
Isopropylbenzene	0.020		mg/kg	0.0019	0.00020	1
1,3,5-Trimethylbenzene	0.0012	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.0014	J	mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	115		70-130
4-Bromofluorobenzene	167	Q	70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11
 Client ID: GPR1116-15-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:48
 Analyst: NLK
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.39	0.039	1
Benzene	0.050	J	mg/kg	0.097	0.032	1
1,2-Dichloroethane	ND		mg/kg	0.19	0.050	1
Toluene	0.35		mg/kg	0.19	0.10	1
1,2-Dibromoethane	ND		mg/kg	0.097	0.057	1
Ethylbenzene	0.27		mg/kg	0.19	0.027	1
p/m-Xylene	1.1		mg/kg	0.39	0.11	1
o-Xylene	0.27		mg/kg	0.19	0.056	1
Xylenes, Total	1.4		mg/kg	0.19	0.056	1
Isopropylbenzene	1.1		mg/kg	0.19	0.021	1
1,3,5-Trimethylbenzene	0.38	J	mg/kg	0.39	0.037	1
1,2,4-Trimethylbenzene	2.6		mg/kg	0.39	0.064	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	192	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:34
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 08:56
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	82		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	115		70-130
Dibromofluoromethane	97		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:41
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 09:19
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-14
 Client ID: TB-080122
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:47
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-14
 Client ID: TB-080122
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 09:42
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	82		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15
 Client ID: DUP-48
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:09
 Analyst: NLK
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0035	0.00035	1
Benzene	ND		mg/kg	0.00088	0.00029	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00045	1
Toluene	ND		mg/kg	0.0018	0.00095	1
1,2-Dibromoethane	ND		mg/kg	0.00088	0.00051	1
Ethylbenzene	ND		mg/kg	0.0018	0.00025	1
p/m-Xylene	0.0011	J	mg/kg	0.0035	0.00098	1
o-Xylene	0.0016	J	mg/kg	0.0018	0.00051	1
Xylenes, Total	0.0027	J	mg/kg	0.0018	0.00051	1
Isopropylbenzene	0.0040		mg/kg	0.0018	0.00019	1
1,3,5-Trimethylbenzene	0.0012	J	mg/kg	0.0035	0.00034	1
1,2,4-Trimethylbenzene	0.0038		mg/kg	0.0035	0.00058	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	129		70-130
Dibromofluoromethane	84		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/02/22 18:07
Analyst: GT

Extraction Method: EPA 8011
Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 12-14 Batch: WG1670324-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-04 Batch: WG1671226-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 05 Batch: WG1671227-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06,09-10,15 Batch: WG1671352-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 07,11 Batch: WG1671356-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/02/22 08:32
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 12-14 Batch: WG1671475-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
1,2-Dibromoethane	ND		ug/l	2.0	0.19
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	97		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 04 Batch: WG1671502-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1671744-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/04/22 20:35
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,07 Batch: WG1671753-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 20:35
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1671755-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 12-14 Batch: WG1670324-2									
1,2-Dibromoethane	118		-		80-120	-		20	A

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-04 Batch: WG1671226-3 WG1671226-4								
Methyl tert butyl ether	83		90		66-130	8		30
Benzene	82		87		70-130	6		30
1,2-Dichloroethane	82		89		70-130	8		30
Toluene	77		80		70-130	4		30
1,2-Dibromoethane	80		87		70-130	8		30
Ethylbenzene	83		86		70-130	4		30
p/m-Xylene	83		87		70-130	5		30
o-Xylene	85		89		70-130	5		30
Isopropylbenzene	84		88		70-130	5		30
1,3,5-Trimethylbenzene	85		88		70-130	3		30
1,2,4-Trimethylbenzene	84		87		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1671227-3 WG1671227-4								
Methyl tert butyl ether	83		90		66-130	8		30
Benzene	82		87		70-130	6		30
1,2-Dichloroethane	82		89		70-130	8		30
Toluene	77		80		70-130	4		30
1,2-Dibromoethane	80		87		70-130	8		30
Ethylbenzene	83		86		70-130	4		30
p/m-Xylene	83		87		70-130	5		30
o-Xylene	85		89		70-130	5		30
Isopropylbenzene	84		88		70-130	5		30
1,3,5-Trimethylbenzene	85		88		70-130	3		30
1,2,4-Trimethylbenzene	84		87		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	101		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06,09-10,15 Batch: WG1671352-3 WG1671352-4								
Methyl tert butyl ether	77		78		66-130	1		30
Benzene	85		84		70-130	1		30
1,2-Dichloroethane	84		84		70-130	0		30
Toluene	85		86		70-130	1		30
1,2-Dibromoethane	88		89		70-130	1		30
Ethylbenzene	91		90		70-130	1		30
p/m-Xylene	91		90		70-130	1		30
o-Xylene	90		90		70-130	0		30
Isopropylbenzene	91		90		70-130	1		30
1,3,5-Trimethylbenzene	92		92		70-130	0		30
1,2,4-Trimethylbenzene	94		92		70-130	2		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	95		94		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		93		70-130
Dibromofluoromethane	90		88		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 07,11 Batch: WG1671356-3 WG1671356-4								
Methyl tert butyl ether	77		78		66-130	1		30
Benzene	85		84		70-130	1		30
1,2-Dichloroethane	84		84		70-130	0		30
Toluene	85		86		70-130	1		30
1,2-Dibromoethane	88		89		70-130	1		30
Ethylbenzene	91		90		70-130	1		30
p/m-Xylene	91		90		70-130	1		30
o-Xylene	90		90		70-130	0		30
Isopropylbenzene	91		90		70-130	1		30
1,3,5-Trimethylbenzene	92		92		70-130	0		30
1,2,4-Trimethylbenzene	94		92		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	95		94		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		93		70-130
Dibromofluoromethane	90		88		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 12-14 Batch: WG1671475-3 WG1671475-4								
Methyl tert butyl ether	91		98		63-130	7		20
Benzene	92		95		70-130	3		20
1,2-Dichloroethane	83		87		70-130	5		20
Toluene	99		100		70-130	1		20
1,2-Dibromoethane	89		97		70-130	9		20
Ethylbenzene	99		100		70-130	1		20
p/m-Xylene	100		100		70-130	0		20
o-Xylene	100		100		70-130	0		20
Isopropylbenzene	120		120		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	80		82		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	121		117		70-130
Dibromofluoromethane	90		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 Batch: WG1671502-3 WG1671502-4								
Methyl tert butyl ether	75		74		66-130	1		30
Benzene	83		82		70-130	1		30
1,2-Dichloroethane	81		81		70-130	0		30
Toluene	83		82		70-130	1		30
1,2-Dibromoethane	85		84		70-130	1		30
Ethylbenzene	88		87		70-130	1		30
p/m-Xylene	88		88		70-130	0		30
o-Xylene	87		88		70-130	1		30
Isopropylbenzene	89		87		70-130	2		30
1,3,5-Trimethylbenzene	90		87		70-130	3		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		96		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	94		94		70-130
Dibromofluoromethane	92		90		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1671744-3 WG1671744-4								
Methyl tert butyl ether	75		74		66-130	1		30
Benzene	83		82		70-130	1		30
1,2-Dichloroethane	81		81		70-130	0		30
Toluene	83		82		70-130	1		30
1,2-Dibromoethane	85		84		70-130	1		30
Ethylbenzene	88		87		70-130	1		30
p/m-Xylene	88		88		70-130	0		30
o-Xylene	87		88		70-130	1		30
Isopropylbenzene	89		87		70-130	2		30
1,3,5-Trimethylbenzene	90		87		70-130	3		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		96		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	93		94		70-130
Dibromofluoromethane	92		90		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,07 Batch: WG1671753-3 WG1671753-4								
Methyl tert butyl ether	110		90		66-130	20		30
Benzene	102		102		70-130	0		30
1,2-Dichloroethane	96		98		70-130	2		30
Toluene	98		101		70-130	3		30
1,2-Dibromoethane	96		100		70-130	4		30
Ethylbenzene	102		104		70-130	2		30
p/m-Xylene	102		104		70-130	2		30
o-Xylene	99		102		70-130	3		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		104		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		92		70-130
Dibromofluoromethane	90		92		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1671755-3 WG1671755-4								
Methyl tert butyl ether	110		90		66-130	20		30
Benzene	102		102		70-130	0		30
1,2-Dichloroethane	96		98		70-130	2		30
Toluene	98		101		70-130	3		30
1,2-Dibromoethane	96		100		70-130	4		30
Ethylbenzene	102		104		70-130	2		30
p/m-Xylene	102		104		70-130	2		30
o-Xylene	99		102		70-130	3		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		104		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		92		70-130
Dibromofluoromethane	90		92		70-130

SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 13:03
 Analyst: CMM
 Percent Solids: 76%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.35		mg/kg	0.22	0.026	1
Fluorene	0.056	J	mg/kg	0.22	0.021	1
Phenanthrene	0.15		mg/kg	0.13	0.026	1
Anthracene	0.055	J	mg/kg	0.13	0.042	1
Pyrene	0.21		mg/kg	0.13	0.021	1
Benzo(a)anthracene	0.24		mg/kg	0.13	0.024	1
Chrysene	0.27		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	0.42		mg/kg	0.13	0.036	1
Benzo(a)pyrene	0.40		mg/kg	0.17	0.052	1
Benzo(ghi)perylene	0.26		mg/kg	0.17	0.025	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	55		30-120
4-Terphenyl-d14	55		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02
 Client ID: GPR1116-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 13:27
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.1		mg/kg	0.20	0.024	1
Fluorene	0.22		mg/kg	0.20	0.019	1
Phenanthrene	0.67		mg/kg	0.12	0.024	1
Anthracene	0.18		mg/kg	0.12	0.038	1
Pyrene	0.55		mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.27		mg/kg	0.12	0.022	1
Chrysene	0.30		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.44		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.41		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.31		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	52		30-120
4-Terphenyl-d14	44		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03 D
 Client ID: GPR1116-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/08/22 12:10
 Analyst: SZ
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	11	1.3	20
Fluorene	1.4	J	mg/kg	11	1.1	20
Phenanthrene	2.8	J	mg/kg	6.6	1.3	20
Anthracene	ND		mg/kg	6.6	2.2	20
Pyrene	ND		mg/kg	6.6	1.1	20
Benzo(a)anthracene	ND		mg/kg	6.6	1.2	20
Chrysene	ND		mg/kg	6.6	1.2	20
Benzo(b)fluoranthene	ND		mg/kg	6.6	1.9	20
Benzo(a)pyrene	ND		mg/kg	8.8	2.7	20
Benzo(ghi)perylene	ND		mg/kg	8.8	1.3	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 14:14
 Analyst: CMM
 Percent Solids: 78%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.21	0.025	1
Fluorene	0.024	J	mg/kg	0.21	0.020	1
Phenanthrene	0.062	J	mg/kg	0.12	0.025	1
Anthracene	ND		mg/kg	0.12	0.041	1
Pyrene	0.041	J	mg/kg	0.12	0.021	1
Benzo(a)anthracene	0.029	J	mg/kg	0.12	0.024	1
Chrysene	0.030	J	mg/kg	0.12	0.022	1
Benzo(b)fluoranthene	0.035	J	mg/kg	0.12	0.035	1
Benzo(a)pyrene	ND		mg/kg	0.17	0.051	1
Benzo(ghi)perylene	ND		mg/kg	0.17	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	88		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	60		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05
 Client ID: GPR1116-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:01
 Analyst: CMM
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.20	0.024	1
Fluorene	ND		mg/kg	0.20	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	ND		mg/kg	0.12	0.020	1
Benzo(a)anthracene	ND		mg/kg	0.12	0.022	1
Chrysene	ND		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.033	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	47		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
 Client ID: GPR1116-10-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:25
 Analyst: CMM
 Percent Solids: 76%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.2		mg/kg	0.22	0.026	1
Fluorene	0.14	J	mg/kg	0.22	0.021	1
Phenanthrene	0.34		mg/kg	0.13	0.026	1
Anthracene	0.22		mg/kg	0.13	0.042	1
Pyrene	0.38		mg/kg	0.13	0.022	1
Benzo(a)anthracene	0.40		mg/kg	0.13	0.024	1
Chrysene	0.52		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	1.2		mg/kg	0.13	0.036	1
Benzo(a)pyrene	1.4		mg/kg	0.17	0.053	1
Benzo(ghi)perylene	0.94		mg/kg	0.17	0.026	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	64		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:48
 Analyst: CMM
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.16	J	mg/kg	0.20	0.024	1
Fluorene	0.036	J	mg/kg	0.20	0.019	1
Phenanthrene	0.083	J	mg/kg	0.12	0.024	1
Anthracene	0.039	J	mg/kg	0.12	0.038	1
Pyrene	0.16		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.13		mg/kg	0.12	0.022	1
Chrysene	0.16		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.18		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.17		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.092	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	48		30-120
4-Terphenyl-d14	33		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08
 Client ID: GPR1116-12-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:12
 Analyst: CMM
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.32		mg/kg	0.19	0.023	1
Fluorene	1.2		mg/kg	0.19	0.018	1
Phenanthrene	1.6		mg/kg	0.11	0.023	1
Anthracene	0.45		mg/kg	0.11	0.036	1
Pyrene	0.62		mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.34		mg/kg	0.11	0.021	1
Chrysene	0.92		mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	0.68		mg/kg	0.11	0.031	1
Benzo(a)pyrene	0.62		mg/kg	0.15	0.046	1
Benzo(ghi)perylene	0.31		mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	157	Q	23-120
2-Fluorobiphenyl	34		30-120
4-Terphenyl-d14	23		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09
 Client ID: GPR1116-13-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:35
 Analyst: CMM
 Percent Solids: 80%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.3		mg/kg	0.21	0.025	1
Fluorene	0.53		mg/kg	0.21	0.020	1
Phenanthrene	1.5		mg/kg	0.12	0.025	1
Anthracene	0.48		mg/kg	0.12	0.040	1
Pyrene	1.5		mg/kg	0.12	0.021	1
Benzo(a)anthracene	0.85		mg/kg	0.12	0.023	1
Chrysene	0.86		mg/kg	0.12	0.022	1
Benzo(b)fluoranthene	0.92		mg/kg	0.12	0.035	1
Benzo(a)pyrene	0.97		mg/kg	0.16	0.050	1
Benzo(ghi)perylene	0.45		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	76		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	47		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10
 Client ID: GPR1116-14-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:59
 Analyst: CMM
 Percent Solids: 60%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.37		mg/kg	0.27	0.033	1
Fluorene	0.74		mg/kg	0.27	0.027	1
Phenanthrene	1.5		mg/kg	0.16	0.033	1
Anthracene	0.18		mg/kg	0.16	0.054	1
Pyrene	0.62		mg/kg	0.16	0.027	1
Benzo(a)anthracene	0.42		mg/kg	0.16	0.031	1
Chrysene	0.36		mg/kg	0.16	0.028	1
Benzo(b)fluoranthene	0.44		mg/kg	0.16	0.046	1
Benzo(a)pyrene	0.43		mg/kg	0.22	0.067	1
Benzo(ghi)perylene	0.19	J	mg/kg	0.22	0.032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	54		30-120
4-Terphenyl-d14	38		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11
 Client ID: GPR1116-15-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 17:46
 Analyst: CMM
 Percent Solids: 70%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.9		mg/kg	0.23	0.028	1
Fluorene	0.52		mg/kg	0.23	0.022	1
Phenanthrene	2.8		mg/kg	0.14	0.028	1
Anthracene	1.3		mg/kg	0.14	0.045	1
Pyrene	4.3		mg/kg	0.14	0.023	1
Benzo(a)anthracene	3.7		mg/kg	0.14	0.026	1
Chrysene	3.7		mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	5.1		mg/kg	0.14	0.039	1
Benzo(a)pyrene	5.2		mg/kg	0.18	0.056	1
Benzo(ghi)perylene	3.8		mg/kg	0.18	0.027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	51		30-120
4-Terphenyl-d14	45		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:23
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	0.05	J	ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	0.03	J	ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.01	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	74		15-120
4-Terphenyl-d14	83		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:39
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	75		15-120
4-Terphenyl-d14	84		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15
 Client ID: DUP-48
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 18:10
 Analyst: CMM
 Percent Solids: 71%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.16	J	mg/kg	0.23	0.028	1
Fluorene	0.087	J	mg/kg	0.23	0.022	1
Phenanthrene	0.19		mg/kg	0.14	0.028	1
Anthracene	ND		mg/kg	0.14	0.044	1
Pyrene	0.10	J	mg/kg	0.14	0.023	1
Benzo(a)anthracene	0.040	J	mg/kg	0.14	0.026	1
Chrysene	0.044	J	mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	0.042	J	mg/kg	0.14	0.038	1
Benzo(a)pyrene	ND		mg/kg	0.18	0.056	1
Benzo(ghi)perylene	0.028	J	mg/kg	0.18	0.027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		23-120
2-Fluorobiphenyl	79		30-120
4-Terphenyl-d14	76		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/02/22 16:42
Analyst: SZ

Extraction Method: EPA 3546
Extraction Date: 08/02/22 06:01

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-11,15 Batch: WG1670007-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.097	0.020
Anthracene	ND		mg/kg	0.097	0.032
Pyrene	ND		mg/kg	0.097	0.016
Benzo(a)anthracene	ND		mg/kg	0.097	0.018
Chrysene	ND		mg/kg	0.097	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.097	0.027
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	77		30-120
4-Terphenyl-d14	95		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:07
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 12-13 Batch: WG1670368-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	50		23-120
2-Fluorobiphenyl	48		15-120
4-Terphenyl-d14	76		41-149



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-11,15 Batch: WG1670007-2 WG1670007-3								
Naphthalene	72		72		40-140	0		50
Fluorene	77		77		40-140	0		50
Phenanthrene	71		71		40-140	0		50
Anthracene	75		75		40-140	0		50
Pyrene	71		70		35-142	1		50
Benzo(a)anthracene	82		78		40-140	5		50
Chrysene	78		74		40-140	5		50
Benzo(b)fluoranthene	94		93		40-140	1		50
Benzo(a)pyrene	94		92		40-140	2		50
Benzo(ghi)perylene	77		73		40-140	5		50

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	82		83		23-120
2-Fluorobiphenyl	77		76		30-120
4-Terphenyl-d14	86		84		18-120



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 12-13 Batch: WG1670368-2 WG1670368-3								
Naphthalene	77		83		40-140	8		40
Fluorene	82		88		40-140	7		40
Phenanthrene	86		92		40-140	7		40
Anthracene	87		92		40-140	6		40
Pyrene	97		97		26-127	0		40
Benzo(a)anthracene	104		100		40-140	4		40
Chrysene	102		98		40-140	4		40
Benzo(b)fluoranthene	105		103		40-140	2		40
Benzo(a)pyrene	95		92		40-140	3		40
Benzo(ghi)perylene	111		108		40-140	3		40

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	79		87		23-120
2-Fluorobiphenyl	72		78		15-120
4-Terphenyl-d14	88		86		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01

Date Collected: 08/01/22 08:45

Client ID: GPR1116-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	67.9		mg/kg	2.49	0.134	1	08/02/22 15:27	08/06/22 19:03	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02

Date Collected: 08/01/22 09:00

Client ID: GPR1116-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	104		mg/kg	2.25	0.121	1	08/02/22 15:27	08/06/22 19:59	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03

Date Collected: 08/01/22 09:10

Client ID: GPR1116-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	119		mg/kg	2.25	0.121	1	08/02/22 15:27	08/06/22 20:04	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-04

Date Collected: 08/01/22 09:50

Client ID: GPR1116-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	85.3		mg/kg	12.2	0.652	5	08/02/22 15:27	08/08/22 20:03	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05

Date Collected: 08/01/22 10:10

Client ID: GPR1116-09-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	40.8		mg/kg	2.31	0.124	1	08/02/22 15:27	08/06/22 20:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
 Client ID: GPR1116-10-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	13.9		mg/kg	2.48	0.133	1	08/02/22 15:27	08/06/22 20:18	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07

Date Collected: 08/01/22 11:00

Client ID: GPR1116-11-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	193		mg/kg	2.30	0.123	1	08/02/22 15:27	08/06/22 20:32	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08

Date Collected: 08/01/22 12:30

Client ID: GPR1116-12-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	97.5		mg/kg	2.15	0.115	1	08/02/22 15:27	08/06/22 20:37	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09
 Client ID: GPR1116-13-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	375		mg/kg	2.37	0.127	1	08/02/22 15:27	08/06/22 20:41	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10

Date Collected: 08/01/22 13:20

Client ID: GPR1116-14-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	60.2		mg/kg	3.22	0.172	1	08/02/22 15:27	08/06/22 20:46	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11

Date Collected: 08/01/22 13:35

Client ID: GPR1116-15-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	189		mg/kg	2.68	0.143	1	08/02/22 15:27	08/06/22 20:50	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12

Date Collected: 08/01/22 14:35

Client ID: FB-080122-3

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 21:18	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13

Date Collected: 08/01/22 14:40

Client ID: FB-080122-4

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 21:23	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15

Date Collected: 08/01/22 00:00

Client ID: DUP-48

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	206		mg/kg	13.4	0.716	5	08/02/22 15:27	08/08/22 20:08	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 12-13 Batch: WG1670146-1									
Lead, Total	ND	ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 20:05	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-11,15 Batch: WG1670165-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/02/22 15:27	08/06/22 18:40	1,6010D	MC

Prep Information

Digestion Method: EPA 3050B



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 12-13 Batch: WG1670146-2								
Lead, Total	95		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 Batch: WG1670165-2 SRM Lot Number: D113-540								
Lead, Total	93		-		72-128	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 12-13 QC Batch ID: WG1670146-3 QC Sample: L2241079-01 Client ID: MS Sample												
Lead, Total	3.328	530	527.1	99		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-3 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01												
Lead, Total	67.9	52.7	102	65	Q	-	-		75-125	-		20



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-4 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Lead, Total	67.9	96.4	mg/kg	35	Q	20

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-6 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Lead, Total	67.9	99.7	mg/kg	47	Q	20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
Client ID: GPR1116-05-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
Date Received: 08/01/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.1		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02
 Client ID: GPR1116-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.4		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03

Date Collected: 08/01/22 09:10

Client ID: GPR1116-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.5		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-04

Date Collected: 08/01/22 09:50

Client ID: GPR1116-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	78.4		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-05

Date Collected: 08/01/22 10:10

Client ID: GPR1116-09-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.6		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06

Date Collected: 08/01/22 10:30

Client ID: GPR1116-10-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.1		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07

Date Collected: 08/01/22 11:00

Client ID: GPR1116-11-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.3		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-08

Date Collected: 08/01/22 12:30

Client ID: GPR1116-12-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.2		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09

Date Collected: 08/01/22 12:45

Client ID: GPR1116-13-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.7		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-10

Date Collected: 08/01/22 13:20

Client ID: GPR1116-14-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	59.6		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Project Number:** 200.00135.006**Lab Number:** L2241031**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-11

Client ID: GPR1116-15-SS01

Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:35

Date Received: 08/01/22

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	70.4		%	0.100	NA	1	-	08/02/22 09:28	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15
Client ID: DUP-48
Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
Date Received: 08/01/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	71.0		%	0.100	NA	1	-	08/02/22 09:28	121,2540G	RI



Lab Duplicate Analysis *Batch Quality Control*

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 11,15 QC Batch ID: WG1670059-1 QC Sample: L2241056-01 Client ID: DUP Sample						
Solids, Total	82.3	82.1	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-10 QC Batch ID: WG1670085-1 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Solids, Total	76.1	76.7	%	1		20



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-01A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241031-01B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-01C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-01D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-01F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-02A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-02B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-02C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-02D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-02E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-02F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-03A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-03B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-03C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-03D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-03E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-03F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-04A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-04B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-04C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-04D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-04F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-05A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-05B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-05C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-05D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-05E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-05F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-06A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-06B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-06C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-06D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-06F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-07A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241031-07B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-07C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-07D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-07F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-08A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-08B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-08C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-08D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-08E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-08F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-09A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-09B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-09C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-09D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-09E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-09F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-10A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-10B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-10C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-10D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-10E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-10F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-11A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-11B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-11C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-11D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-11E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-11F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-12A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12C	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-12E	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-12F	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-12G	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-12H	Plastic 250ml HNO3 preserved	C	<2	<2	3.9	Y	Absent		PB-6020T-PPB(180)
L2241031-13A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-13B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-13C	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-13D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-13E	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-13F	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-13G	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-13H	Plastic 250ml HNO3 preserved	C	<2	<2	3.9	Y	Absent		PB-6020T-PPB(180)
L2241031-14A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-14B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-14C	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-14D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-15A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-15B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-15C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-15D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-15E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-15F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

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REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

PADEP Short List Analytical Suites per Table III-5:

1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene

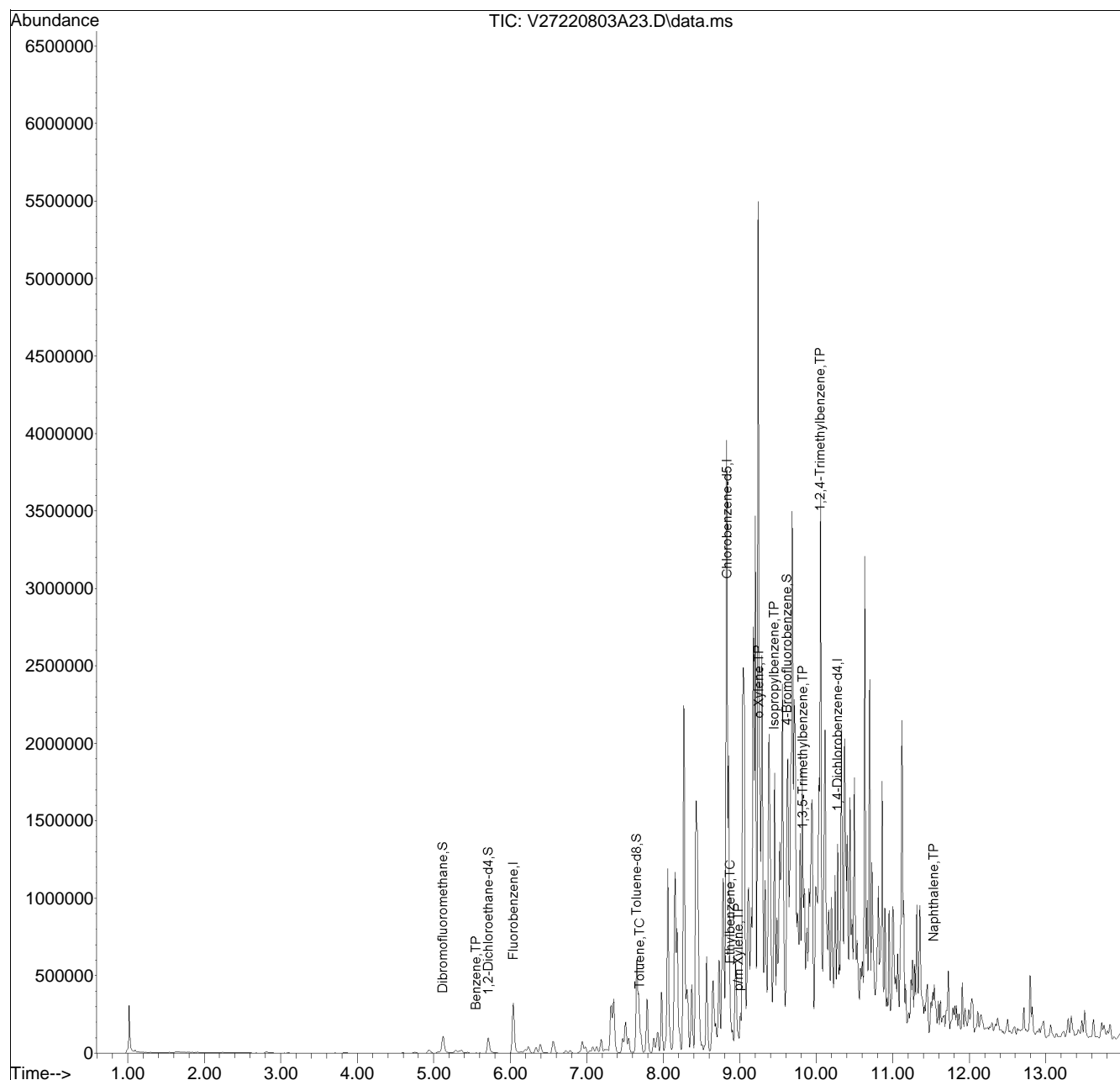
- ~~3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene~~
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2022\220803A\
 Data File : V27220803A23.D
 Acq On : 03 Aug 2022 02:23 pm
 Operator : VOA127:NLK
 Sample : L2241031-02D,31H,4.39,5,0.010,,A
 Misc : WG1671226,ICAL19153
 ALS Vial : 23 Sample Multiplier: 1

Quant Time: Aug 04 09:48:00 2022
 Quant Method : I:\VOLATILES\VOA127\2022\220803A\V127_220706A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 07 06:48:30 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V27220803A01.D•

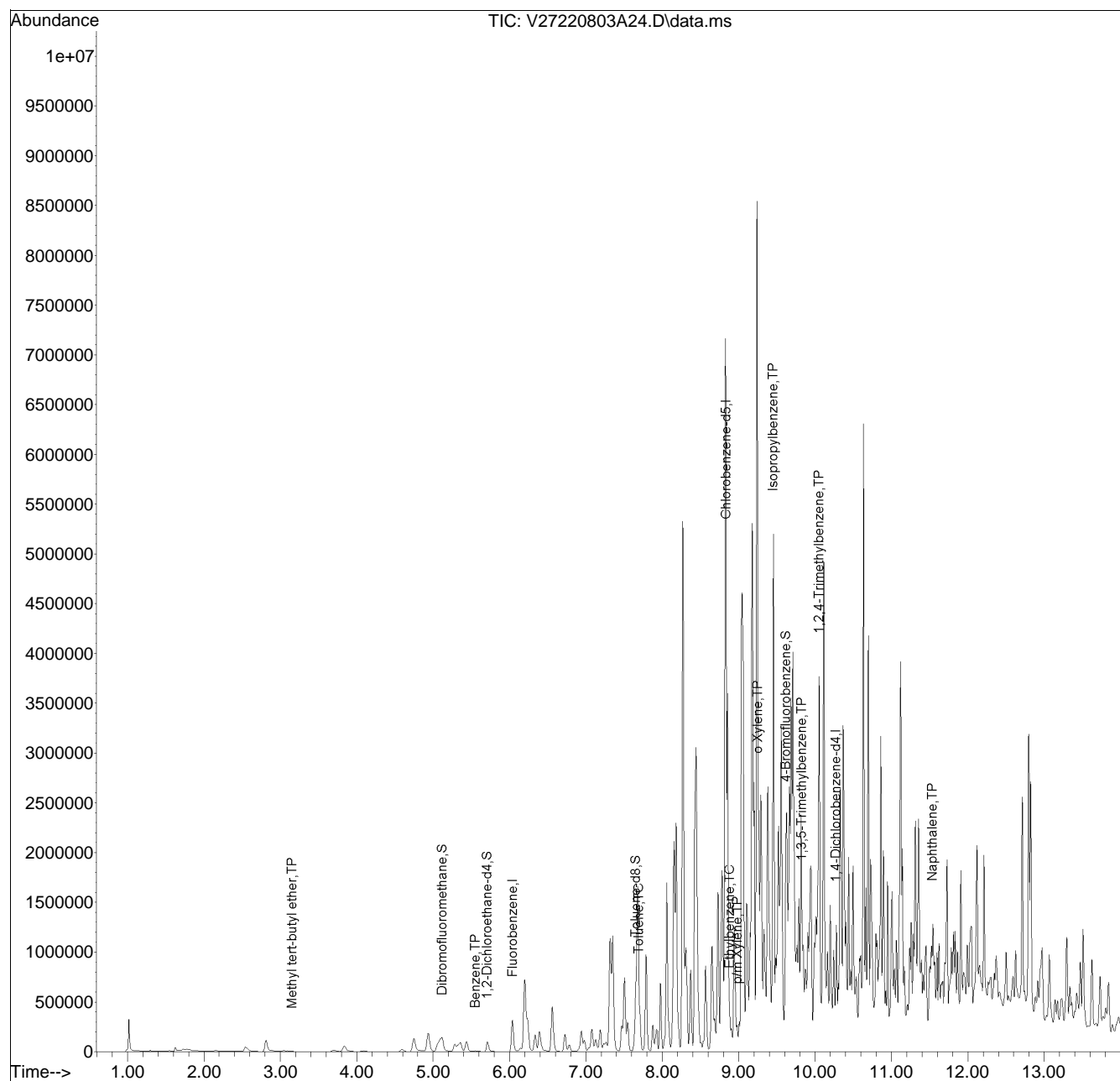


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2022\220803A\
Data File : V27220803A24.D
Acq On : 03 Aug 2022 02:43 pm
Operator : VOA127:NLK
Sample : L2241031-03,31H,3.61,5,0.100,,A
Misc : WG1671226,ICAL19153
ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 04 09:54:45 2022
Quant Method : I:\VOLATILES\VOA127\2022\220803A\V127_220706A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jul 07 06:48:30 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V27220803A01.D•

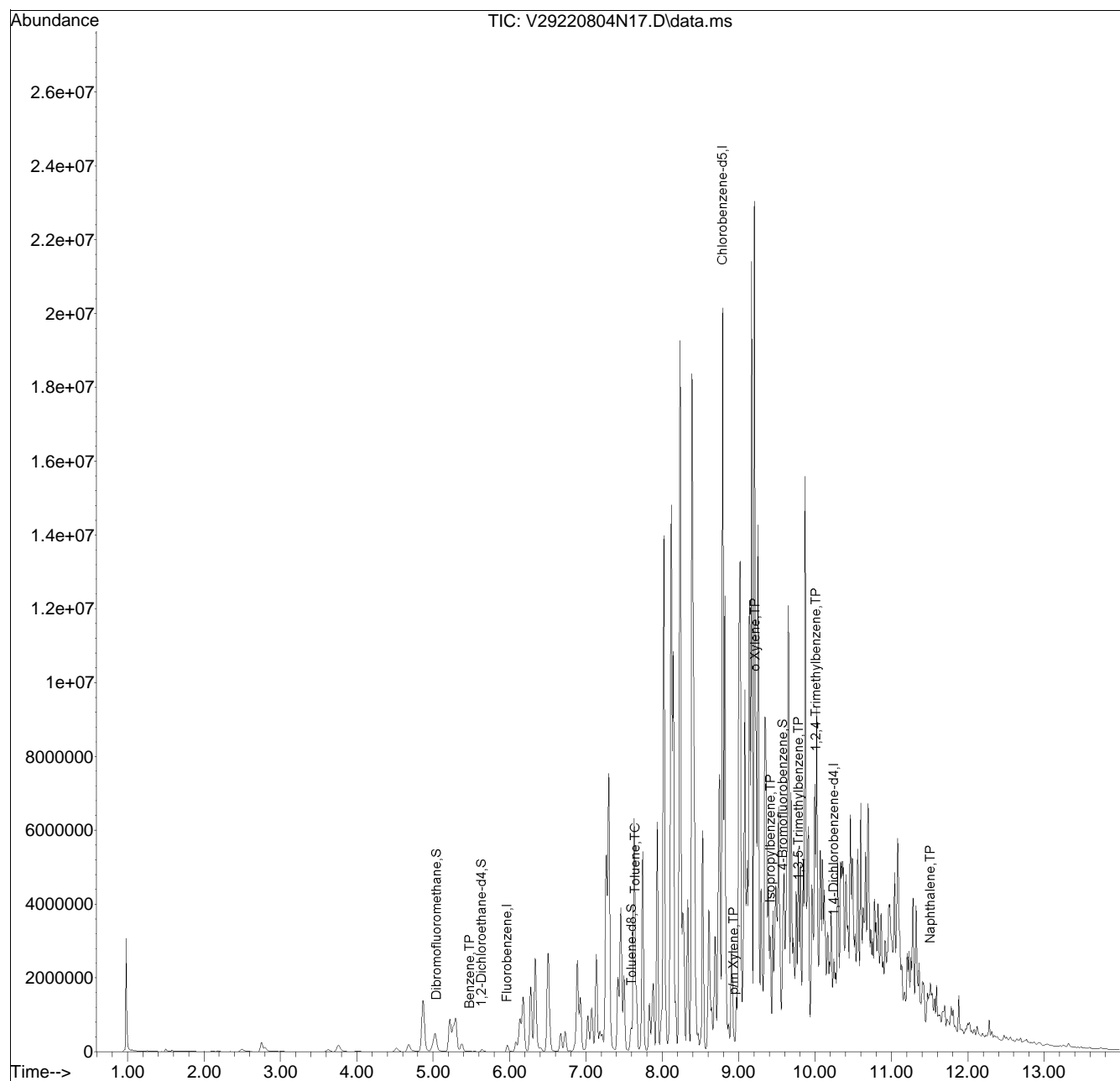


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220804N\
Data File : V29220804N17.D
Acq On : 05 Aug 2022 01:08 am
Operator : VOA129:NLK
Sample : 12241031-07,31,5.09,5,,b
Misc : WG1671753,ICAL19173
ALS Vial : 17 Sample Multiplier: 1

Quant Time: Aug 05 12:24:36 2022
Quant Method : I:\VOLATILES\VOA129\2022\220804N\V129_220712N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jul 14 08:00:36 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list04N\V29220804N01.D•

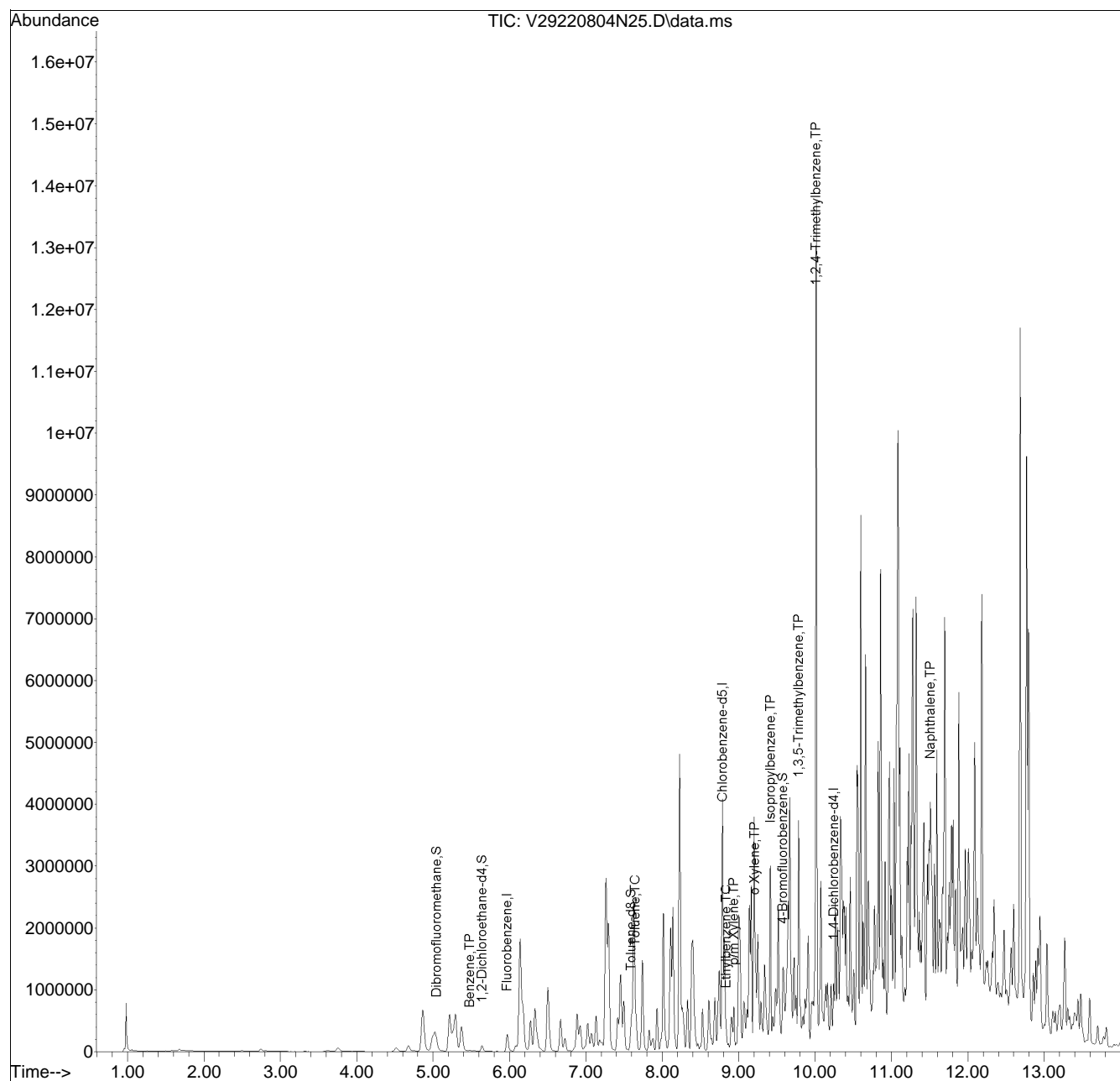


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220804N\
Data File : V29220804N25.D
Acq On : 05 Aug 2022 03:56 am
Operator : VOA129:NLK
Sample : 12241031-08,31h,4.68,5,0.100,,a
Misc : WG1671755,ICAL19173
ALS Vial : 25 Sample Multiplier: 1

Quant Time: Aug 05 07:51:26 2022
Quant Method : I:\VOLATILES\VOA129\2022\220804N\V129_220712N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jul 14 08:00:36 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list04N\V29220804N01.D•

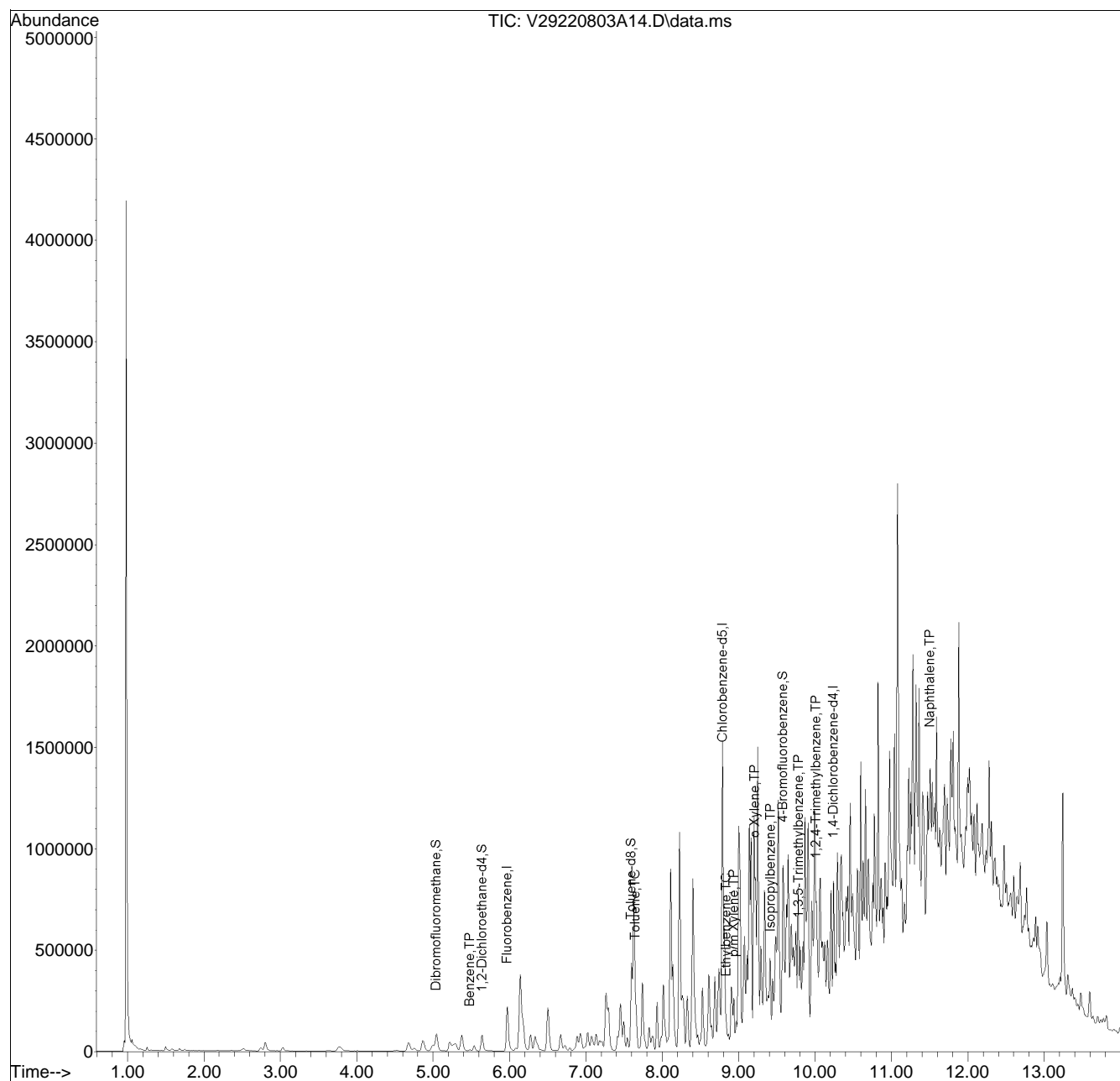


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220803A\
Data File : V29220803A14.D
Acq On : 03 Aug 2022 12:06 pm
Operator : VOA129:NLK
Sample : 12241031-09,31,4.79,5,,c
Misc : WG1671352,ICAL19173
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 04 12:45:30 2022
Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jul 14 08:00:36 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•

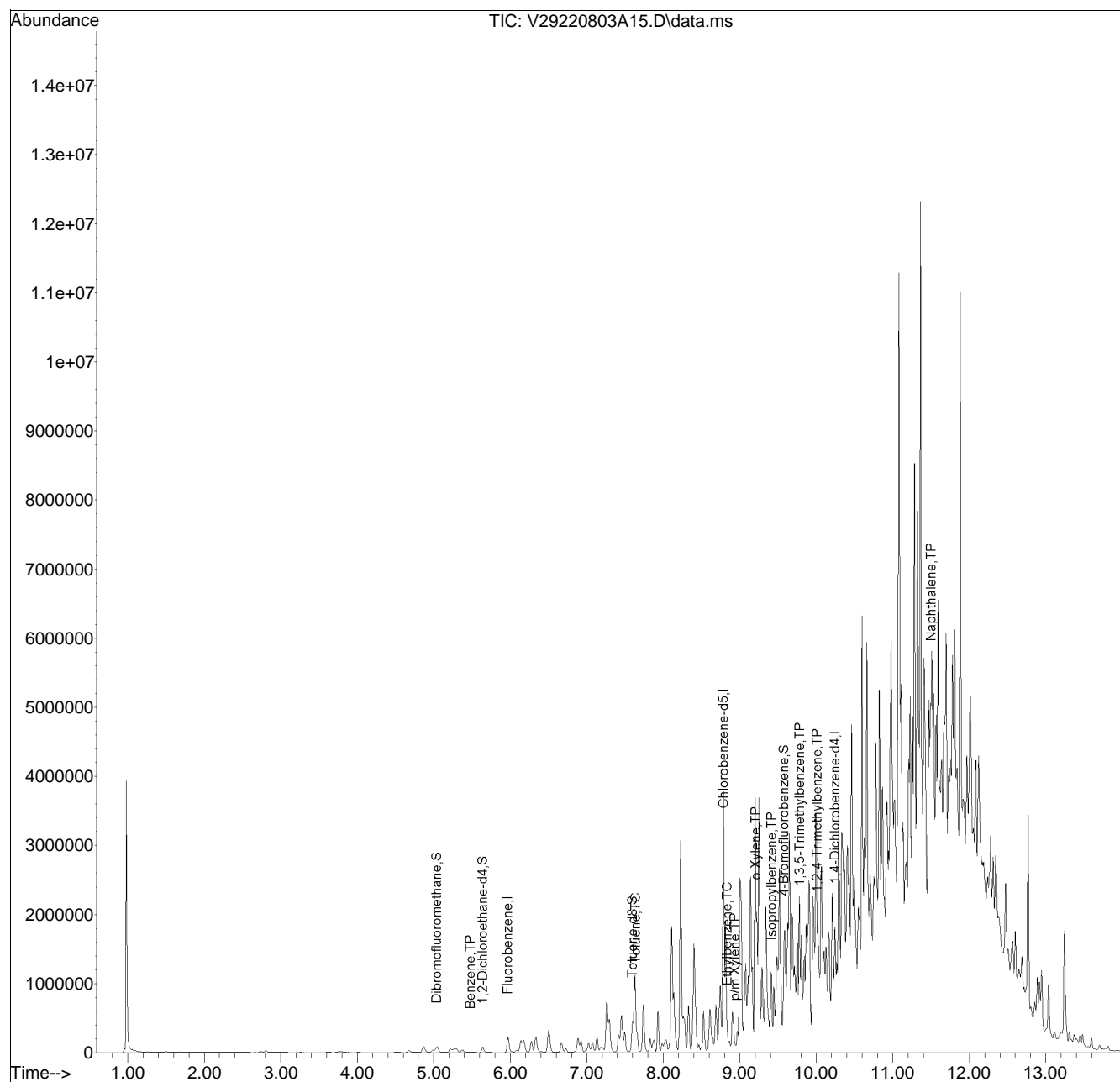


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220803A\
 Data File : V29220803A15.D
 Acq On : 03 Aug 2022 12:27 pm
 Operator : VOA129:NLK
 Sample : 12241031-10,31,4.51,5,,b
 Misc : WG1671352,ICAL19173
 ALS Vial : 15 Sample Multiplier: 1

Quant Time: Aug 04 13:23:30 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•

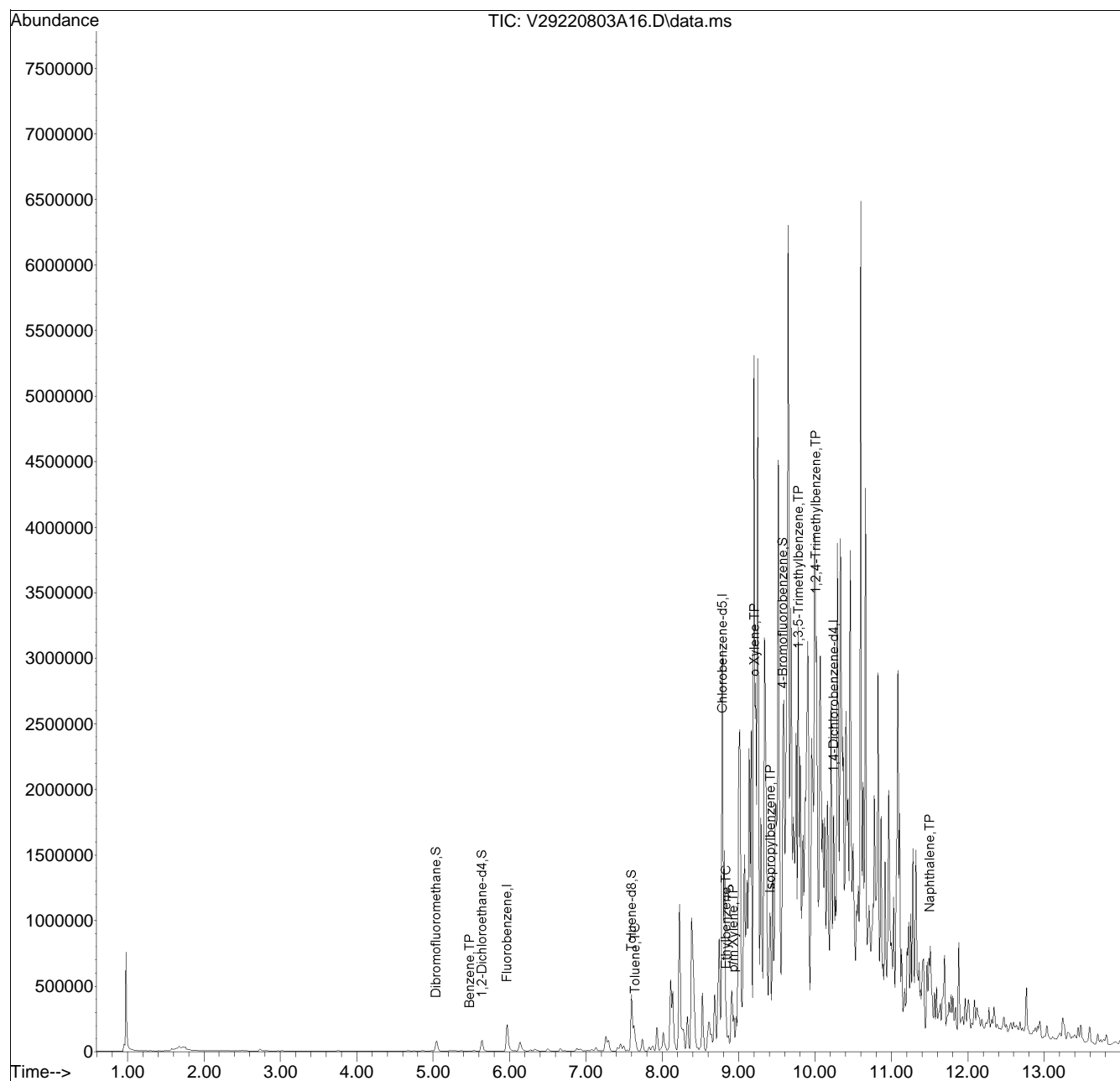


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220803A\
 Data File : V29220803A16.D
 Acq On : 03 Aug 2022 12:48 pm
 Operator : VOA129:NLK
 Sample : 12241031-11,31h,2.06,5,0.100,,a
 Misc : WG1671356,ICAL19173
 ALS Vial : 16 Sample Multiplier: 1

Quant Time: Aug 04 12:45:38 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•





ANALYTICAL REPORT

Lab Number:	L2241290
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/08/22

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241290

Report Date: 08/08/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241290-01	GPR792-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:00	08/02/22
L2241290-02	GPR792-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:10	08/02/22
L2241290-03	GPR792-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:20	08/02/22
L2241290-04	GPR792-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:30	08/02/22
L2241290-05	GPR792-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:40	08/02/22
L2241290-06	GPR792-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:50	08/02/22
L2241290-07	GPR792-07-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:00	08/02/22
L2241290-08	GPR793-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:10	08/02/22
L2241290-09	GPR793-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:20	08/02/22
L2241290-10	GPR793-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:30	08/02/22
L2241290-11	GPR793-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:40	08/02/22
L2241290-12	GPR793-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:50	08/02/22
L2241290-13	GPR793-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 12:00	08/02/22
L2241290-14	DUP-49	SOIL	PHILADELPHIA, PA	08/02/22 00:00	08/02/22
L2241290-15	FB-080222-1	WATER	PHILADELPHIA, PA	08/02/22 13:00	08/02/22
L2241290-16	FB-080222-2	WATER	PHILADELPHIA, PA	08/02/22 13:10	08/02/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 08/08/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-01 D
 Client ID: GPR792-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:48
 Analyst: JC
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	2400		mg/kg	15	1.6	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-02 D
 Client ID: GPR792-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:23
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4700		mg/kg	49	5.3	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	89		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-03 D
 Client ID: GPR792-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:47
 Analyst: JC
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	12000		mg/kg	88	9.6	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-04 D
 Client ID: GPR792-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:11
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	5000		mg/kg	54	5.9	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	90		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-05 D
 Client ID: GPR792-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:35
 Analyst: JC
 Percent Solids: 73%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	8900		mg/kg	65	7.1	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-06 D
 Client ID: GPR792-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:50
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:59
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4600		mg/kg	70	7.7	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	90		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-07 D
 Client ID: GPR792-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 14:23
 Analyst: JC
 Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1400		mg/kg	12	1.3	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	85		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	89		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-08 D
 Client ID: GPR793-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/06/22 02:38
 Analyst: AJK
 Percent Solids: 95%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	5500		mg/kg	92	10.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-09 D
 Client ID: GPR793-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 14:47
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	11000		mg/kg	100	11.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-10 D
 Client ID: GPR793-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:11
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	15000		mg/kg	120	14.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-11 D
 Client ID: GPR793-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:35
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	14000		mg/kg	110	12.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-12 D
 Client ID: GPR793-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:50
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:35
 Analyst: JC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1900		mg/kg	9.2	1.0	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-13 D
 Client ID: GPR793-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 12:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:59
 Analyst: JC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1800		mg/kg	11	1.2	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-14 D
 Client ID: DUP-49
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:59
 Analyst: NLK
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4700		mg/kg	59	6.4	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-15
 Client ID: FB-080222-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 12:42
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-16
 Client ID: FB-080222-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 13:05
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:47
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 15-16 Batch: WG1671600-5					
Isopropylbenzene	ND		ug/l	0.50	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-07,09-14 Batch: WG1672612-5					
Isopropylbenzene	ND		mg/kg	0.050	0.0054

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/05/22 18:45
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1672622-5					
Isopropylbenzene	ND		mg/kg	0.050	0.0054

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	93		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 15-16 Batch: WG1671600-3 WG1671600-4								
Isopropylbenzene	94		96		70-130	2		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	109		112		70-130
Toluene-d8	99		97		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	104		104		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-07,09-14 Batch: WG1672612-3 WG1672612-4								
Isopropylbenzene	102		99		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	83		83		70-130
Toluene-d8	100		95		70-130
4-Bromofluorobenzene	100		99		70-130
Dibromofluoromethane	89		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1672622-3 WG1672622-4								
Isopropylbenzene	115		102		70-130	12		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	89		89		70-130
Toluene-d8	97		97		70-130
4-Bromofluorobenzene	106		101		70-130
Dibromofluoromethane	94		89		70-130



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-01

Date Collected: 08/02/22 10:00

Client ID: GPR792-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-02

Date Collected: 08/02/22 10:10

Client ID: GPR792-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-03

Date Collected: 08/02/22 10:20

Client ID: GPR792-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.0		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-04

Date Collected: 08/02/22 10:30

Client ID: GPR792-04-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-05

Date Collected: 08/02/22 10:40

Client ID: GPR792-05-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	73.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-06

Date Collected: 08/02/22 10:50

Client ID: GPR792-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-07

Date Collected: 08/02/22 11:00

Client ID: GPR792-07-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.0		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-08

Date Collected: 08/02/22 11:10

Client ID: GPR793-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.7		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-09
Client ID: GPR793-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.8		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-10

Date Collected: 08/02/22 11:30

Client ID: GPR793-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.6		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Project Number:** 200.00135.006**Lab Number:** L2241290**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-11

Client ID: GPR793-04-SS01

Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:40

Date Received: 08/02/22

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.5		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-12

Date Collected: 08/02/22 11:50

Client ID: GPR793-05-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.7		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-13

Date Collected: 08/02/22 12:00

Client ID: GPR793-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.8		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-14

Date Collected: 08/02/22 00:00

Client ID: DUP-49

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.5		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241290

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-14 QC Batch ID: WG1670716-1 QC Sample: L2241290-01 Client ID: GPR792-01-SS01						
Solids, Total	85.2	85.1	%	0		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-01A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-01B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-01C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-01D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-02A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-02B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-02C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-02D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-03A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-03B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-03C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-03D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-04A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-04B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-04C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-04D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-05A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-05B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-05C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-05D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-06A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-06B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-06C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-06D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-07A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-07B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-07C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-07D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-08A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-08B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-08C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-08D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-09A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-09B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-09C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-09D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-10A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-10B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-10C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-10D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-11A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-11B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-11C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-11D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-12A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-12B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-12C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-12D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-13A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-13B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-13C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-13D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-14A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-14B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-14C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-14D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-15A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-15B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-15C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Report Date: 08/08/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

PAGE 1 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA
 TEL: 508-898-9220
 FAX: 508-898-9193

Mansfield, MA
 TEL: 508-822-9300
 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: 2224129D

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

Cumene

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41290-01	GPR-792-01-SS01	8/2/22	1000	S	an
-02	GPR-792-02-SS01		1010		
-03	GPR-792-03-SS01		1020		
-04	GPR-792-04-SS01		1030		
-05	GPR-792-05-SS01		1040		
-06	GPR-792-06-SS01		1050		
-07	GPR-792-07-SS01		1100		
-08	GPR-793-01-SS01		1110		
-09	GPR-793-02-SS01		1120		
-10	GPR-793-03-SS01		1130		

Container Type	-	-	G	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/2/22	ST-ADL	8/2/22 14:52
<i>[Signature]</i>	8/2/22 1900	CMF	8-2-1800
<i>[Signature]</i>	8-2-2100	<i>[Signature]</i>	8/2/22 2100
<i>[Signature]</i>	8/2/22	<i>[Signature]</i>	8/2/22 25:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



ANALYTICAL REPORT

Lab Number:	L2241291
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/10/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241291-01	GPR494-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 08:45	08/02/22
L2241291-02	GPR494-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 09:10	08/02/22
L2241291-03	GPR494-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 09:30	08/02/22
L2241291-04	GPR494-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:00	08/02/22
L2241291-05	GPR494-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:20	08/02/22
L2241291-06	GPR494-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:40	08/02/22
L2241291-07	GPR494-07-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:00	08/02/22
L2241291-08	GPR494-08-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:20	08/02/22
L2241291-09	GPR494-09-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:30	08/02/22
L2241291-10	GPR1088-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:00	08/02/22
L2241291-11	GPR1088-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:15	08/02/22
L2241291-12	GPR1088-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:30	08/02/22
L2241291-13	DUP-50	SOIL	PHILADELPHIA, PA	08/02/22 00:00	08/02/22
L2241291-14	FB-080222-3	WATER	PHILADELPHIA, PA	08/02/22 13:35	08/02/22
L2241291-15	FB-080222-4	WATER	PHILADELPHIA, PA	08/02/22 13:40	08/02/22
L2241291-16	TB-080222	WATER	PHILADELPHIA, PA	08/02/22 00:00	08/02/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241291-01: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (48%) and the surrogate recovery for 4-bromofluorobenzene (153%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis; however, since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. The results of both analyses are reported.

L2241291-02: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (47%) and the surrogate recovery for 4-bromofluorobenzene (207%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. Since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. A high-level analysis was performed, and those results are also reported.

L2241291-03: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (201%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-04: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (33%) and the surrogate recoveries for toluene-d8 (133%) and 4-bromofluorobenzene (254%) were outside the acceptance criteria; however, re-analysis achieved the following results: 1,4-dichlorobenzene-d4 (44%) and 4-bromofluorobenzene (171%). The results of both analyses are reported; however, since the IS response was below method criteria, all associated compounds and surrogate recoveries are considered to have a potentially high bias.

L2241291-05D: The sample has elevated detection limits due to the dilution required by the elevated

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative (continued)

concentrations of non-target compounds in the sample.

L2241291-05D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (220%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-06: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (149%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-07: The surrogate recoveries are outside the acceptance criteria for toluene-d8 (144%) and 4-bromofluorobenzene (834%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-08: The surrogate recovery for 4-bromofluorobenzene (137%) was outside the acceptance criteria; however, re-analysis achieved the following results: 1,4-dichlorobenzene-d4 (36%) and 4-bromofluorobenzene (134%). The results of both analyses are reported; however, since the IS response was below method criteria, all associated compounds and surrogate recoveries are considered to have a potentially high bias.

Semivolatile Organics

L2241291-01D and -03D through -06D: The sample has elevated detection limits due to the dilution required by the sample matrix.

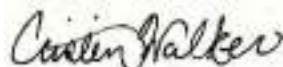
L2241291-08D: The surrogate recoveries are below the acceptance criteria for nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%) and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

Total Metals

The WG1670927-3 MS recovery for lead (486%), performed on L2241291-01, does not apply because the sample concentration is greater than four times the spike amount added.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Cristin Walker

Title: Technical Director/Representative

Date: 08/10/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:13
 Analyst: JC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.0040		mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.033		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	0.036		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.21		mg/kg	0.0024	0.00066	1
o-Xylene	0.095		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.30		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.054		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.16		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.63	E	mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	153	Q	70-130
Dibromofluoromethane	76		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 22:38
 Analyst: AJK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.099	0.0099	1
Benzene	ND		mg/kg	0.025	0.0082	1
1,2-Dichloroethane	ND		mg/kg	0.049	0.013	1
Toluene	ND		mg/kg	0.049	0.027	1
1,2-Dibromoethane	ND		mg/kg	0.025	0.014	1
Ethylbenzene	0.022	J	mg/kg	0.049	0.0070	1
p/m-Xylene	0.078	J	mg/kg	0.099	0.028	1
o-Xylene	0.038	J	mg/kg	0.049	0.014	1
Xylenes, Total	0.12	J	mg/kg	0.049	0.014	1
Isopropylbenzene	ND		mg/kg	0.049	0.0054	1
1,3,5-Trimethylbenzene	0.060	J	mg/kg	0.099	0.0095	1
1,2,4-Trimethylbenzene	0.22		mg/kg	0.099	0.016	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:40
 Analyst: JC
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.14	0.014	1
Benzene	0.037		mg/kg	0.036	0.012	1
1,2-Dichloroethane	ND		mg/kg	0.072	0.018	1
Toluene	0.047	J	mg/kg	0.072	0.039	1
1,2-Dibromoethane	ND		mg/kg	0.036	0.021	1
Ethylbenzene	0.064	J	mg/kg	0.072	0.010	1
p/m-Xylene	0.078	J	mg/kg	0.14	0.040	1
o-Xylene	0.14		mg/kg	0.072	0.021	1
Xylenes, Total	0.22	J	mg/kg	0.072	0.021	1
Isopropylbenzene	0.63		mg/kg	0.072	0.0078	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.14	0.014	1
1,2,4-Trimethylbenzene	0.061	J	mg/kg	0.14	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	98		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 22:58
 Analyst: AJK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.0041		mg/kg	0.00092	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00048	1
Toluene	0.0086		mg/kg	0.0018	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00092	0.00054	1
Ethylbenzene	0.0074		mg/kg	0.0018	0.00026	1
p/m-Xylene	0.0054		mg/kg	0.0037	0.0010	1
o-Xylene	0.025		mg/kg	0.0018	0.00054	1
Xylenes, Total	0.030		mg/kg	0.0018	0.00054	1
Isopropylbenzene	0.072		mg/kg	0.0018	0.00020	1
1,3,5-Trimethylbenzene	0.00036	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.0053		mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	127		70-130
4-Bromofluorobenzene	207	Q	70-130
Dibromofluoromethane	79		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03
 Client ID: GPR494-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 23:40
 Analyst: AJK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	0.00040	J	mg/kg	0.00048	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00096	0.00025	1
Toluene	0.00082	J	mg/kg	0.00096	0.00052	1
1,2-Dibromoethane	ND		mg/kg	0.00048	0.00028	1
Ethylbenzene	0.0012		mg/kg	0.00096	0.00014	1
p/m-Xylene	0.0064		mg/kg	0.0019	0.00054	1
o-Xylene	0.0068		mg/kg	0.00096	0.00028	1
Xylenes, Total	0.013		mg/kg	0.00096	0.00028	1
Isopropylbenzene	0.034		mg/kg	0.00096	0.00010	1
1,3,5-Trimethylbenzene	0.00040	J	mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	0.0017	J	mg/kg	0.0019	0.00032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	125		70-130
4-Bromofluorobenzene	201	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:33
 Analyst: JC
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00021	1
Benzene	0.0018		mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	0.0050		mg/kg	0.0010	0.00056	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	0.0042		mg/kg	0.0010	0.00014	1
p/m-Xylene	0.0096		mg/kg	0.0020	0.00057	1
o-Xylene	0.019		mg/kg	0.0010	0.00030	1
Xylenes, Total	0.029		mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.013		mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	0.0010	J	mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	0.0057		mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	128		70-130
Toluene-d8	133	Q	70-130
4-Bromofluorobenzene	254	Q	70-130
Dibromofluoromethane	116		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04 R
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 23:19
 Analyst: AJK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.00036	J	mg/kg	0.00061	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.0011	J	mg/kg	0.0012	0.00066	1
1,2-Dibromoethane	ND		mg/kg	0.00061	0.00036	1
Ethylbenzene	0.0010	J	mg/kg	0.0012	0.00017	1
p/m-Xylene	0.0027		mg/kg	0.0024	0.00068	1
o-Xylene	0.0041		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.0068		mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.0072		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0074		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0010	J	mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	171	Q	70-130
Dibromofluoromethane	87		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05 D
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:00
 Analyst: JC
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.27	0.027	2
Benzene	ND		mg/kg	0.068	0.022	2
1,2-Dichloroethane	ND		mg/kg	0.14	0.035	2
Toluene	0.089	J	mg/kg	0.14	0.074	2
1,2-Dibromoethane	ND		mg/kg	0.068	0.040	2
Ethylbenzene	0.046	J	mg/kg	0.14	0.019	2
p/m-Xylene	0.16	J	mg/kg	0.27	0.076	2
o-Xylene	0.086	J	mg/kg	0.14	0.040	2
Xylenes, Total	0.25	J	mg/kg	0.14	0.040	2
Isopropylbenzene	2.1		mg/kg	0.14	0.015	2
1,3,5-Trimethylbenzene	ND		mg/kg	0.27	0.026	2
1,2,4-Trimethylbenzene	0.15	J	mg/kg	0.27	0.045	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	220	Q	70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-06
 Client ID: GPR494-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 15:30
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0022	0.00022	1
Benzene	0.00059		mg/kg	0.00056	0.00018	1
1,2-Dichloroethane	ND		mg/kg	0.0011	0.00029	1
Toluene	0.0012		mg/kg	0.0011	0.00061	1
1,2-Dibromoethane	ND		mg/kg	0.00056	0.00033	1
Ethylbenzene	0.00067	J	mg/kg	0.0011	0.00016	1
p/m-Xylene	0.0032		mg/kg	0.0022	0.00062	1
o-Xylene	0.0052		mg/kg	0.0011	0.00032	1
Xylenes, Total	0.0084		mg/kg	0.0011	0.00032	1
Isopropylbenzene	0.0091		mg/kg	0.0011	0.00012	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0022	0.00022	1
1,2,4-Trimethylbenzene	0.0020	J	mg/kg	0.0022	0.00037	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	149	Q	70-130
Dibromofluoromethane	85		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:53
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.00050	J	mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.0043		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	0.0028		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.041		mg/kg	0.0024	0.00066	1
o-Xylene	0.020		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.061		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.14		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0025		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.018		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	130		70-130
Toluene-d8	144	Q	70-130
4-Bromofluorobenzene	834	Q	70-130
Dibromofluoromethane	106		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:20
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	0.0052		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	0.0044		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00040	1
Ethylbenzene	0.0030		mg/kg	0.0014	0.00020	1
p/m-Xylene	0.012		mg/kg	0.0028	0.00078	1
o-Xylene	0.0075		mg/kg	0.0014	0.00040	1
Xylenes, Total	0.020		mg/kg	0.0014	0.00040	1
Isopropylbenzene	0.0029		mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	0.0039		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	0.012		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	121		70-130
4-Bromofluorobenzene	137	Q	70-130
Dibromofluoromethane	108		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08 R
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 21:34
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.016		mg/kg	0.00060	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.0057		mg/kg	0.0012	0.00066	1
1,2-Dibromoethane	ND		mg/kg	0.00060	0.00035	1
Ethylbenzene	0.0036		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.012		mg/kg	0.0024	0.00068	1
o-Xylene	0.0083		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.020		mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.0019		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0022	J	mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0063		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	113		70-130
4-Bromofluorobenzene	134	Q	70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
 Client ID: GPR494-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 21:54
 Analyst: NLK
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	ND		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00041	1
Ethylbenzene	ND		mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00078	1
o-Xylene	ND		mg/kg	0.0014	0.00040	1
Xylenes, Total	ND		mg/kg	0.0014	0.00040	1
Isopropylbenzene	ND		mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 18:57
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 10:28
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:04
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 10:52
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-16
 Client ID: TB-080222
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:11
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-16
 Client ID: TB-080222
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 11:17
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/04/22 08:49
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 14-16 Batch: WG1671346-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/08/22 17:23
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 14-16 Batch: WG1672421-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 16:59
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG1672584-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 16:59
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02-04 Batch: WG1672587-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02,05 Batch: WG1672595-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,04,07 Batch: WG1672597-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/08/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06 Batch: WG1672815-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/08/22 18:52
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 08-09 Batch: WG1672860-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	96		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 08 Batch: WG1672867-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 14-16 Batch: WG1671346-3 WG1671346-4								
Methyl tert butyl ether	87		89		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	100		110		70-130	10		20
Ethylbenzene	100		110		70-130	10		20
p/m-Xylene	105		105		70-130	0		20
o-Xylene	100		105		70-130	5		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	100		110		64-130	10		20
1,2,4-Trimethylbenzene	100		110		70-130	10		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	93		92		70-130
Toluene-d8	102		100		70-130
4-Bromofluorobenzene	99		99		70-130
Dibromofluoromethane	103		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 14-16 Batch: WG1672421-2									
1,2-Dibromoethane	92		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1672584-3 WG1672584-4								
Methyl tert butyl ether	91		90		66-130	1		30
Benzene	98		95		70-130	3		30
1,2-Dichloroethane	94		93		70-130	1		30
Toluene	96		94		70-130	2		30
1,2-Dibromoethane	99		98		70-130	1		30
Ethylbenzene	101		98		70-130	3		30
p/m-Xylene	100		97		70-130	3		30
o-Xylene	99		97		70-130	2		30
Isopropylbenzene	100		98		70-130	2		30
1,3,5-Trimethylbenzene	100		99		70-130	1		30
1,2,4-Trimethylbenzene	101		99		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		99		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	89		91		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-04 Batch: WG1672587-3 WG1672587-4								
Methyl tert butyl ether	91		90		66-130	1		30
Benzene	98		95		70-130	3		30
1,2-Dichloroethane	94		93		70-130	1		30
Toluene	96		94		70-130	2		30
1,2-Dibromoethane	99		98		70-130	1		30
Ethylbenzene	101		98		70-130	3		30
p/m-Xylene	100		97		70-130	3		30
o-Xylene	99		97		70-130	2		30
Isopropylbenzene	100		98		70-130	2		30
1,3,5-Trimethylbenzene	100		99		70-130	1		30
1,2,4-Trimethylbenzene	101		99		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		99		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	89		91		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,05 Batch: WG1672595-3 WG1672595-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,04,07 Batch: WG1672597-3 WG1672597-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1672815-3 WG1672815-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 08-09 Batch: WG1672860-3 WG1672860-4								
Methyl tert butyl ether	93		93		66-130	0		30
Benzene	91		90		70-130	1		30
1,2-Dichloroethane	90		90		70-130	0		30
Toluene	84		83		70-130	1		30
1,2-Dibromoethane	90		89		70-130	1		30
Ethylbenzene	90		88		70-130	2		30
p/m-Xylene	90		88		70-130	2		30
o-Xylene	91		89		70-130	2		30
Isopropylbenzene	92		92		70-130	0		30
1,3,5-Trimethylbenzene	91		92		70-130	1		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	103		104		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	99		101		70-130
Dibromofluoromethane	99		97		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 08 Batch: WG1672867-3 WG1672867-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01 D
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 13:44
 Analyst: JG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.3	J	mg/kg	1.8	0.22	10
Fluorene	5.2		mg/kg	1.8	0.18	10
Phenanthrene	30.		mg/kg	1.1	0.22	10
Anthracene	4.8		mg/kg	1.1	0.35	10
Pyrene	11.		mg/kg	1.1	0.18	10
Benzo(a)anthracene	9.7		mg/kg	1.1	0.20	10
Chrysene	13.		mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	3.7		mg/kg	1.1	0.30	10
Benzo(a)pyrene	7.7		mg/kg	1.4	0.44	10
Benzo(ghi)perylene	2.5		mg/kg	1.4	0.21	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	77		30-120
4-Terphenyl-d14	69		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02 D
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 14:32
 Analyst: JG
 Percent Solids: 88%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.4	J	mg/kg	1.9	0.23	10
Fluorene	9.0		mg/kg	1.9	0.18	10
Phenanthrene	71.		mg/kg	1.1	0.23	10
Anthracene	7.1		mg/kg	1.1	0.36	10
Pyrene	39.		mg/kg	1.1	0.19	10
Benzo(a)anthracene	20.		mg/kg	1.1	0.21	10
Chrysene	34.		mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	8.4		mg/kg	1.1	0.32	10
Benzo(a)pyrene	18.		mg/kg	1.5	0.46	10
Benzo(ghi)perylene	7.0		mg/kg	1.5	0.22	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	42		23-120
2-Fluorobiphenyl	58		30-120
4-Terphenyl-d14	61		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03 D
 Client ID: GPR494-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 01:40
 Analyst: CMM
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.91	0.11	5
Fluorene	4.8		mg/kg	0.91	0.088	5
Phenanthrene	29.		mg/kg	0.54	0.11	5
Anthracene	4.0		mg/kg	0.54	0.18	5
Pyrene	20.		mg/kg	0.54	0.090	5
Benzo(a)anthracene	7.8		mg/kg	0.54	0.10	5
Chrysene	14.		mg/kg	0.54	0.094	5
Benzo(b)fluoranthene	3.6		mg/kg	0.54	0.15	5
Benzo(a)pyrene	7.4		mg/kg	0.72	0.22	5
Benzo(ghi)perylene	2.4		mg/kg	0.72	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	48		23-120
2-Fluorobiphenyl	64		30-120
4-Terphenyl-d14	60		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04 D
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 02:03
 Analyst: CMM
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.36	J	mg/kg	0.93	0.11	5
Fluorene	0.57	J	mg/kg	0.93	0.091	5
Phenanthrene	1.1		mg/kg	0.56	0.11	5
Anthracene	0.59		mg/kg	0.56	0.18	5
Pyrene	8.6		mg/kg	0.56	0.093	5
Benzo(a)anthracene	3.9		mg/kg	0.56	0.10	5
Chrysene	9.7		mg/kg	0.56	0.097	5
Benzo(b)fluoranthene	4.6		mg/kg	0.56	0.16	5
Benzo(a)pyrene	7.4		mg/kg	0.75	0.23	5
Benzo(ghi)perylene	3.5		mg/kg	0.75	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	54		23-120
2-Fluorobiphenyl	63		30-120
4-Terphenyl-d14	67		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05 D
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 14:55
 Analyst: JG
 Percent Solids: 81%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.94	J	mg/kg	2.0	0.24	10
Fluorene	8.1		mg/kg	2.0	0.20	10
Phenanthrene	36.		mg/kg	1.2	0.24	10
Anthracene	4.7		mg/kg	1.2	0.39	10
Pyrene	15.		mg/kg	1.2	0.20	10
Benzo(a)anthracene	11.		mg/kg	1.2	0.23	10
Chrysene	16.		mg/kg	1.2	0.21	10
Benzo(b)fluoranthene	3.9		mg/kg	1.2	0.34	10
Benzo(a)pyrene	8.7		mg/kg	1.6	0.49	10
Benzo(ghi)perylene	2.7		mg/kg	1.6	0.24	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	60		23-120
2-Fluorobiphenyl	80		30-120
4-Terphenyl-d14	74		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-06 D
 Client ID: GPR494-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 15:18
 Analyst: JG
 Percent Solids: 92%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.42	J	mg/kg	1.8	0.22	10
Fluorene	1.4	J	mg/kg	1.8	0.17	10
Phenanthrene	7.6		mg/kg	1.1	0.22	10
Anthracene	1.8		mg/kg	1.1	0.35	10
Pyrene	2.3		mg/kg	1.1	0.18	10
Benzo(a)anthracene	2.8		mg/kg	1.1	0.20	10
Chrysene	3.1		mg/kg	1.1	0.18	10
Benzo(b)fluoranthene	1.2		mg/kg	1.1	0.30	10
Benzo(a)pyrene	2.1		mg/kg	1.4	0.43	10
Benzo(ghi)perylene	0.75	J	mg/kg	1.4	0.21	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	85		23-120
2-Fluorobiphenyl	81		30-120
4-Terphenyl-d14	72		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07 D
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:11
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.98	0.12	5
Fluorene	6.6		mg/kg	0.98	0.095	5
Phenanthrene	30.		mg/kg	0.58	0.12	5
Anthracene	2.8		mg/kg	0.58	0.19	5
Pyrene	7.8		mg/kg	0.58	0.097	5
Benzo(a)anthracene	3.5		mg/kg	0.58	0.11	5
Chrysene	7.0		mg/kg	0.58	0.10	5
Benzo(b)fluoranthene	1.1		mg/kg	0.58	0.16	5
Benzo(a)pyrene	2.7		mg/kg	0.78	0.24	5
Benzo(ghi)perylene	0.70	J	mg/kg	0.78	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	57		30-120
4-Terphenyl-d14	54		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08 D
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:33
 Analyst: JG
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	4.8	J	mg/kg	6.7	0.81	35
Fluorene	11.		mg/kg	6.7	0.65	35
Phenanthrene	110		mg/kg	4.0	0.81	35
Anthracene	23.		mg/kg	4.0	1.3	35
Pyrene	130		mg/kg	4.0	0.66	35
Benzo(a)anthracene	71.		mg/kg	4.0	0.75	35
Chrysene	170		mg/kg	4.0	0.70	35
Benzo(b)fluoranthene	28.		mg/kg	4.0	1.1	35
Benzo(a)pyrene	54.		mg/kg	5.4	1.6	35
Benzo(ghi)perylene	18.		mg/kg	5.4	0.79	35

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
 Client ID: GPR494-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:56
 Analyst: CMM
 Percent Solids: 81%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.059	J	mg/kg	0.20	0.024	1
Fluorene	0.030	J	mg/kg	0.20	0.019	1
Phenanthrene	0.45		mg/kg	0.12	0.024	1
Anthracene	0.13		mg/kg	0.12	0.039	1
Pyrene	0.84		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.73		mg/kg	0.12	0.022	1
Chrysene	0.70		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	1.2		mg/kg	0.12	0.033	1
Benzo(a)pyrene	1.1		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.51		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	69		30-120
4-Terphenyl-d14	65		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/08/22 12:33
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	71		23-120
2-Fluorobiphenyl	64		15-120
4-Terphenyl-d14	49		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/08/22 12:49
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	68		15-120
4-Terphenyl-d14	52		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 08/08/22 23:47
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-09 Batch: WG1671002-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	84		30-120
4-Terphenyl-d14	103		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 08/08/22 12:17
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 14-15 Batch: WG1672057-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	66		15-120
4-Terphenyl-d14	53		41-149



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-09 Batch: WG1671002-2 WG1671002-3								
Naphthalene	83		77		40-140	8		50
Fluorene	91		84		40-140	8		50
Phenanthrene	81		76		40-140	6		50
Anthracene	87		80		40-140	8		50
Pyrene	83		76		35-142	9		50
Benzo(a)anthracene	93		87		40-140	7		50
Chrysene	88		84		40-140	5		50
Benzo(b)fluoranthene	113		103		40-140	9		50
Benzo(a)pyrene	114		108		40-140	5		50
Benzo(ghi)perylene	92		87		40-140	6		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	94		84		23-120
2-Fluorobiphenyl	83		77		30-120
4-Terphenyl-d14	99		90		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 14-15 Batch: WG1672057-2 WG1672057-3								
Naphthalene	76		73		40-140	4		40
Fluorene	76		73		40-140	4		40
Phenanthrene	76		71		40-140	7		40
Anthracene	74		70		40-140	6		40
Pyrene	67		63		26-127	6		40
Benzo(a)anthracene	79		73		40-140	8		40
Chrysene	85		80		40-140	6		40
Benzo(b)fluoranthene	88		78		40-140	12		40
Benzo(a)pyrene	76		68		40-140	11		40
Benzo(ghi)perylene	82		79		40-140	4		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	80		76		23-120
2-Fluorobiphenyl	72		67		15-120
4-Terphenyl-d14	58		54		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01

Date Collected: 08/02/22 08:45

Client ID: GPR494-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	517		mg/kg	2.11	0.113	1	08/03/22 23:50	08/09/22 19:10	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	90.3		mg/kg	2.21	0.118	1	08/03/22 23:50	08/09/22 18:56	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03
 Client ID: GPR494-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	12.9		mg/kg	2.12	0.114	1	08/03/22 23:50	08/09/22 19:01	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	238		mg/kg	2.14	0.115	1	08/03/22 23:50	08/09/22 19:06	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	32.0		mg/kg	2.37	0.127	1	08/03/22 23:50	08/09/22 19:43	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-06
 Client ID: GPR494-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	78.1		mg/kg	2.06	0.111	1	08/03/22 23:50	08/09/22 19:48	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	19.3		mg/kg	2.28	0.122	1	08/03/22 23:50	08/09/22 19:53	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	114		mg/kg	2.26	0.121	1	08/03/22 23:50	08/09/22 19:57	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
 Client ID: GPR494-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	70.9		mg/kg	2.36	0.127	1	08/03/22 23:50	08/09/22 20:02	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:45	EPA 3005A	1,6010D	EW



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15

Date Collected: 08/02/22 13:40

Client ID: FB-080222-4

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:50	EPA 3005A	1,6010D	EW



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1670927-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/03/22 23:50	08/09/22 18:47	1,6010D	NB

Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 14-15 Batch: WG1670990-1									
Lead, Total	ND	mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:27	1,6010D	EW

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1670927-2 SRM Lot Number: D113-540								
Lead, Total	81		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 14-15 Batch: WG1670990-2								
Lead, Total	100		-		80-120	-		

Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1670927-3 QC Sample: L2241291-01 Client ID: GPR494-01-SS01												
Lead, Total	517	45.2	737	486	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 14-15 QC Batch ID: WG1670990-3 QC Sample: L2241354-01 Client ID: MS Sample												
Lead, Total	0.004J	0.53	0.507	96		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1670927-4 QC Sample: L2241291-01 Client ID: GPR494-01-SS01						
Lead, Total	517	569	mg/kg	10		20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01

Date Collected: 08/02/22 08:45

Client ID: GPR494-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.5		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-02

Date Collected: 08/02/22 09:10

Client ID: GPR494-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	87.8		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-03

Date Collected: 08/02/22 09:30

Client ID: GPR494-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.5		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
Client ID: GPR494-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.7		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05

Date Collected: 08/02/22 10:20

Client ID: GPR494-05-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.1		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-06

Date Collected: 08/02/22 10:40

Client ID: GPR494-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.9		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07

Date Collected: 08/02/22 11:00

Client ID: GPR494-07-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.0		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
Client ID: GPR494-08-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
Client ID: GPR494-09-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-10

Date Collected: 08/02/22 13:00

Client ID: GPR1088-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.5		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-11

Date Collected: 08/02/22 13:15

Client ID: GPR1088-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-12

Date Collected: 08/02/22 13:30

Client ID: GPR1088-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-13

Date Collected: 08/02/22 00:00

Client ID: DUP-50

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14

Date Collected: 08/02/22 13:35

Client ID: FB-080222-3

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	7.0		SU	-	NA	1	-	08/03/22 20:36	1,9040C	AS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15

Date Collected: 08/02/22 13:40

Client ID: FB-080222-4

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.8		SU	-	NA	1	-	08/03/22 20:36	1,9040C	AS



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 14-15 Batch: WG1670909-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 10-13 Batch: WG1671686-1								
pH	100		-		99-101	-		

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG1670713-1 QC Sample: L2241331-01 Client ID: DUP Sample						
Solids, Total	84.5	85.1	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 09 QC Batch ID: WG1670716-1 QC Sample: L2241290-01 Client ID: DUP Sample						
Solids, Total	85.2	85.1	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 14-15 QC Batch ID: WG1670909-2 QC Sample: L2240789-01 Client ID: DUP Sample						
pH	6.7	6.6	SU	2		5
General Chemistry - Westborough Lab Associated sample(s): 10-13 QC Batch ID: WG1671686-2 QC Sample: L2241901-01 Client ID: DUP Sample						
pH	3.8	3.7	SU	3		5

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-01A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241291-01B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-01C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-01D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-01E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-01F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-02A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241291-02B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-02C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-02D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-02E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-02F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-03A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-03B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-03C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-03D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-03E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-03F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-04A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-04B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-04C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-04D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-04E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-04F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-05A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-05B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-05C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-05D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-05E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-05F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-06A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-06B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-06C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-06D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-06E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-06F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-07A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-07B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-07C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-07D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-07E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-07F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-08A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-08B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-08C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-08D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-08E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-08F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-09A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-09B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-09C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-09D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-09E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-09F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-10A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-11A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-12A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-13A	Glass 250ml/8oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-14A	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14B	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14C	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14D	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-14E	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-14F	Plastic 60ml unpreserved	C	7	7	3.6	Y	Absent		PH-9040(1)
L2241291-14G	Plastic 250ml HNO3 preserved	C	<2	<2	3.6	Y	Absent		PB-TI(180)
L2241291-14H	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-14I	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-15A	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15B	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15C	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15D	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-15E	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-15F	Plastic 60ml unpreserved	C	7	7	3.6	Y	Absent		PH-9040(1)
L2241291-15G	Plastic 250ml HNO3 preserved	C	<2	<2	3.6	Y	Absent		PB-TI(180)
L2241291-15H	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-15I	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-16A	Vial HCl preserved	B	NA		3.0	Y	Absent		PA-8260(14)
L2241291-16B	Vial HCl preserved	B	NA		3.0	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Serial_No:08102211:47

Lab Number: L2241291

Report Date: 08/10/22

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-16C	Vial Na2S2O3 preserved	B	NA		3.0	Y	Absent		8011(14)
L2241291-16D	Vial Na2S2O3 preserved	B	NA		3.0	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: L2241291

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
41291-01	8/2	0845	BSS	TS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-02		0910			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-03		0930			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-04		1000			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-05		1020			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-06		1040			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-07		1100			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-08		1120			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-09		1130			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-10		1300			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SHORT LIST 1-5
PH

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41291-01	CPR494-01-SS01	8/2	0845	BSS	TS
-02	CPR494-02-SS01		0910		
-03	CPR494-03-SS01		0930		
-04	CPR494-04-SS01		1000		
-05	CPR494-05-SS01		1020		
-06	CPR494-06-SS01		1040		
-07	CPR494-07-SS01		1100		
-08	CPR494-08-SS01		1120		
-09	CPR494-09-SS01		1130		
-10	CPR1088-01-SS01		1300		

Container Type: G
 Preservative:

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/2/22	ST - AAL	8/2/22 4:52
<i>[Signature]</i>	8/2/22 16:00	AMU	8/2/22 16:00
<i>[Signature]</i>	8/2/22	<i>[Signature]</i>	8/2/22 23:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrafase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: L2241291

Report Information Data Deliverables

FAX EMAIL Add'l Deliverables
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: Standard Rush (ONLY IF PRE-APPROVED)

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrafase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

ANALYSIS

	SHEET LIST 1-5	PH	VOC PORTIONS - F5L	EDB (8011)	ANALYSIS												
					1	2	3	4	5	6	7	8	9	10	11	12	
41291-11	✓	✓	✓	✓													
-12	✓	✓	✓	✓													
-13	✓	✓	✓	✓													
-14	✓	✓	✓	✓													
-15	✓	✓	✓	✓													
-16	✓	✓	✓	✓													

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41291-11	GPR 1088-02-SS01	8/2	1316	S	TS
-12	GPR 1088-03-SS01		1330	S	TS
-13	DUP-50		-	S	TS
-14	FB-080222-3		1335	W	TS
-15	FB-080222-4		1340	W	TS
-16	TB-080222		-	W	TS

Container Type

Preservative

Relinquished By: [Signature]

Date/Time: 8/2/22

Received By: [Signature]

Date/Time: 8/2/22 14:52

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene

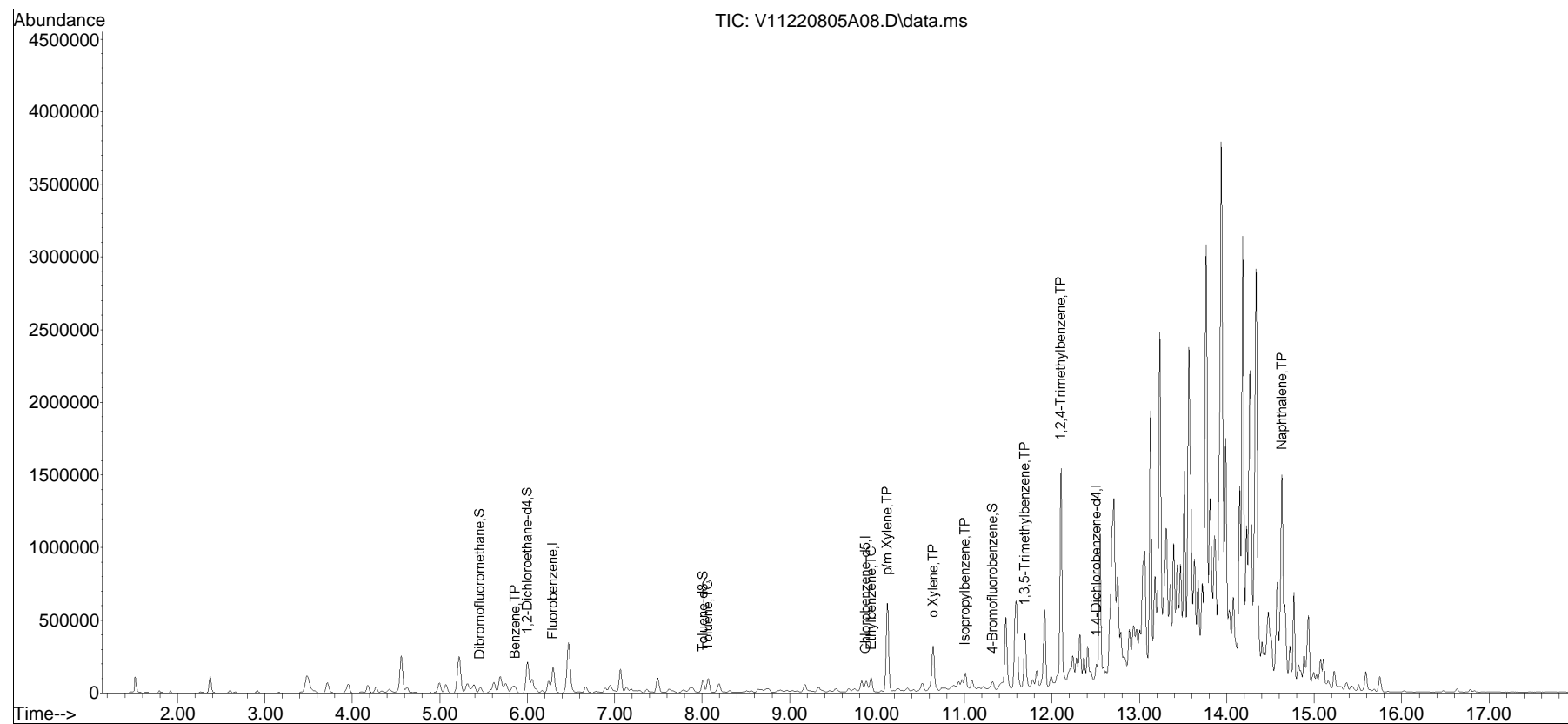
- ~~3. Kerosene Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene~~
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
 Data File : V11220805A08.D
 Acq On : 05 Aug 2022 10:13 am
 Operator : VOA111:JC
 Sample : L2241291-01,31,4.67,5,,B
 Misc : WG1672597,ICAL19072
 ALS Vial : 8 Sample Multiplier: 1

Quant Time: Aug 05 13:21:07 2022
 Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jun 09 10:30:20 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•

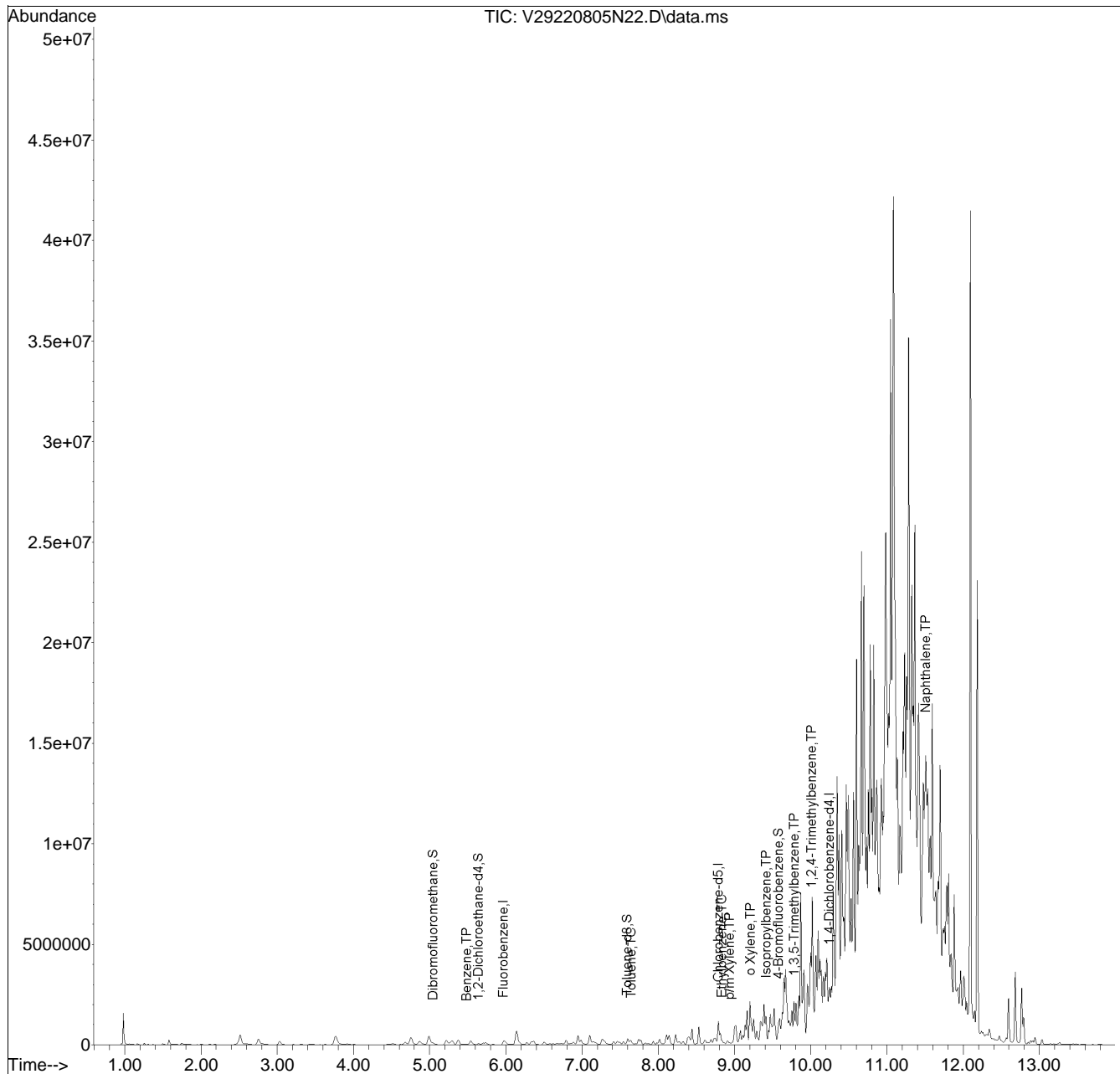


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220805N\
 Data File : V29220805N22.D
 Acq On : 05 Aug 2022 10:58 pm
 Operator : VOA129:AJK
 Sample : 12241291-02,31,3.08,5,,c
 Misc : WG1672587,ICAL19173
 ALS Vial : 22 Sample Multiplier: 1

Quant Time: Aug 07 17:29:18 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220805N\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05N\V29220805N01.D•

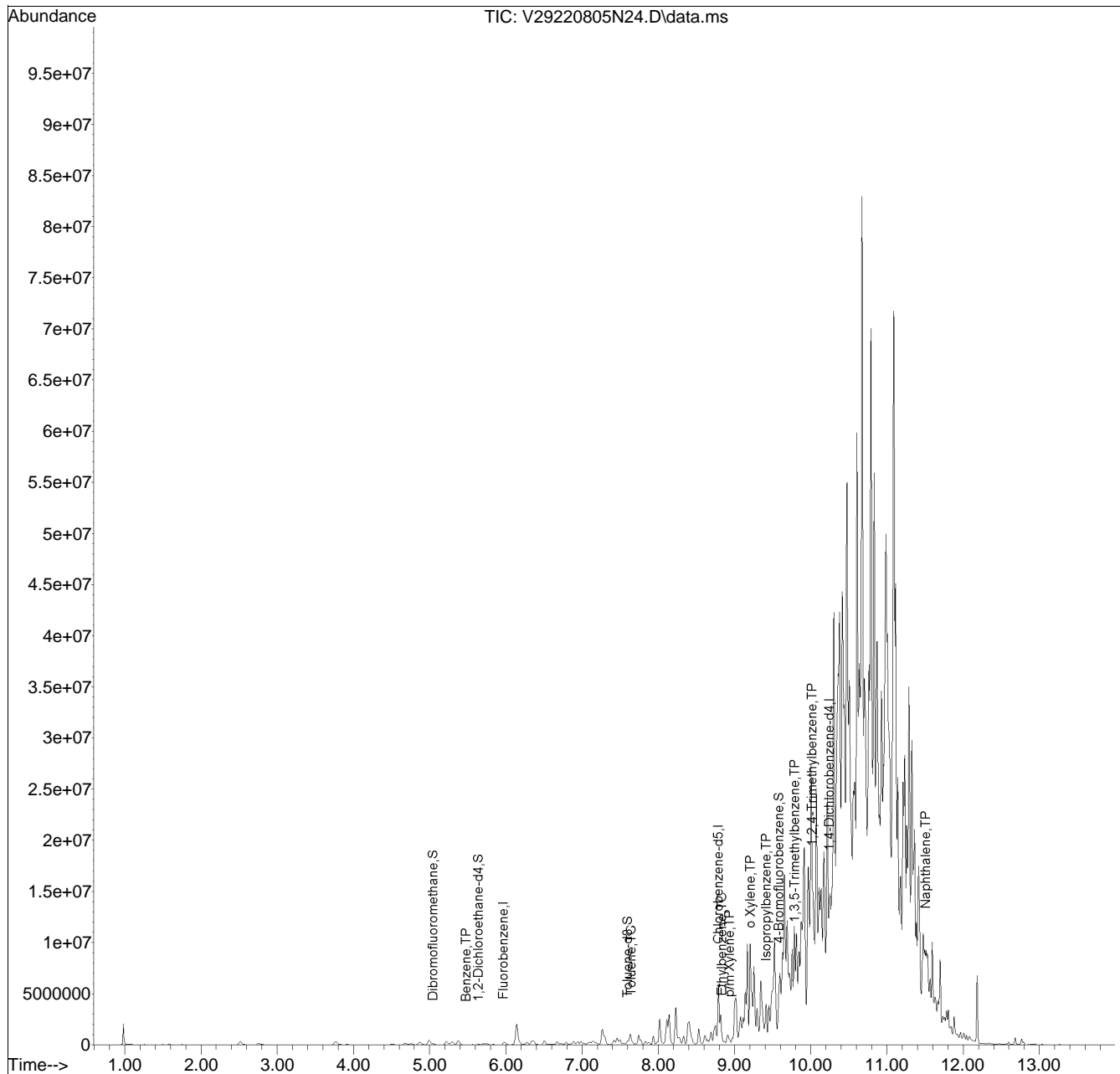


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220805N\
 Data File : V29220805N24.D
 Acq On : 05 Aug 2022 11:40 pm
 Operator : VOA129:AJK
 Sample : 12241291-03,31,5.82,5,,c
 Misc : WG1672587,ICAL19173
 ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 07 17:30:50 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220805N\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05N\V29220805N01.D•

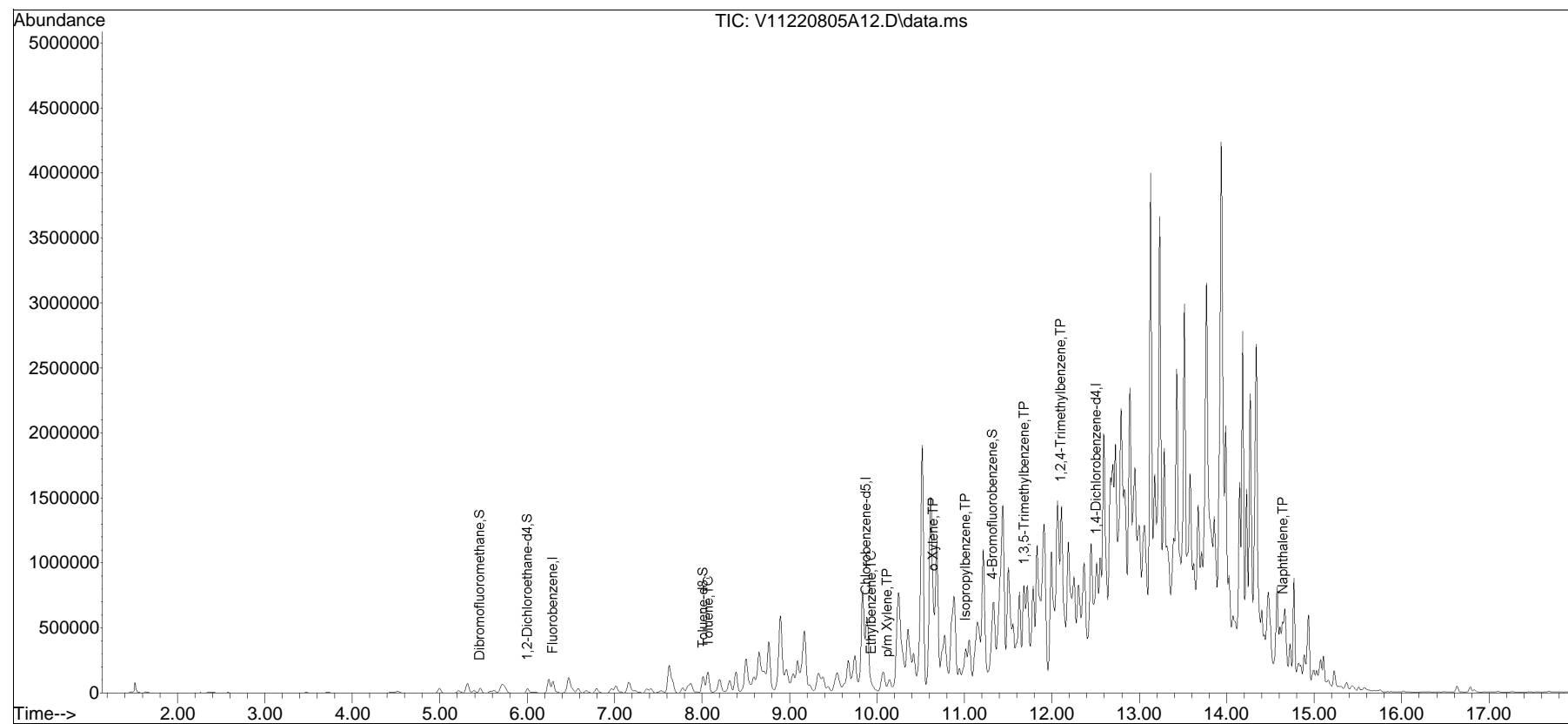


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
Data File : V11220805A12.D
Acq On : 05 Aug 2022 12:00 pm
Operator : VOA111:JC
Sample : L2241291-05D,31H,5.47,5,0.050,,A
Misc : WG1672595,ICAL19072
ALS Vial : 12 Sample Multiplier: 1

Quant Time: Aug 05 13:25:23 2022
Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jun 09 10:30:20 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•

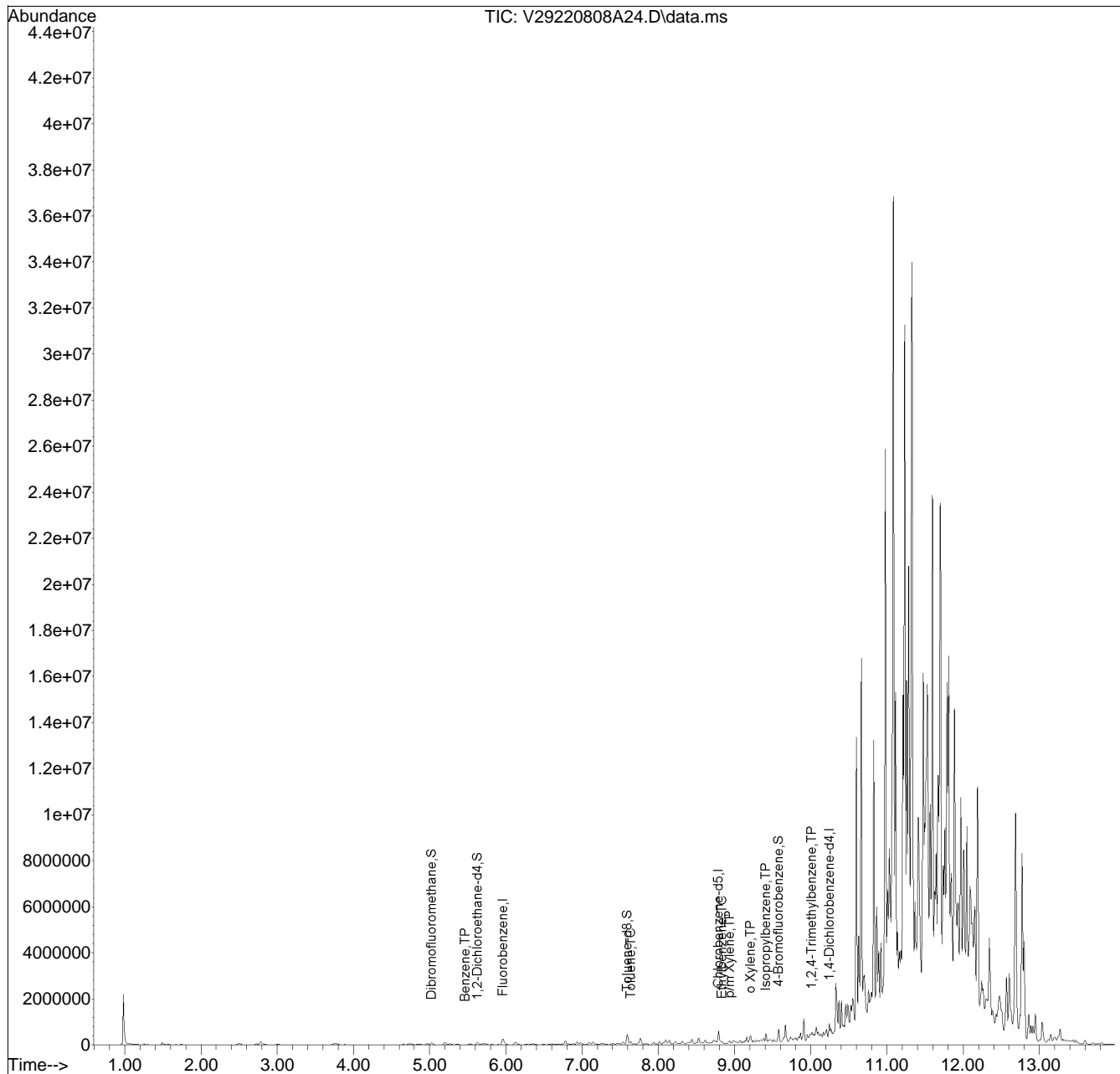


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220808A\
 Data File : V29220808A24.D
 Acq On : 08 Aug 2022 03:30 pm
 Operator : VOA129:NLK
 Sample : 12241291-06,31,4.87,5,,b
 Misc : WG1672815,ICAL19173
 ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 09 06:29:08 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220808A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list08A\V29220808A02.D•

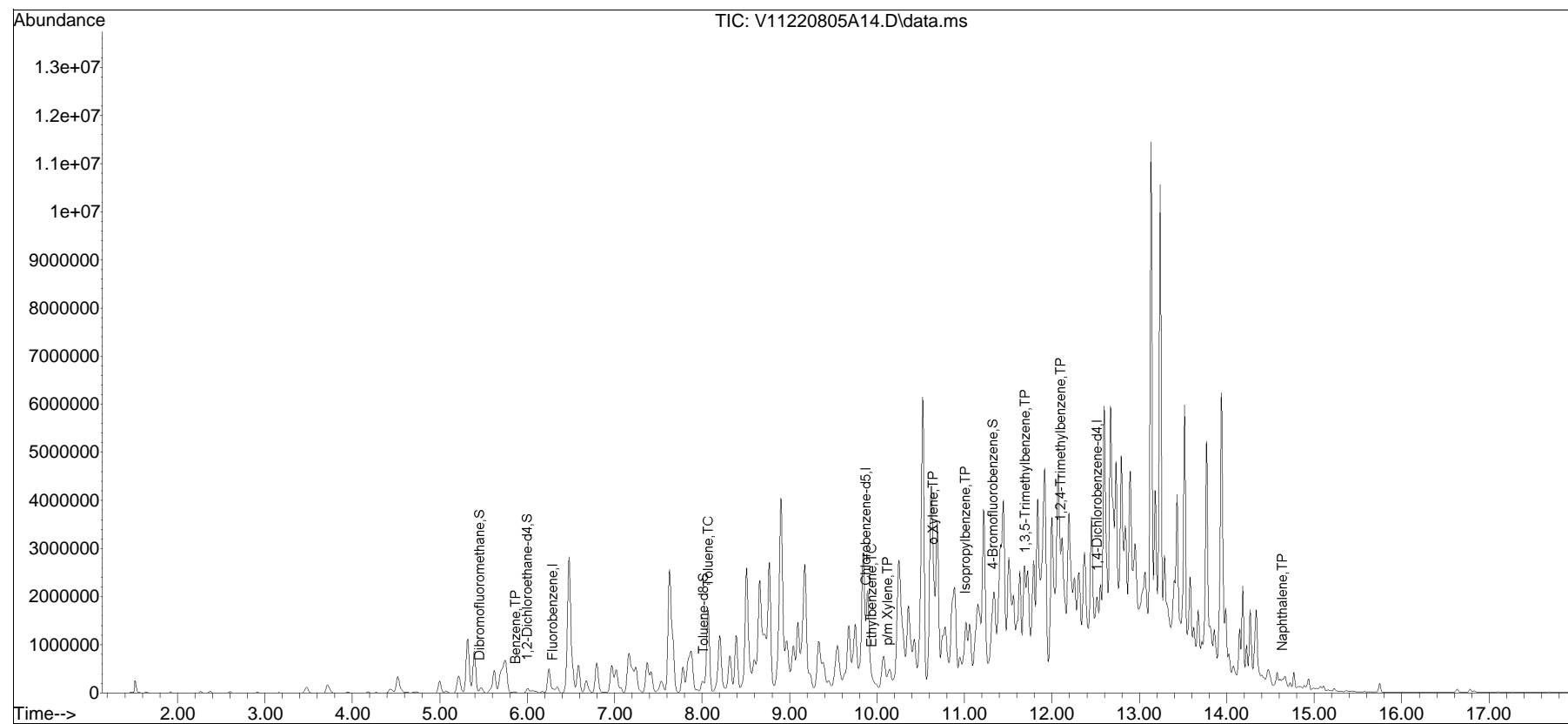


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
Data File : V11220805A14.D
Acq On : 05 Aug 2022 12:53 pm
Operator : VOA111:JC
Sample : L2241291-07,31,5.02,5,,C
Misc : WG1672597,ICAL19072
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 05 13:28:47 2022
Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jun 09 10:30:20 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•





ANALYTICAL REPORT

Lab Number:	L2241635
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/11/22

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241635-01	GPR794-01-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:00	08/03/22
L2241635-02	GPR794-02-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:10	08/03/22
L2241635-03	GPR794-03-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:20	08/03/22
L2241635-04	GPR794-04-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:30	08/03/22
L2241635-05	GPR794-05-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:40	08/03/22
L2241635-06	GPR794-06-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:50	08/03/22
L2241635-07	GPR794-07-SS01	SOIL	PHILADELPHIA, PA	08/03/22 12:00	08/03/22
L2241635-08	GPR794-08-SS01	SOIL	PHILADELPHIA, PA	08/03/22 12:10	08/03/22
L2241635-09	GPR1088-04-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:00	08/03/22
L2241635-10	GPR1088-05-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:10	08/03/22
L2241635-11	GPR1088-06-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:20	08/03/22
L2241635-12	DUP-51	SOIL	PHILADELPHIA, PA	08/03/22 00:00	08/03/22
L2241635-13	FB-080322-1	WATER	PHILADELPHIA, PA	08/03/22 14:00	08/03/22
L2241635-14	FB-080322-2	WATER	PHILADELPHIA, PA	08/03/22 14:10	08/03/22
L2241635-15	TB-080322	WATER	PHILADELPHIA, PA	08/03/22 00:00	08/03/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241635-03: The internal standard (IS) responses for chlorobenzene-d5 (48%) and 1,4-dichlorobenzene-d4 (42%) and the surrogate recoveries for 1,2-dichloroethane-d4 (42%) and dibromofluoromethane (51%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis; however, since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. The results of both analyses are reported.

Semivolatile Organics

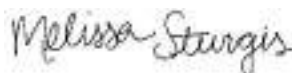
L2241635-01D, -02D, -04D, -06D, and -08D: The sample has elevated detection limits due to the dilution required by the sample matrix.

Semivolatile Organics by SIM

The WG1672949-1 Method Blank, associated with L2241635-13 and -14, has a concentration above the reporting limit for Phenanthrene. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 08/11/22

ORGANICS



VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D2
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 08:29
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2200		mg/kg	14	4.8	500
Toluene	3400		mg/kg	29	16.	500
Isopropylbenzene	4000		mg/kg	29	3.1	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:25
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	4.6	0.46	40
Benzene	2300	E	mg/kg	1.2	0.38	40
1,2-Dichloroethane	ND		mg/kg	2.3	0.59	40
Toluene	3000	E	mg/kg	2.3	1.2	40
1,2-Dibromoethane	ND		mg/kg	1.2	0.68	40
Ethylbenzene	74.		mg/kg	2.3	0.32	40
p/m-Xylene	240		mg/kg	4.6	1.3	40
o-Xylene	55.		mg/kg	2.3	0.67	40
Xylenes, Total	300		mg/kg	2.3	0.67	40
Isopropylbenzene	1900	E	mg/kg	2.3	0.25	40
1,3,5-Trimethylbenzene	16.		mg/kg	4.6	0.45	40
1,2,4-Trimethylbenzene	32.		mg/kg	4.6	0.77	40

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D2
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 08:08
 Analyst: NLK
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	8.3	0.83	50
Benzene	2400	E	mg/kg	2.1	0.69	50
1,2-Dichloroethane	ND		mg/kg	4.1	1.1	50
Toluene	1200		mg/kg	4.1	2.2	50
1,2-Dibromoethane	ND		mg/kg	2.1	1.2	50
Ethylbenzene	26.		mg/kg	4.1	0.58	50
p/m-Xylene	86.		mg/kg	8.3	2.3	50
o-Xylene	25.		mg/kg	4.1	1.2	50
Xylenes, Total	110		mg/kg	4.1	1.2	50
Isopropylbenzene	2200	E	mg/kg	4.1	0.45	50
1,3,5-Trimethylbenzene	3.9	J	mg/kg	8.3	0.80	50
1,2,4-Trimethylbenzene	8.4		mg/kg	8.3	1.4	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	75		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	80		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:46
 Analyst: NLK
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2800		mg/kg	8.3	2.7	200
Isopropylbenzene	3000		mg/kg	16	1.8	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 09:00
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0018	0.00018	1
Benzene	0.32	E	mg/kg	0.00045	0.00015	1
1,2-Dichloroethane	ND		mg/kg	0.00090	0.00023	1
Toluene	0.43	E	mg/kg	0.00090	0.00049	1
1,2-Dibromoethane	ND		mg/kg	0.00045	0.00026	1
Ethylbenzene	0.020		mg/kg	0.00090	0.00013	1
p/m-Xylene	0.060		mg/kg	0.0018	0.00050	1
o-Xylene	0.013		mg/kg	0.00090	0.00026	1
Xylenes, Total	0.073		mg/kg	0.00090	0.00026	1
Isopropylbenzene	1.4	E	mg/kg	0.00090	0.00009	1
1,3,5-Trimethylbenzene	0.0024		mg/kg	0.0018	0.00017	1
1,2,4-Trimethylbenzene	0.0040		mg/kg	0.0018	0.00030	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	42	Q	70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	51	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:31
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.11	0.011	1
Benzene	0.41		mg/kg	0.028	0.0092	1
1,2-Dichloroethane	ND		mg/kg	0.055	0.014	1
Toluene	0.21		mg/kg	0.055	0.030	1
1,2-Dibromoethane	ND		mg/kg	0.028	0.016	1
Ethylbenzene	0.0087	J	mg/kg	0.055	0.0078	1
p/m-Xylene	ND		mg/kg	0.11	0.031	1
o-Xylene	ND		mg/kg	0.055	0.016	1
Xylenes, Total	ND		mg/kg	0.055	0.016	1
Isopropylbenzene	0.38		mg/kg	0.055	0.0060	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.11	0.011	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.11	0.018	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D2
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:52
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	35	3.5	200
Benzene	7000	E	mg/kg	8.7	2.9	200
1,2-Dichloroethane	ND		mg/kg	17	4.4	200
Toluene	5300	E	mg/kg	17	9.4	200
1,2-Dibromoethane	ND		mg/kg	8.7	5.1	200
Ethylbenzene	120		mg/kg	17	2.4	200
p/m-Xylene	430		mg/kg	35	9.7	200
o-Xylene	95.		mg/kg	17	5.0	200
Xylenes, Total	520		mg/kg	17	5.0	200
Isopropylbenzene	9000	E	mg/kg	17	1.9	200
1,3,5-Trimethylbenzene	35.		mg/kg	35	3.3	200
1,2,4-Trimethylbenzene	79.		mg/kg	35	5.8	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	80		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:07
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	7800		mg/kg	43	14.	1000
Toluene	6100		mg/kg	87	47.	1000
Isopropylbenzene	12000		mg/kg	87	9.4	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	84		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05 D2
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:48
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	6.7	0.67	50
Benzene	1700	E	mg/kg	1.7	0.56	50
1,2-Dichloroethane	ND		mg/kg	3.4	0.86	50
Toluene	1200	E	mg/kg	3.4	1.8	50
1,2-Dibromoethane	ND		mg/kg	1.7	0.98	50
Ethylbenzene	31.		mg/kg	3.4	0.47	50
p/m-Xylene	110		mg/kg	6.7	1.9	50
o-Xylene	25.		mg/kg	3.4	0.98	50
Xylenes, Total	140		mg/kg	3.4	0.98	50
Isopropylbenzene	1500	E	mg/kg	3.4	0.36	50
1,3,5-Trimethylbenzene	3.5	J	mg/kg	6.7	0.65	50
1,2,4-Trimethylbenzene	7.7		mg/kg	6.7	1.1	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	80		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05 D
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 11:08
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2600		mg/kg	13	4.4	400
Toluene	1800		mg/kg	27	14.	400
Isopropylbenzene	2500		mg/kg	27	2.9	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	83		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D2
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:27
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Toluene	4300		mg/kg	59	32.	1000
Isopropylbenzene	4800		mg/kg	59	6.4	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 11:29
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	24	2.4	200
Benzene	2000		mg/kg	5.9	2.0	200
1,2-Dichloroethane	ND		mg/kg	12	3.0	200
Toluene	4700	E	mg/kg	12	6.4	200
1,2-Dibromoethane	ND		mg/kg	5.9	3.4	200
Ethylbenzene	110		mg/kg	12	1.7	200
p/m-Xylene	390		mg/kg	24	6.6	200
o-Xylene	100		mg/kg	12	3.4	200
Xylenes, Total	490		mg/kg	12	3.4	200
Isopropylbenzene	5500	E	mg/kg	12	1.3	200
1,3,5-Trimethylbenzene	23.	J	mg/kg	24	2.3	200
1,2,4-Trimethylbenzene	48.		mg/kg	24	3.9	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07 D2
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:10
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.89	0.090	10
Benzene	130		mg/kg	0.22	0.074	10
1,2-Dichloroethane	ND		mg/kg	0.45	0.11	10
Toluene	8.7		mg/kg	0.45	0.24	10
1,2-Dibromoethane	ND		mg/kg	0.22	0.13	10
Ethylbenzene	1.5		mg/kg	0.45	0.063	10
p/m-Xylene	3.1		mg/kg	0.89	0.25	10
o-Xylene	ND		mg/kg	0.45	0.13	10
Xylenes, Total	3.1		mg/kg	0.45	0.13	10
Isopropylbenzene	250	E	mg/kg	0.45	0.049	10
1,3,5-Trimethylbenzene	0.20	J	mg/kg	0.89	0.086	10
1,2,4-Trimethylbenzene	0.81	J	mg/kg	0.89	0.15	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	79		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	81		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07 D
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 09:42
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	330		mg/kg	2.2	0.24	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D2
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 10:54
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	12000		mg/kg	30	10.	1000
Toluene	6200		mg/kg	60	33.	1000
Isopropylbenzene	7600		mg/kg	60	6.6	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	79		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:04
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	3.0	0.30	25
Benzene	3500	E	mg/kg	0.76	0.25	25
1,2-Dichloroethane	ND		mg/kg	1.5	0.39	25
Toluene	3000	E	mg/kg	1.5	0.82	25
1,2-Dibromoethane	ND		mg/kg	0.76	0.44	25
Ethylbenzene	120		mg/kg	1.5	0.21	25
p/m-Xylene	390		mg/kg	3.0	0.85	25
o-Xylene	86.		mg/kg	1.5	0.44	25
Xylenes, Total	480		mg/kg	1.5	0.44	25
Isopropylbenzene	1600	E	mg/kg	1.5	0.16	25
1,3,5-Trimethylbenzene	15.		mg/kg	3.0	0.29	25
1,2,4-Trimethylbenzene	35.		mg/kg	3.0	0.50	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:17
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 16:47
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	111		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:24
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 17:10
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	102		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-15
 Client ID: TB-080322
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 00:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:31
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-15
 Client ID: TB-080322
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 00:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 17:32
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/08/22 17:23
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 13-15 Batch: WG1672421-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/04/22 12:23
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 13-15 Batch: WG1672513-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/08/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1672815-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/08/22 08:37
 Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,05-08 Batch: WG1672957-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/10/22 06:44
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-08 Batch: WG1673529-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	113		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 13-15 Batch: WG1672421-2									
1,2-Dibromoethane	92		-		80-120	-		20	A

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 13-15 Batch: WG1672513-3 WG1672513-4								
Methyl tert butyl ether	87		85		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	110		110		70-130	0		20
Toluene	120		110		70-130	9		20
Ethylbenzene	120		110		70-130	9		20
p/m-Xylene	120		115		70-130	4		20
o-Xylene	110		110		70-130	0		20
Isopropylbenzene	120		110		70-130	9		20
1,3,5-Trimethylbenzene	120		110		64-130	9		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	105		105		70-130
Toluene-d8	106		103		70-130
4-Bromofluorobenzene	94		95		70-130
Dibromofluoromethane	101		97		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1672815-3 WG1672815-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,05-08 Batch: WG1672957-3 WG1672957-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-08 Batch: WG1673529-3 WG1673529-4								
Methyl tert butyl ether	75		75		66-130	0		30
Benzene	86		85		70-130	1		30
1,2-Dichloroethane	75		75		70-130	0		30
Toluene	86		85		70-130	1		30
1,2-Dibromoethane	86		87		70-130	1		30
Ethylbenzene	88		88		70-130	0		30
p/m-Xylene	90		90		70-130	0		30
o-Xylene	89		89		70-130	0		30
Isopropylbenzene	90		88		70-130	2		30
1,3,5-Trimethylbenzene	91		90		70-130	1		30
1,2,4-Trimethylbenzene	92		89		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	86		85		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	97		95		70-130
Dibromofluoromethane	89		87		70-130

SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 13:31
 Analyst: JG
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.5		mg/kg	1.9	0.23	10
Fluorene	2.0		mg/kg	1.9	0.19	10
Phenanthrene	8.7		mg/kg	1.2	0.23	10
Anthracene	0.51	J	mg/kg	1.2	0.38	10
Pyrene	0.71	J	mg/kg	1.2	0.19	10
Benzo(a)anthracene	0.27	J	mg/kg	1.2	0.22	10
Chrysene	0.35	J	mg/kg	1.2	0.20	10
Benzo(b)fluoranthene	ND		mg/kg	1.2	0.32	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.47	10
Benzo(ghi)perylene	ND		mg/kg	1.5	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	48		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	71		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 20:02
 Analyst: JG
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.0	J	mg/kg	2.1	0.26	10
Fluorene	0.47	J	mg/kg	2.1	0.21	10
Phenanthrene	2.9		mg/kg	1.3	0.26	10
Anthracene	ND		mg/kg	1.3	0.42	10
Pyrene	0.86	J	mg/kg	1.3	0.21	10
Benzo(a)anthracene	0.46	J	mg/kg	1.3	0.24	10
Chrysene	0.44	J	mg/kg	1.3	0.22	10
Benzo(b)fluoranthene	0.47	J	mg/kg	1.3	0.36	10
Benzo(a)pyrene	ND		mg/kg	1.7	0.52	10
Benzo(ghi)perylene	ND		mg/kg	1.7	0.25	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	55		23-120
2-Fluorobiphenyl	67		30-120
4-Terphenyl-d14	63		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 05:34
 Analyst: SZ
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.017	1
Phenanthrene	0.037	J	mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.035	1
Pyrene	0.049	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.038	J	mg/kg	0.11	0.020	1
Chrysene	0.038	J	mg/kg	0.11	0.018	1
Benzo(b)fluoranthene	0.065	J	mg/kg	0.11	0.030	1
Benzo(a)pyrene	0.049	J	mg/kg	0.14	0.043	1
Benzo(ghi)perylene	0.030	J	mg/kg	0.14	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	41		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	56		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 14:16
 Analyst: EK
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.1		mg/kg	1.9	0.23	10
Fluorene	1.0	J	mg/kg	1.9	0.19	10
Phenanthrene	1.9		mg/kg	1.2	0.23	10
Anthracene	0.46	J	mg/kg	1.2	0.38	10
Pyrene	2.0		mg/kg	1.2	0.19	10
Benzo(a)anthracene	0.64	J	mg/kg	1.2	0.22	10
Chrysene	1.4		mg/kg	1.2	0.20	10
Benzo(b)fluoranthene	0.78	J	mg/kg	1.2	0.32	10
Benzo(a)pyrene	0.48	J	mg/kg	1.5	0.47	10
Benzo(ghi)perylene	0.41	J	mg/kg	1.5	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	38		23-120
2-Fluorobiphenyl	52		30-120
4-Terphenyl-d14	58		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 06:19
 Analyst: SZ
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.7		mg/kg	0.20	0.024	1
Fluorene	0.17	J	mg/kg	0.20	0.019	1
Phenanthrene	0.43		mg/kg	0.12	0.024	1
Anthracene	0.070	J	mg/kg	0.12	0.039	1
Pyrene	0.058	J	mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.035	J	mg/kg	0.12	0.022	1
Chrysene	0.033	J	mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.034	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.049	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	62		30-120
4-Terphenyl-d14	60		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 14:38
 Analyst: EK
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	6.3		mg/kg	1.9	0.23	10
Fluorene	1.4	J	mg/kg	1.9	0.18	10
Phenanthrene	3.0		mg/kg	1.1	0.23	10
Anthracene	0.67	J	mg/kg	1.1	0.36	10
Pyrene	0.94	J	mg/kg	1.1	0.18	10
Benzo(a)anthracene	0.41	J	mg/kg	1.1	0.21	10
Chrysene	0.35	J	mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	0.36	J	mg/kg	1.1	0.32	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.46	10
Benzo(ghi)perylene	ND		mg/kg	1.5	0.22	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	24		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	70		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 04:04
 Analyst: SZ
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.054	J	mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.018	1
Phenanthrene	0.19		mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.036	1
Pyrene	0.077	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.027	J	mg/kg	0.11	0.021	1
Chrysene	0.041	J	mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	0.034	J	mg/kg	0.11	0.031	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1
Benzo(ghi)perylene	ND		mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	73		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 15:01
 Analyst: EK
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	8.7		mg/kg	2.0	0.24	10
Fluorene	0.75	J	mg/kg	2.0	0.19	10
Phenanthrene	2.3		mg/kg	1.2	0.24	10
Anthracene	ND		mg/kg	1.2	0.39	10
Pyrene	0.28	J	mg/kg	1.2	0.20	10
Benzo(a)anthracene	ND		mg/kg	1.2	0.22	10
Chrysene	ND		mg/kg	1.2	0.21	10
Benzo(b)fluoranthene	ND		mg/kg	1.2	0.34	10
Benzo(a)pyrene	ND		mg/kg	1.6	0.48	10
Benzo(ghi)perylene	ND		mg/kg	1.6	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	68		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/10/22 11:56
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	100		23-120
2-Fluorobiphenyl	84		15-120
4-Terphenyl-d14	90		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/10/22 12:13
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	108		23-120
2-Fluorobiphenyl	91		15-120
4-Terphenyl-d14	96		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8270D
 Analytical Date: 08/08/22 23:47
 Analyst: CMM

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01,03-06,08 Batch: WG1671002-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	84		30-120
4-Terphenyl-d14	103		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 08/09/22 22:28
Analyst: SZ

Extraction Method: EPA 3546
Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02,07 Batch: WG1671945-1					
Naphthalene	ND		mg/kg	0.17	0.020
Fluorene	ND		mg/kg	0.17	0.016
Phenanthrene	ND		mg/kg	0.10	0.020
Anthracene	ND		mg/kg	0.10	0.032
Pyrene	ND		mg/kg	0.10	0.016
Benzo(a)anthracene	ND		mg/kg	0.10	0.019
Chrysene	ND		mg/kg	0.10	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.10	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.020

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	56		30-120
4-Terphenyl-d14	84		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 08/10/22 07:35
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 13-14 Batch: WG1672949-1					
Naphthalene	2.8		ug/l	0.10	0.05
Fluorene	0.06	J	ug/l	0.10	0.01
Phenanthrene	0.07		ug/l	0.05	0.02
Anthracene	0.02	J	ug/l	0.10	0.01
Pyrene	0.03	J	ug/l	0.10	0.02
Benzo(a)anthracene	0.03	J	ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	101		23-120
2-Fluorobiphenyl	86		15-120
4-Terphenyl-d14	92		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,03-06,08 Batch: WG1671002-2 WG1671002-3								
Naphthalene	83		77		40-140	8		50
Fluorene	91		84		40-140	8		50
Phenanthrene	81		76		40-140	6		50
Anthracene	87		80		40-140	8		50
Pyrene	83		76		35-142	9		50
Benzo(a)anthracene	93		87		40-140	7		50
Chrysene	88		84		40-140	5		50
Benzo(b)fluoranthene	113		103		40-140	9		50
Benzo(a)pyrene	114		108		40-140	5		50
Benzo(ghi)perylene	92		87		40-140	6		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
Nitrobenzene-d5	94		84		23-120
2-Fluorobiphenyl	83		77		30-120
4-Terphenyl-d14	99		90		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,07 Batch: WG1671945-2 WG1671945-3								
Naphthalene	74		80		40-140	8		50
Fluorene	78		86		40-140	10		50
Phenanthrene	74		84		40-140	13		50
Anthracene	79		88		40-140	11		50
Pyrene	75		80		35-142	6		50
Benzo(a)anthracene	80		90		40-140	12		50
Chrysene	76		82		40-140	8		50
Benzo(b)fluoranthene	93		105		40-140	12		50
Benzo(a)pyrene	98		110		40-140	12		50
Benzo(ghi)perylene	79		92		40-140	15		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	83		88		23-120
2-Fluorobiphenyl	74		77		30-120
4-Terphenyl-d14	87		92		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 13-14 Batch: WG1672949-2 WG1672949-3								
Naphthalene	74		83		40-140	11		40
Fluorene	87		91		40-140	4		40
Phenanthrene	91		90		40-140	1		40
Anthracene	93		93		40-140	0		40
Pyrene	90		85		26-127	6		40
Benzo(a)anthracene	100		96		40-140	4		40
Chrysene	105		103		40-140	2		40
Benzo(b)fluoranthene	94		93		40-140	1		40
Benzo(a)pyrene	88		86		40-140	2		40
Benzo(ghi)perylene	107		101		40-140	6		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	84		99		23-120
2-Fluorobiphenyl	75		82		15-120
4-Terphenyl-d14	86		83		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01

Date Collected: 08/03/22 11:00

Client ID: GPR794-01-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	408		mg/kg	2.32	0.124	1	08/04/22 23:16	08/09/22 11:35	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02

Date Collected: 08/03/22 11:10

Client ID: GPR794-02-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	347		mg/kg	2.56	0.138	1	08/04/22 23:16	08/09/22 11:40	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	24.2		mg/kg	2.20	0.118	1	08/04/22 23:16	08/09/22 11:45	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04

Date Collected: 08/03/22 11:30

Client ID: GPR794-04-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	63.8		mg/kg	2.34	0.125	1	08/04/22 23:16	08/09/22 11:50	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05

Date Collected: 08/03/22 11:40

Client ID: GPR794-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	23.6		mg/kg	2.35	0.126	1	08/04/22 23:16	08/09/22 13:17	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06

Date Collected: 08/03/22 11:50

Client ID: GPR794-06-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	429		mg/kg	2.20	0.118	1	08/04/22 23:16	08/09/22 13:22	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07

Date Collected: 08/03/22 12:00

Client ID: GPR794-07-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	3.73		mg/kg	2.21	0.118	1	08/04/22 23:16	08/09/22 13:27	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	132		mg/kg	2.40	0.129	1	08/04/22 23:16	08/09/22 13:32	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13

Date Collected: 08/03/22 14:00

Client ID: FB-080322-1

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 14:59	EPA 3005A	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14

Date Collected: 08/03/22 14:10

Client ID: FB-080322-2

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 15:46	EPA 3005A	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 13-14 Batch: WG1671033-1									
Lead, Total	ND	mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 14:44	1,6010D	NB

Prep Information

Digestion Method: EPA 3005A

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG1671440-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/04/22 23:16	08/09/22 10:29	1,6010D	NB

Prep Information

Digestion Method: EPA 3050B



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 13-14 Batch: WG1671033-2								
Lead, Total	96		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 01-08 Batch: WG1671440-2 SRM Lot Number: D113-540								
Lead, Total	87		-		72-128	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1671033-3 QC Sample: L2241764-02 Client ID: MS Sample												
Lead, Total	ND	0.53	0.491	93		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1671440-3 QC Sample: L2241632-02 Client ID: MS Sample												
Lead, Total	10.8	49.6	54.9	89		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1671440-4 QC Sample: L2241632-02 Client ID: DUP Sample						
Lead, Total	10.8	10.1	mg/kg	7		20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01

Date Collected: 08/03/22 11:00

Client ID: GPR794-01-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.3		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02
Client ID: GPR794-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
Date Received: 08/03/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.4		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-03

Date Collected: 08/03/22 11:20

Client ID: GPR794-03-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-04

Date Collected: 08/03/22 11:30

Client ID: GPR794-04-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-05

Date Collected: 08/03/22 11:40

Client ID: GPR794-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.5		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-06

Date Collected: 08/03/22 11:50

Client ID: GPR794-06-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.6		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-07

Date Collected: 08/03/22 12:00

Client ID: GPR794-07-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.5		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-08

Date Collected: 08/03/22 12:10

Client ID: GPR794-08-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-09

Date Collected: 08/03/22 13:00

Client ID: GPR1088-04-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.2		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.2		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-10

Date Collected: 08/03/22 13:10

Client ID: GPR1088-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	8.9		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-11

Date Collected: 08/03/22 13:20

Client ID: GPR1088-06-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.3		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.7		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-12

Date Collected: 08/03/22 00:00

Client ID: DUP-51

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	73.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.1		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-13

Date Collected: 08/03/22 14:00

Client ID: FB-080322-1

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.1		SU	-	NA	1	-	08/08/22 17:57	1,9040C	AS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-14

Date Collected: 08/03/22 14:10

Client ID: FB-080322-2

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.3		SU	-	NA	1	-	08/08/22 17:57	1,9040C	AS



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 13-14 Batch: WG1672434-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 09-12 Batch: WG1672436-1								
pH	100		-		99-101	-		

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-12 QC Batch ID: WG1671234-1 QC Sample: L2241632-01 Client ID: DUP Sample						
Solids, Total	86.6	86.4	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 13-14 QC Batch ID: WG1672434-2 QC Sample: L2241635-13 Client ID: FB-080322-1						
pH (H)	6.1	6.0	SU	2		5
General Chemistry - Westborough Lab Associated sample(s): 09-12 QC Batch ID: WG1672436-2 QC Sample: L2242054-01 Client ID: DUP Sample						
pH	9.5	9.8	SU	3		5

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-01A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-01B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-01C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-01D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-01F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-02A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-02B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-02C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-02D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-02E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-02F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-03A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241635-03B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260H(14),PA-8260HLW(14)
L2241635-03C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260H(14),PA-8260HLW(14)
L2241635-03D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-03E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-03F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-04A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-04B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-04C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-04D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-04F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-05A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-05B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-05C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-05D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-05E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-05F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-06A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-06B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-06C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-06D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-06F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-07A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-07B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-07C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-07D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-07F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-08A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-08B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-08C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-08D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-08E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-08F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-09A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-10A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-11A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-12A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-13A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13C	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-13E	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-13F	Plastic 60ml unpreserved	A	7	7	2.7	Y	Absent		PH-9040(1)
L2241635-13G	Plastic 250ml HNO3 preserved	A	<2	<2	2.7	Y	Absent		PB-TI(180)
L2241635-13H	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-13I	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-14A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14C	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-14E	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-14F	Plastic 60ml unpreserved	A	7	7	2.7	Y	Absent		PH-9040(1)
L2241635-14G	Plastic 250ml HNO3 preserved	A	<2	<2	2.7	Y	Absent		PB-TI(180)
L2241635-14H	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-14I	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-15A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-15B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-15C	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-15D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

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REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

①

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: 5-DAY Time:

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3286

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: _____
Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/1/22

ALPHA Job #: L2241635

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Short list 1-5	TEG	PH												
41635-01	8/3/22	1100	S	W	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-02		1110			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-03		1120			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-04		1130			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-05		1140			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-06		1150			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-07		1200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-08		1210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-09		1300			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-10		1310			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING
Filtration
 Done
 Not Needed
 Lab to do
Preservation
 Lab to do
(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41635-01	GPR-794-01-SS01	8/3/22	1100	S	W
-02	GPR-794-02-SS01		1110		
-03	GPR-794-03-SS01		1120		
-04	GPR-794-04-SS01		1130		
-05	GPR-794-05-SS01		1140		
-06	GPR-794-06-SS01		1150		
-07	GPR-794-07-SS01		1200		
-08	GPR-794-08-SS01		1210		
-09	GPR-1088-04-SS01		1300		
-10	GPR-1088-05-SS01		1310		

Container Type: G
Preservative: -

Relinquished By: <u>W Schmidt</u>	Date/Time: <u>8/3/22 1200</u>	Received By: <u>Tom Oldham</u>	Date/Time: <u>8/3/22 1500</u>
<u>W Schmidt</u>	<u>8/3/22</u>	<u>Tom Oldham</u>	<u>8/3/22 1500</u>
<u>W Schmidt</u>	<u>8/3/22</u>	<u>Tom Oldham</u>	<u>8/3/22 1500</u>

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

x 5-DAY

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-896-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:
 Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/4/22

ALPHA Job #: 12241035

Report Information Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

ALPHA Lab ID	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Short list 1-5	TEG	PH	Vol Petro of SLI-5	EBD (8011)												
41635-11	GPR-1088-06-SS01	8/3/22	1320	S	an	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-12	DUP-51			S		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-13	FB-080322-1		1400	W		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-14	FB-080322-2		1410	W		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-15	TB-080322			W		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

PH ONLY

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

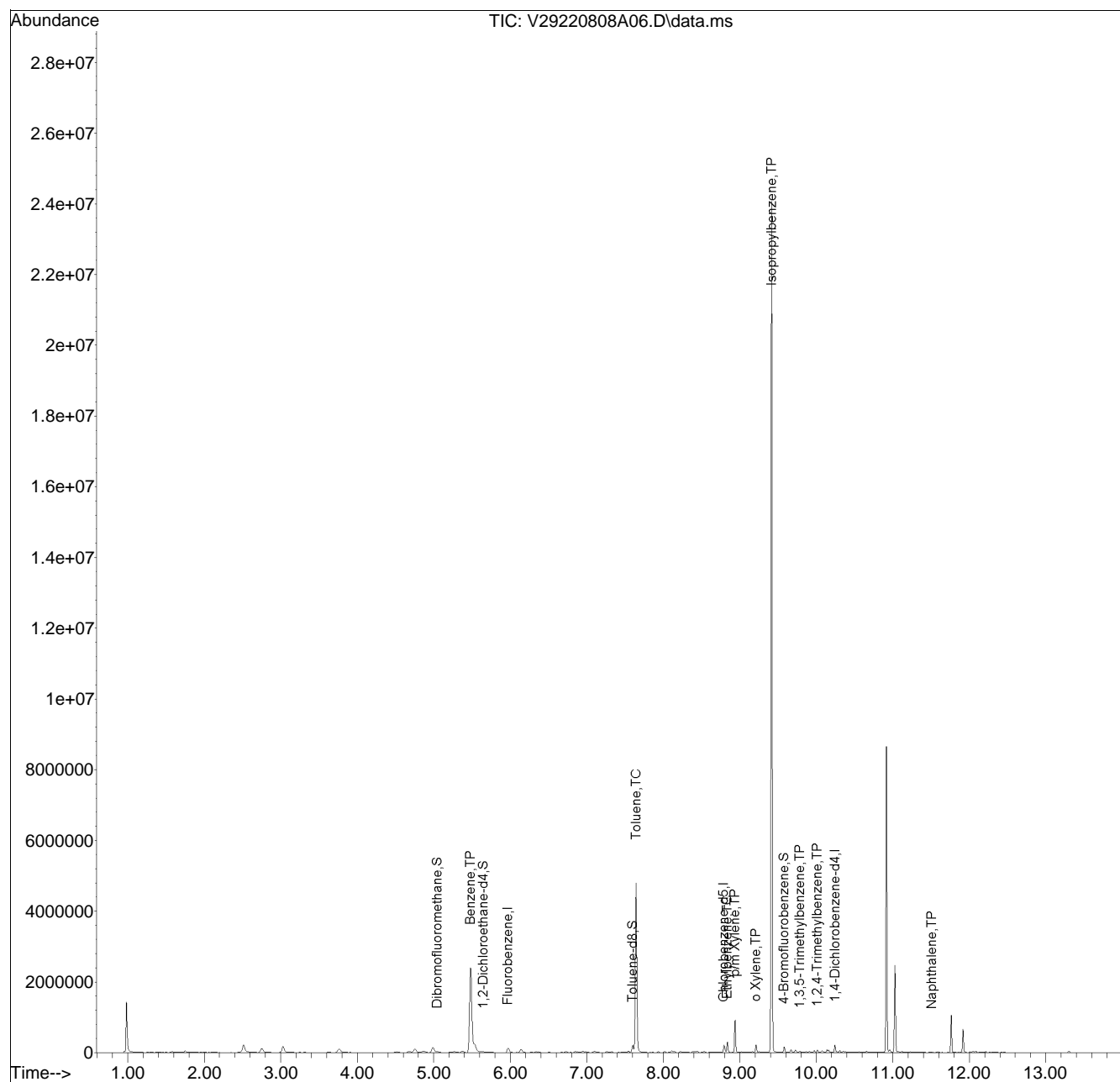
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220808A\
 Data File : V29220808A06.D
 Acq On : 08 Aug 2022 09:00 am
 Operator : VOA129:NLK
 Sample : 12241635-03,31,6.09,5,,c
 Misc : WG1672815,ICAL19173
 ALS Vial : 6 Sample Multiplier: 1

Quant Time: Aug 09 08:30:01 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220808A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list08A\V29220808A02.D•





ANALYTICAL REPORT

Lab Number:	L2243874
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/22/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2243874-01	GPU767-01-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:30	08/15/22
L2243874-02	GPU767-02-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:40	08/15/22
L2243874-03	GPU767-03-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:45	08/15/22
L2243874-04	GPU767-04-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:55	08/15/22
L2243874-05	GPU767-05-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:30	08/15/22
L2243874-06	GPU767-06-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:40	08/15/22
L2243874-07	GPU767-07-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:50	08/15/22
L2243874-08	TB-081522	WATER	PHILADELPHIA, PA	08/15/22 00:00	08/15/22
L2243874-09	FB-081522	WATER	PHILADELPHIA, PA	08/15/22 13:45	08/15/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2243874-01: The collection date and time on the chain of custody was 12-AUG-22 12:30; however, the collection date/time on the container label was 15-AUG-22 12:30. At the client's request, the collection date/time is reported as 15-AUG-22 12:30.

L2243874-02: The collection date and time on the chain of custody was 12-AUG-22 12:40; however, the collection date/time on the container label was 15-AUG-22 12:40. At the client's request, the collection date/time is reported as 15-AUG-22 12:40.

L2243874-03: The collection date and time on the chain of custody was 12-AUG-22 12:45; however, the collection date/time on the container label was 15-AUG-22 12:45. At the client's request, the collection date/time is reported as 15-AUG-22 12:45.

L2243874-04: The collection date and time on the chain of custody was 12-AUG-22 12:55; however, the collection date/time on the container label was 15-AUG-22 12:55. At the client's request, the collection date/time is reported as 15-AUG-22 12:55.

L2243874-05: The collection date and time on the chain of custody was 12-AUG-22 13:30; however, the collection date/time on the container label was 15-AUG-22 13:30. At the client's request, the collection date/time is reported as 15-AUG-22 13:30.

L2243874-06: The collection date and time on the chain of custody was 12-AUG-22 13:40; however, the collection date/time on the container label was 15-AUG-22 13:40. At the client's request, the collection date/time is reported as 15-AUG-22 13:40.

L2243874-07: The collection date and time on the chain of custody was 12-AUG-22 13:50; however, the collection date/time on the container label was 15-AUG-22 13:50. At the client's request, the collection date/time is reported as 15-AUG-22 13:50.

L2243874-08: The collection date and time on the chain of custody was 12-AUG-22 00:00; however, the

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative (continued)

collection date/time on the container label was 15-AUG-22 00:00. At the client's request, the collection date/time is reported as 15-AUG-22 00:00.

L2243874-09: The collection date and time on the chain of custody was 12-AUG-22 14:00; however, the collection date/time on the container label was 15-AUG-22 14:00. At the client's request, the collection date/time is reported as 15-AUG-22 13:45.

Volatile Organics

L2243874-02: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (174%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2243874-03: The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis. The results of both analyses are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 08/22/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01
 Client ID: GPU767-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 13:08
 Analyst: AJK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	ND		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00040	1
Ethylbenzene	ND		mg/kg	0.0014	0.00019	1
p/m-Xylene	ND		mg/kg	0.0028	0.00077	1
o-Xylene	ND		mg/kg	0.0014	0.00040	1
Xylenes, Total	ND		mg/kg	0.0014	0.00040	1
Isopropylbenzene	0.0011	J	mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 13:28
 Analyst: AJK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.00035	0.00003	1
Benzene	0.00007	J	mg/kg	0.00008	0.00002	1
1,2-Dichloroethane	ND		mg/kg	0.00018	0.00004	1
Toluene	0.00018		mg/kg	0.00018	0.00009	1
1,2-Dibromoethane	ND		mg/kg	0.00008	0.00005	1
Ethylbenzene	0.00016	J	mg/kg	0.00018	0.00002	1
p/m-Xylene	0.00026	J	mg/kg	0.00035	0.00009	1
o-Xylene	0.00011	J	mg/kg	0.00018	0.00005	1
Xylenes, Total	0.00037	J	mg/kg	0.00018	0.00005	1
Isopropylbenzene	0.0093		mg/kg	0.00018	0.00001	1
1,3,5-Trimethylbenzene	0.00010	J	mg/kg	0.00035	0.00003	1
1,2,4-Trimethylbenzene	0.00027	J	mg/kg	0.00035	0.00005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	112		70-130
4-Bromofluorobenzene	174	Q	70-130
Dibromofluoromethane	88		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 14:10
 Analyst: AJK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	0.0030		mg/kg	0.00048	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00095	0.00024	1
Toluene	0.00091	J	mg/kg	0.00095	0.00052	1
1,2-Dibromoethane	ND		mg/kg	0.00048	0.00028	1
Ethylbenzene	0.0015		mg/kg	0.00095	0.00013	1
p/m-Xylene	0.00082	J	mg/kg	0.0019	0.00053	1
o-Xylene	0.0010		mg/kg	0.00095	0.00028	1
Xylenes, Total	0.0018	J	mg/kg	0.00095	0.00028	1
Isopropylbenzene	0.42	E	mg/kg	0.00095	0.00010	1
1,3,5-Trimethylbenzene	0.00058	J	mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	0.00089	J	mg/kg	0.0019	0.00032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	88		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/18/22 08:55
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.13	0.014	1
Benzene	0.071		mg/kg	0.034	0.011	1
1,2-Dichloroethane	ND		mg/kg	0.067	0.017	1
Toluene	0.052	J	mg/kg	0.067	0.036	1
1,2-Dibromoethane	ND		mg/kg	0.034	0.020	1
Ethylbenzene	0.030	J	mg/kg	0.067	0.0095	1
p/m-Xylene	0.049	J	mg/kg	0.13	0.038	1
o-Xylene	0.022	J	mg/kg	0.067	0.020	1
Xylenes, Total	0.071	J	mg/kg	0.067	0.020	1
Isopropylbenzene	1.6		mg/kg	0.067	0.0073	1
1,3,5-Trimethylbenzene	0.016	J	mg/kg	0.13	0.013	1
1,2,4-Trimethylbenzene	0.032	J	mg/kg	0.13	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04
 Client ID: GPU767-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:55
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 14:51
 Analyst: AJK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.14	0.014	1
Benzene	0.021	J	mg/kg	0.036	0.012	1
1,2-Dichloroethane	ND		mg/kg	0.071	0.018	1
Toluene	0.17		mg/kg	0.071	0.039	1
1,2-Dibromoethane	ND		mg/kg	0.036	0.021	1
Ethylbenzene	0.047	J	mg/kg	0.071	0.010	1
p/m-Xylene	0.14		mg/kg	0.14	0.040	1
o-Xylene	ND		mg/kg	0.071	0.021	1
Xylenes, Total	0.14		mg/kg	0.071	0.021	1
Isopropylbenzene	4.8		mg/kg	0.071	0.0078	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.14	0.014	1
1,2,4-Trimethylbenzene	0.037	J	mg/kg	0.14	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	102		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:12
 Analyst: AJK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.12	0.012	1
Benzene	0.044		mg/kg	0.029	0.0098	1
1,2-Dichloroethane	ND		mg/kg	0.059	0.015	1
Toluene	0.062		mg/kg	0.059	0.032	1
1,2-Dibromoethane	ND		mg/kg	0.029	0.017	1
Ethylbenzene	0.12		mg/kg	0.059	0.0083	1
p/m-Xylene	0.19		mg/kg	0.12	0.033	1
o-Xylene	0.021	J	mg/kg	0.059	0.017	1
Xylenes, Total	0.21	J	mg/kg	0.059	0.017	1
Isopropylbenzene	22.	E	mg/kg	0.059	0.0064	1
1,3,5-Trimethylbenzene	0.017	J	mg/kg	0.12	0.011	1
1,2,4-Trimethylbenzene	0.075	J	mg/kg	0.12	0.020	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05 D
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/18/22 10:34
 Analyst: NLK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	24.		mg/kg	0.24	0.026	4

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06
 Client ID: GPU767-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:33
 Analyst: AJK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	ND		mg/kg	0.00047	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00094	0.00024	1
Toluene	ND		mg/kg	0.00094	0.00051	1
1,2-Dibromoethane	ND		mg/kg	0.00047	0.00027	1
Ethylbenzene	ND		mg/kg	0.00094	0.00013	1
p/m-Xylene	ND		mg/kg	0.0019	0.00052	1
o-Xylene	ND		mg/kg	0.00094	0.00027	1
Xylenes, Total	ND		mg/kg	0.00094	0.00027	1
Isopropylbenzene	0.0010		mg/kg	0.00094	0.00010	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0019	0.00031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07
 Client ID: GPU767-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:50
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:53
 Analyst: AJK
 Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0040	0.00040	1
Benzene	ND		mg/kg	0.0010	0.00033	1
1,2-Dichloroethane	ND		mg/kg	0.0020	0.00051	1
Toluene	ND		mg/kg	0.0020	0.0011	1
1,2-Dibromoethane	ND		mg/kg	0.0010	0.00059	1
Ethylbenzene	ND		mg/kg	0.0020	0.00028	1
p/m-Xylene	ND		mg/kg	0.0040	0.0011	1
o-Xylene	ND		mg/kg	0.0020	0.00058	1
Xylenes, Total	ND		mg/kg	0.0020	0.00058	1
Isopropylbenzene	0.00049	J	mg/kg	0.0020	0.00022	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0040	0.00039	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0040	0.00067	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-08
 Client ID: TB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 00:00
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/16/22 16:07
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-08
 Client ID: TB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 00:00
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/16/22 09:54
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/16/22 16:14
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.011	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/16/22 10:20
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	98		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/16/22 14:34
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 08-09 Batch: WG1675742-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/16/22 08:36
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08-09 Batch: WG1676096-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/17/22 11:11
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03,06-07 Batch: WG1676803-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	111		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/17/22 11:11
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04-05 Batch: WG1676810-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	111		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/18/22 08:27
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03,05 Batch: WG1677395-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	96		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 08-09 Batch: WG1675742-2									
1,2-Dibromoethane	101		-		80-120	-		20	A

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08-09 Batch: WG1676096-3 WG1676096-4								
Methyl tert butyl ether	87		97		63-130	11		20
Benzene	100		100		70-130	0		20
1,2-Dichloroethane	100		110		70-130	10		20
Toluene	98		99		70-130	1		20
Ethylbenzene	98		99		70-130	1		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
Isopropylbenzene	92		96		70-130	4		20
1,3,5-Trimethylbenzene	92		95		64-130	3		20
1,2,4-Trimethylbenzene	91		93		70-130	2		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	110		112		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	92		93		70-130
Dibromofluoromethane	98		98		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03,06-07 Batch: WG1676803-3 WG1676803-4								
Methyl tert butyl ether	70		70		66-130	0		30
Benzene	88		87		70-130	1		30
1,2-Dichloroethane	90		89		70-130	1		30
Toluene	90		93		70-130	3		30
1,2-Dibromoethane	83		84		70-130	1		30
Ethylbenzene	94		96		70-130	2		30
p/m-Xylene	96		98		70-130	2		30
o-Xylene	95		97		70-130	2		30
Isopropylbenzene	95		98		70-130	3		30
1,3,5-Trimethylbenzene	98		101		70-130	3		30
1,2,4-Trimethylbenzene	99		102		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		91		70-130
Toluene-d8	101		103		70-130
4-Bromofluorobenzene	96		98		70-130
Dibromofluoromethane	87		89		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04-05 Batch: WG1676810-3 WG1676810-4								
Methyl tert butyl ether	70		70		66-130	0		30
Benzene	88		87		70-130	1		30
1,2-Dichloroethane	90		89		70-130	1		30
Toluene	90		93		70-130	3		30
1,2-Dibromoethane	83		84		70-130	1		30
Ethylbenzene	94		96		70-130	2		30
p/m-Xylene	96		98		70-130	2		30
o-Xylene	95		97		70-130	2		30
Isopropylbenzene	95		98		70-130	3		30
1,3,5-Trimethylbenzene	98		101		70-130	3		30
1,2,4-Trimethylbenzene	99		102		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		91		70-130
Toluene-d8	100		103		70-130
4-Bromofluorobenzene	96		98		70-130
Dibromofluoromethane	87		90		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03,05 Batch: WG1677395-3 WG1677395-4								
Methyl tert butyl ether	92		97		66-130	5		30
Benzene	91		96		70-130	5		30
1,2-Dichloroethane	92		97		70-130	5		30
Toluene	88		89		70-130	1		30
1,2-Dibromoethane	93		95		70-130	2		30
Ethylbenzene	92		95		70-130	3		30
p/m-Xylene	92		96		70-130	4		30
o-Xylene	94		97		70-130	3		30
Isopropylbenzene	93		95		70-130	2		30
1,3,5-Trimethylbenzene	91		96		70-130	5		30
1,2,4-Trimethylbenzene	91		95		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		102		70-130
Toluene-d8	102		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01
 Client ID: GPU767-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:08
 Analyst: EK
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.19	0.023	1
Fluorene	ND		mg/kg	0.19	0.018	1
Phenanthrene	ND		mg/kg	0.11	0.023	1
Anthracene	ND		mg/kg	0.11	0.037	1
Pyrene	0.032	J	mg/kg	0.11	0.019	1
Benzo(a)anthracene	0.044	J	mg/kg	0.11	0.021	1
Chrysene	0.046	J	mg/kg	0.11	0.020	1
Benzo(b)fluoranthene	0.10	J	mg/kg	0.11	0.032	1
Benzo(a)pyrene	0.070	J	mg/kg	0.15	0.046	1
Indeno(1,2,3-cd)pyrene	0.077	J	mg/kg	0.15	0.026	1
Benzo(ghi)perylene	0.076	J	mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	62		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:31
 Analyst: EK
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.048	J	mg/kg	0.20	0.024	1
Fluorene	0.085	J	mg/kg	0.20	0.019	1
Phenanthrene	0.24		mg/kg	0.12	0.024	1
Anthracene	0.058	J	mg/kg	0.12	0.039	1
Pyrene	0.18		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.12		mg/kg	0.12	0.022	1
Chrysene	0.12		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	0.15		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.14	J	mg/kg	0.16	0.048	1
Indeno(1,2,3-cd)pyrene	0.091	J	mg/kg	0.16	0.028	1
Benzo(ghi)perylene	0.077	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	34		23-120
2-Fluorobiphenyl	24	Q	30-120
4-Terphenyl-d14	25		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:55
 Analyst: EK
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.20	0.024	1
Fluorene	ND		mg/kg	0.20	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	ND		mg/kg	0.12	0.020	1
Benzo(a)anthracene	ND		mg/kg	0.12	0.022	1
Chrysene	ND		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.033	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.048	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.16	0.028	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	65		23-120
2-Fluorobiphenyl	44		30-120
4-Terphenyl-d14	48		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04
 Client ID: GPU767-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:55
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 01:18
 Analyst: EK
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.19	0.024	1
Fluorene	ND		mg/kg	0.19	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	0.090	J	mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.037	J	mg/kg	0.12	0.022	1
Chrysene	0.093	J	mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.054	J	mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.049	J	mg/kg	0.16	0.047	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.16	0.027	1
Benzo(ghi)perylene	0.064	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	61		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 01:41
 Analyst: EK
 Percent Solids: 88%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.018	1
Phenanthrene	ND		mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.036	1
Pyrene	0.022	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	ND		mg/kg	0.11	0.021	1
Chrysene	0.024	J	mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	ND		mg/kg	0.11	0.031	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.15	0.026	1
Benzo(ghi)perylene	0.025	J	mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	34		30-120
4-Terphenyl-d14	36		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06
 Client ID: GPU767-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 02:05
 Analyst: EK
 Percent Solids: 93%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.068	J	mg/kg	0.18	0.021	1
Fluorene	0.030	J	mg/kg	0.18	0.017	1
Phenanthrene	0.19		mg/kg	0.10	0.021	1
Anthracene	0.053	J	mg/kg	0.10	0.034	1
Pyrene	0.34		mg/kg	0.10	0.017	1
Benzo(a)anthracene	0.33		mg/kg	0.10	0.020	1
Chrysene	0.38		mg/kg	0.10	0.018	1
Benzo(b)fluoranthene	0.56		mg/kg	0.10	0.030	1
Benzo(a)pyrene	0.42		mg/kg	0.14	0.043	1
Indeno(1,2,3-cd)pyrene	0.35		mg/kg	0.14	0.024	1
Benzo(ghi)perylene	0.29		mg/kg	0.14	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	117		23-120
2-Fluorobiphenyl	82		30-120
4-Terphenyl-d14	84		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07
 Client ID: GPU767-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:50
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 02:28
 Analyst: EK
 Percent Solids: 94%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.17	0.021	1
Fluorene	ND		mg/kg	0.17	0.017	1
Phenanthrene	ND		mg/kg	0.10	0.021	1
Anthracene	ND		mg/kg	0.10	0.034	1
Pyrene	ND		mg/kg	0.10	0.017	1
Benzo(a)anthracene	ND		mg/kg	0.10	0.019	1
Chrysene	ND		mg/kg	0.10	0.018	1
Benzo(b)fluoranthene	ND		mg/kg	0.10	0.029	1
Benzo(a)pyrene	ND		mg/kg	0.14	0.042	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.14	0.024	1
Benzo(ghi)perylene	ND		mg/kg	0.14	0.020	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	99		23-120
2-Fluorobiphenyl	71		30-120
4-Terphenyl-d14	77		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/21/22 16:24
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/21/22 08:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	0.06	J	ug/l	0.10	0.01	1
Phenanthrene	0.04	J	ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.02	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	95		23-120
2-Fluorobiphenyl	78		15-120
4-Terphenyl-d14	83		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/19/22 21:24
Analyst: EK

Extraction Method: EPA 3546
Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG1676057-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.027
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.13	0.023
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	42		23-120
2-Fluorobiphenyl	32		30-120
4-Terphenyl-d14	40		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 08/21/22 16:07
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 08/21/22 08:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 09 Batch: WG1677772-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	0.04	J	ug/l	0.05	0.02
Chrysene	0.02	J	ug/l	0.10	0.01
Benzo(b)fluoranthene	0.02	J	ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	70		15-120
4-Terphenyl-d14	76		41-149

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG1676057-2 WG1676057-3								
Naphthalene	58		56		40-140	4		50
Fluorene	61		60		40-140	2		50
Phenanthrene	58		58		40-140	0		50
Anthracene	60		59		40-140	2		50
Pyrene	62		63		35-142	2		50
Benzo(a)anthracene	58		57		40-140	2		50
Chrysene	57		56		40-140	2		50
Benzo(b)fluoranthene	58		58		40-140	0		50
Benzo(a)pyrene	58		58		40-140	0		50
Indeno(1,2,3-cd)pyrene	67		66		40-140	2		50
Benzo(ghi)perylene	59		58		40-140	2		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	89		86		23-120
2-Fluorobiphenyl	63		62		30-120
4-Terphenyl-d14	65		68		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 09 Batch: WG1677772-2 WG1677772-3								
Naphthalene	73		86		40-140	16		40
Fluorene	78		92		40-140	16		40
Phenanthrene	79		89		40-140	12		40
Anthracene	79		87		40-140	10		40
Pyrene	79		86		26-127	8		40
Benzo(a)anthracene	89		90		40-140	1		40
Chrysene	81		94		40-140	15		40
Benzo(b)fluoranthene	77		92		40-140	18		40
Benzo(a)pyrene	73		80		40-140	9		40
Indeno(1,2,3-cd)pyrene	98		102		40-140	4		40
Benzo(ghi)perylene	93		98		40-140	5		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	83		94		23-120
2-Fluorobiphenyl	68		80		15-120
4-Terphenyl-d14	75		84		41-149



METALS



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01
 Client ID: GPU767-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	380		mg/kg	2.20	0.118	1	08/16/22 21:25	08/22/22 13:00	EPA 3050B	1,6010D	EW



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	115		mg/kg	2.30	0.123	1	08/16/22 21:25	08/22/22 13:10	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03

Date Collected: 08/15/22 12:45

Client ID: GPU767-03-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	72.0		mg/kg	2.30	0.123	1	08/16/22 21:25	08/22/22 13:15	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04

Date Collected: 08/15/22 12:55

Client ID: GPU767-04-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	121		mg/kg	2.22	0.119	1	08/16/22 21:25	08/22/22 13:21	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	12.5		mg/kg	2.23	0.120	1	08/16/22 21:25	08/22/22 13:26	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06

Date Collected: 08/15/22 13:40

Client ID: GPU767-06-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	688		mg/kg	2.05	0.110	1	08/16/22 21:25	08/22/22 14:22	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07

Date Collected: 08/15/22 13:50

Client ID: GPU767-07-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	87.0		mg/kg	2.01	0.108	1	08/16/22 21:25	08/22/22 14:27	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/16/22 21:25	08/19/22 14:40	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-07 Batch: WG1675792-1										
Lead, Total	0.117	J	mg/kg	2.08	0.112	1	08/16/22 21:25	08/22/22 10:48	1,6010D	EW

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 09 Batch: WG1675903-1										
Lead, Total	ND		ug/l	1.000	0.3430	1	08/16/22 21:25	08/19/22 14:04	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 Batch: WG1675792-2 SRM Lot Number: D113-540								
Lead, Total	98		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 09 Batch: WG1675903-2								
Lead, Total	107		-		80-120	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1675792-3 QC Sample: L2243899-05 Client ID: MS Sample												
Lead, Total	1330	45	288	0	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 09 QC Batch ID: WG1675903-3 QC Sample: L2243874-09 Client ID: FB-081522												
Lead, Total	ND	530	623.7	118		-	-		75-125	-		20

Lab Duplicate Analysis *Batch Quality Control*

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2243874

Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1675792-4 QC Sample: L2243899-05 Client ID: DUP Sample						
Lead, Total	1330	1110	mg/kg	18		20
Total Metals - Mansfield Lab Associated sample(s): 09 QC Batch ID: WG1675903-4 QC Sample: L2243874-09 Client ID: FB-081522						
Lead, Total	ND	ND	ug/l	NC		20



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-01

Date Collected: 08/15/22 12:30

Client ID: GPU767-01-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.9		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-02

Date Collected: 08/15/22 12:40

Client ID: GPU767-02-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.5		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03

Date Collected: 08/15/22 12:45

Client ID: GPU767-03-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.8		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-04

Date Collected: 08/15/22 12:55

Client ID: GPU767-04-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.8		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-05

Date Collected: 08/15/22 13:30

Client ID: GPU767-05-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.3		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06

Date Collected: 08/15/22 13:40

Client ID: GPU767-06-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	93.2		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07
Client ID: GPU767-07-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:50
Date Received: 08/15/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.2		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2243874

Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG1675702-1 QC Sample: L2243849-01 Client ID: DUP Sample						
Solids, Total	86.0	87.7	%	2		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-01A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-01B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-01C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-01D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-01E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-01F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-02A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-02B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-02C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-02D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-02E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-02F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-03A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2243874-03B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260H(14),PA-8260HLW(14)
L2243874-03C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260H(14),PA-8260HLW(14)
L2243874-03D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-03E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-03F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-04A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-04B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-04C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-04D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-04E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-04F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-05A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-05B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-05C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-05D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-05E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-05F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-06A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-06B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-06C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-06D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-06E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-06F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-07A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-07B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-07C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-07D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-07E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-07F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-08A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-08B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-08D	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-08E	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-09A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09D	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Serial_No:08222218:48
Lab Number: L2243874
Report Date: 08/22/22

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-09E	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-09F	Plastic 250ml HNO3 preserved	B	<2	<2	3.2	Y	Absent		PB-6020T-PPB(180)
L2243874-09G	Amber 250ml unpreserved	B	NA		3.2	Y	Absent		PA-PAHSIM-LVI(7)
L2243874-09H	Amber 250ml unpreserved	B	NA		3.2	Y	Absent		PA-PAHSIM-LVI(7)



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1



Westborough, MA
 TEL: 508-898-9220
 FAX: 508-898-9193

Mansfield, MA
 TEL: 508-822-9300
 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC
 Address: 2127 Hamilton Avenue
 Trenton, NJ 08619
 Phone: 215-901-4974

Fax: Standard Rush (ONLY IF PRE-APPROVED)
 Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
43874-01	GPU767-01-SS01	8/12	1230	S	TS
02	GPU767-02-SS01		1230		
03	GPU767-03-SS01		1245		
04	GPU767-04-SS01		1245		
05	GPU767-05-SS01		1330		
06	GPU767-06-SS01		1340		
07	GPU767-07-SS01		1350		
08	TB-081522		-		
09	FB-081522		1400		

Project Information

Project Name: Philadelphia Refinery
AST Closure

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599 **18599**

Turn-Around Time

Date Rec'd in Lab: **8/16/22**

ALPHA Job #: **L2243874**

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client Info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ANALYSIS

SHORTLIST 1-6	EDB (8+11)	V.C PORTION - FSL																
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SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

1240
 1255

Container Type - - G - - - - -
 Preservative - - - - -

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/15 1350	<i>[Signature]</i>	8/15/22 1350
<i>[Signature]</i>	8/16/22 1535	<i>[Signature]</i>	8/15/22
<i>[Signature]</i>	8-15 2106	<i>[Signature]</i>	8-15-22 2100

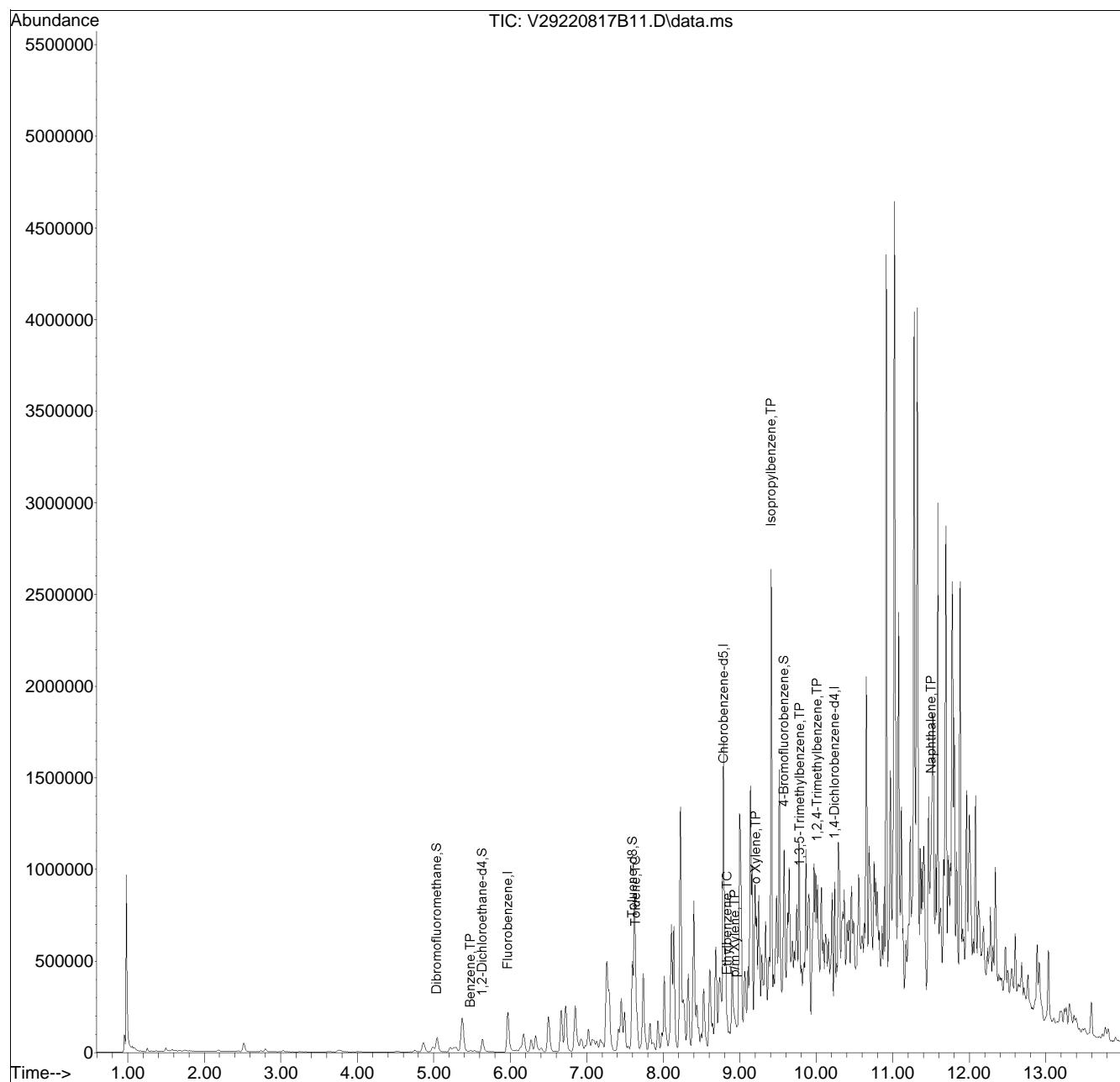
Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220817B\
 Data File : V29220817B11.D
 Acq On : 17 Aug 2022 01:28 pm
 Operator : VOA129:AJK
 Sample : 12243874-02,31,34.63,5,,b
 Misc : WG1676803,ICAL19173
 ALS Vial : 11 Sample Multiplier: 1

Quant Time: Aug 18 09:27:42 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220817B\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list17B\V29220817B01.D•



Appendix G

Soil Boring Logs and Monitoring Well Installation Logs



Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 1.5-2.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-02		60.9	0-3.5 Brown silty FILL with GRAVEL	
2			82.9		
3			122.3		
4			160.2		
5			122.3		
6			83.7	3.5-5.0 Coarse SAND with SILT	
7			125.7		
8			129.2		
9			87.8	END OF BORING (5 ft.)	
10			69.5		
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-03		1.0	0-3.5 Brown sandy FILL with GRAVEL	
2			2.3		
3			5.7		
4			18.1		
5			25.6		
			39.2	3.5-5.0 Brown coarse SAND with SILT	
			45.6		
			30.4		
			102.2	END OF BORING (5 ft.)	
			90.4		
6					
7					
8					
9					
10					
11					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 2.5-3.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-04		25.2	0-2.5 Coarse sandy FILL with GRAVEL	
2			27.1		
3			29.3	2.5-5.0 Coarse SAND with SILT	
4			55.8		
5			45.5		
			60.5		
			15.3		
			12.2		
			9.6		
			3.2		
6				END OF BORING (5 ft.)	
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-05		9.2	0-2.5 Sandy FILL with SILT	
2			10.3		
3			28.2	2.5-5.0 Coarse SAND with SILT	
4			50.2		
5			62.3		
			185.6		
			190.3		
			172.3		
			184.1		
			292.6		
6				END OF BORING (5 ft.)	
7					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-06		10.9	0-3.5 Brown sandy FILL with GRAVEL	
2			20.2		
3			60.7		
4			64.8	3.5-5.0 Brown silty FILL with coarse SAND	
5			53.6		
			126.3		
			285.2		
			398.6		
			640.5		
			822.3		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-07		9.3	0-4.0 Brown silty FILL with GRAVEL	
2			10.2		
3			17.8		
4			25.2		
5			50.2		
			65.0	4.0-5.0 Brown coarse SAND	
			73.9		
			72.0		
			74.3		
			86.7		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-494-09	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR494-09	4.75	0.0	0-5.0' Brown sandy FILL (bricks)	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6			0.0		
7				END OF BORING (5 ft.)	
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-01		0.0	0-5.0 Brown sandy FILL with GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-02		10.2	0-4.0 Brown silty FILL with coarse SAND	
2			26.1		
3			23.8		
4			29.8		
5			40.2		
			45.6	0-5.0 Brown/grey SILT with GRAVEL	
			65.7		
			65.7		
			70.2		
			89.3		
6				END OF BORING (5 ft.)	
7					
8					
9					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-03		0.2	0-4.0 Brown coarse SAND with GRAVEL	
2			0.3		
3			0.6		
4			10.3		
5			29.3		
			20.4	0-5.0 Brown coarse SAND with SILT	
			17.8		
			35.6		
			45.7		
			50.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-04		19.2	0-3.0 Brown/gray silty FILL	
2			21.7		
3			22.0		
4			25.6		
5			38.3		
			40.2	3.0-5.0 Black/brown coarse SAND	
			35.8		
			40.2		
			41.2		
			45.9		
			49.3		
6				END OF BORING (5 ft.)	
7					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-05		0.7	0-3.5 Brown SILT with GRAVEL	
2			0.2		
3			15.2		
4			20.5		
5			25.4		
6			90.2	3.5-5.0 Brown SILT with coarse SAND and GRAVEL	
7		152.3			
8		163.2			
9			132.8		
10				END OF BORING (5 ft.)	
11					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-06		0.0	0-3.5 Brown sandy FILL with SILT and GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPU-767-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/15/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/15/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPU767-07		0.0	0-3.5 Brown sandy FILL with SILT and GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-01	4.50	0.0	0-4.0 Brown sandy SILT	
2			0.0		
3			0.0		
4			13.2		
5			509.1		
			1297	4.0-5.0 Brown/black SILT	
			1301		
			1906		
6				END OF BORING (5 ft.)	
7					
8					
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10					
11					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-02	3.00	0.0	0-4.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
			589.1	4.0-5.0 Brown/black SILT	
			689.2		
			1402		
			1306		
			1709		
6				END OF BORING (5 ft.)	
7					
8					
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11					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-03	3.50	0.0	0-4.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			187.9		
5			1908		
			2029	4.0-5.0 Brown/black SILT	
			3061		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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14					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-04	2.50	0.0	0-5.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-05	3.00	0.0	0-4.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			1798		
			3931	4.0-5.0 Brown/black Silt	
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-06	4.00	0.0	0-3.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			69.3	3.0-4.0 Brown/gray sandy SILT	
5			1451	4.0-5.0 Brown/black sandy SILT	
			1494		
			1606		
			3098		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-790-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR790-07	3.00	0.0	0-3.0 Brown/gray sandy SILT	
2			0.0		
3			0.0		
4			0.0	3.0-5.0 Brown/black sandy SILT	
5			1406		
			1320		
			3941		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-01	4.00	0.0	0-3.0 Brown SILT	
2			0.0		
3			0.0		
4			168.3	3.0-4.0 Grey sandy SILT with some gravel	
5			1318		
			1409	4.0-5.0 Brown/black SILT	
			1606		
			3092		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.5-4.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-02	3.50	0.0	0-5.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			129.2		
5			901.2		
			193.3		
			201.5		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
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25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-03	4.50	0.0	0-5.0 Brown sandy SILT	
2			0.0		
3			2.8	2.0-5.0 Brown/gray SILT with some GRAVEL	
4			1.2		
5			14.8		
			71.3		
			106.9		
			1303		
			110.8		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-04	3.00	0.0	0-5.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-05	3.00	0.0	0-5.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-06	2.50	0.0	0-5.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-07	4.00	0.0	0-1.0 Red crushed STONE	
2			0.0	4.0-5.0 Brown SAND with some GRAVEL	
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-791-08	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR791-08	3.00	0.0	0-4.0 Brown sandy SILT with little GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
5			0.0	4.0-5.0 Brown/black SILT	Soil stained
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-01	3.50	0.0	0-4.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			13.2		
5			100.7		
			784.3	4.0-5.0 Brown/black fine to course SAND	
			1422		
			1662		
			1301		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-02	2.50	0.0	0-2.0 Brown sandy SILT	
2			0.0		
3			0.0	2.0-5.0 Gray/dak gray sandy SILT	
4			0.0		
5			168.1		
			1308		
			1924		
			1092		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-03	4.00	0.0	0-2.5 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0	2.5-5.0 Brown/gray fine SAND	
4			0.0		
5			0.0		
			1307		
			1624		
			1794		
			2094		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-04	4.00	0.0	0-2.5 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0	2.5-5.0 Brown/gray fine SAND	
4			6.9		
5			75.3		
			74.2		
			1619		
			2931		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-05	4.00	0.0	0-3.0 Brown sandy SILT	
2			0.0		
3			0.0		
4			14.7	2.5-5.0 Brown/black fine to coarse SAND	
5			798.3		
			1119.0		
			1418.0		
			1906		
			901.3		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-06	4.00	0.0	0-5.0 Brown sandy SILT	
2			0.0		
3			0.0		
4			2.6		
5			14.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-792-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR792-07	4.00	0.0	0-3.0 Gray fine to coarse SAND	
2			0.0		
3			0.0		
4			2.6	3.0-4.0 Gray fine to coarse SAND with GRAVEL	
5			14.1	4.0-5.0 Brown/black SILT with some fine sand	
			179.2		
			692.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-01	4.00	0.0	0-2.0 Black/gray SILT and GRAVEL	
2			0.0		
3			0.0	2.0-5.0 Brown/gray sandy SILT	
4			18.6		
5			150.2		
			301.8		
			595.1		
			482.6		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.0-4.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-02	3.50	0.0	0-2.0 Black sandy SILT	
2			0.0		
3			0.0	2.0-5.0 Gray fine to coarse SAND	
4			13.6		
5			180.2		
			522.1		
			562.1		
			931.2		
			418.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-03	4.00	0.0	0-2.5 Gray sandy SILT with some GRAVEL	
2			0.0		
3			19.8	2.5-5.0 Dark gray sandy SILT with some GRAVEL	
4			64.2		
5			1495		
			1394		
			5961		
			7841		
			15000		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-04	4.00	0.0	0-2.5 Gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0	2.5-5.0 Dark gray sandy SILT with some GRAVEL	
4			191.3		
5			2001		
			1609		
			13000		
			15000		
6				END OF BORING (5 ft.)	
7					
8					
9					
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11					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-05	3.50	0.0	0-1.0 Brown SILT	
2			0.0	1.0-5.0 Gray fine to coarse SAND and GRAVEL	
3			0.0		
4			13.2		
5			29.6		
			280.3		
			594.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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18					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-793-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.5-4.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR793-05	4.00	0.0	0-1.0 Brown SILT	
2			0.0	1.0-5.0 Gray/black fine to coarse SAND and GRAVEL	
3			18.5		
4			794.2		
5			1416		
			1309		
			2086		
			1714		
			1300		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-01	4.00	0.0	0-4.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			18.1		
4			76.4		
5			922.3		
			904.1	4.0-5.0 Brown/black fine to coarse SAND with little SILT	
			1218		
			1312	END OF BORING (5 ft.)	
			1694		
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-02	4.00	0.0	0-4.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			1211		
5			1301	4.0-5.0 Brown/black fine to coarse SAND with little SILT	
5			2094		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-03	2.50	0.0	0-5.0 Brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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16					
17					
18					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-04	4.50	0.0	0-1.0 Brown SILT	
2			0.0	1.0-3.5 Brown/gray sandy SILT with some GRAVEL	
3			0.0		
4			14.1	3.5-5.0 Tans/black fine to coarse SAND	
5			64.3		
			1419		
			1206		
			1915		
			2841		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-05	4.00	0.0	0-4.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			14.8		
5			98.3		
			1049	4.0-5.0 Black fine to coarse SAND	
			1924		
			3112		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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16					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-06	3.50	0.0	0-1.0 Brown SILT	
2			0.0	1.0-3.5 Brown/gray sandy SILT with some GRAVEL	
3			0.0		
4			73.9	3.5-5.0 Tans/black fine to coarse SAND	
5			88		
			1921		
			1816		
			4931		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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18					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-07	4.00	0.0	0-4.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			73.8		
5			641.2		
			774.3	4.0-5.0 Black fine to coarse SAND	
			1418		
			1934		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-794-08	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 4.5-5.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR794-08	4.00	0.0	0-4.0 Brown/gray sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			1906		
5			1398		
			1786	4.0-5.0 Black fine to coarse SAND	
			7942		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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16					
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18					
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23					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-01	4.00	0	0-5.0 Brown sandy SILT	4-5' Staining
2			0		
3			126.2		
4			188.3		
5			1011		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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16					
17					
18					
19					
20					
21					
22					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-02	4.00	0	0-5.0 Brown/black fine to coarse SAND	3-5' Staining
2			0		
3			0		
4			0		
5			308.2 398.1		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
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15					
16					
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18					
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21					
22					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-03	
Client: PESRM		Project Name: PES Refinery		Date Start: 07/18/2022	
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022	
Drilling Contractor: TPI		Driller:		Permit No.:	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-03	4.50	0	0-5.0 Brown/black sandy SILT	4-5' Staining
2			0		
3			61.9		
4			691.3		
5			171.1		
			1329		
			3018		
			1208		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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14					
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21					
22					
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24					
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Ransom Consulting, LLC		Soil Boring Log			Boring No.: GPR-798-04	
Client: PESRM				Page 1 of 1		
Project Name: PES Refinery				Date Start: 07/18/2022		
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022		
Drilling Contractor: TPI				Permit No.:		
Driller:				Drilling Method: Geoprobe		Ground Elevation: N/A
Hole Diameter: 2"		Sampling Method: Acetate Liner		Datum: N/A		
Logged By: Tyler Short		Sample Interval: 4.5-5.0'		Total Depth: 5.0'		
				Hammer wt./fall: N/A		
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks	
1	GPR798-04	4.00	0	0-5.0 Black/brown sandy SILT	3-5' Staining	
2			0			
3			0			
4			12.8			
5			169.3			
6				END OF BORING (5 ft.)		
7						
8						
9						
10						
11						
12						
13						
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-05	4.00	0	0-5.0 Brown/black sandy SILT	4-5' Staining
2			0		
3			0		
4			198.3		
5			1157		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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14					
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22					
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24					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-06	3.00	0	0-5.0 Brown sandy SILT, some angular GRAVEL	3.5-5' Staining
2			0		
3			0		
4			392.1		
5			689.3		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-798-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR798-07	4.50	0	0-5.0 Black/brown, fine to coarse SAND, some angular GRAVEL	4-5' Staining
2			0		
3			98.3		
4			106.9		
5			1692		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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22					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-799-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR799-01	4.00	0	0-5.0 Brown sandy SILT	3-5' Staining
2			0		
3			0		
4			17.1		
5			130.2		
			208.1		
			1402		
			1603		
			1410		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
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Ransom Consulting, LLC		Soil Boring Log			Boring No.: GPR-799-02	
Client: PESRM				Page 1 of 1		
Project Name: PES Refinery				Date Start: 07/18/2022		
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022		
Drilling Contractor: TPI				Ground Elevation: N/A		
Driller:		Drilling Method: Geoprobe		Datum: N/A		
Hole Diameter: 2"		Sampling Method: Acetate Liner		Total Depth: 5.0'		
Logged By: Tyler Short		Sample Interval: 4.0-4.5'		Hammer wt./fall: N/A		
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks	
1	GPR799-02	4.50	0	0-5.0 Brown sandy SILT	3-5' Black staining	
2			0			
3			101.2			
4			210.3			
5			904.1			
			1462			
			1802			
			1622			
6				END OF BORING (5 ft.)		
7						
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-799-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR799-03	4.00	0	0-5.0 Brown sandy SILT	3-5' Staining
2			0		
3			0		
4			1302		
5			1213		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
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12					
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15					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-799-04	
Client: PESRM		Project Name: PES Refinery		Date Start: 07/18/2022	
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022	
Drilling Contractor: TPI		Driller:		Ground Elevation: N/A	
Hole Diameter: 2"		Drilling Method: Geoprobe		Datum: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Total Depth: 5.0'	
		Sample Interval: 4.0-4.5'		Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR799-04	4.50	0	0-5.0 Brown sandy SILT	4-5' Staining
2			0		
3			601.2		
4			848.2		
5			901.1		
			1503		
			1666		
			1403		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
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16					
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Ransom Consulting, LLC		Soil Boring Log			Boring No.: GPR-799-05	
Client: PESRM				Page 1 of 1		
Project Name: PES Refinery				Date Start: 07/18/2022		
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022		
Drilling Contractor: TPI				Permit No.:		
Driller:				Ground Elevation: N/A		Datum: N/A
Hole Diameter: 2"		Drilling Method: Geoprobe		Total Depth: 5.0'		
Logged By: Tyler Short		Sampling Method: Acetate Liner		Hammer wt./fall: N/A		
Sample Interval: 4.0-4.5'						
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks	
1	GPR799-05	4.50	0	0-5.0 Brown sandy SILT	2-5' Staining	
2			0			
3			13.1			
4			1402			
5			1007			
			910.3			
			905.1			
			1621			
			1822			
			1594			
6				END OF BORING (5 ft.)		
7						
8						
9						
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Ransom Consulting, LLC		Soil Boring Log			Boring No.: GPR-799-06	
Client: PESRM				Page 1 of 1		
Project Name: PES Refinery				Date Start: 07/18/2022		
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022		
Drilling Contractor: TPI				Permit No.:		
Driller:				Drilling Method: Geoprobe		Ground Elevation: N/A
Hole Diameter: 2"		Sampling Method: Acetate Liner			Datum: N/A	
Logged By: Tyler Short		Sample Interval: 4.5-5.0'		Total Depth: 5.0'		
				Hammer wt./fall: N/A		
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks	
1	GPR799-06	4.50	0	0-5.0 Brown/black sandy SILT	2-5' Staining	
2			0			
3			0			
4			1328			
5			1552			
6				END OF BORING (5 ft.)		
7						
8						
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Ransom Consulting, LLC		Soil Boring Log			Boring No.: GPR-799-07	
Client: PESRM				Page 1 of 1		
Project Name: PES Refinery				Date Start: 07/18/2022		
Project No.: 200.00135		Location: Philadelphia, PA		Date Finish: 07/18/2022		
Drilling Contractor: TPI				Ground Elevation: N/A		
Driller:		Drilling Method: Geoprobe		Datum: N/A		
Hole Diameter: 2"		Sampling Method: Acetate Liner		Total Depth: 5.0'		
Logged By: Tyler Short		Sample Interval: 4.5-5.0'		Hammer wt./fall: N/A		
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks	
1	GPR799-07	4.50	0	0-5.0 Brown sandy SILT	3-5' Staining	
2			0			
3			179.5			
4			1306			
5			948.1			
			1517			
			1403			
			1706			
6				END OF BORING (5 ft.)		
7						
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-01	4.25	0.0	0-5.0' Brown silty FILL with SAND	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-02	4.00	0.0	0-5.0' Brown silty FILL with SAND (bricks)	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/02/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/02/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-03	4.00	0.0	0-5.0' Brown silty FILL with course SAND (bricks)	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-04	3.50	0.0	0-2.0 Brown sandy SILT	
2			0.0		
3			0.0	2.0-3.0 Red SANDSTONE	
4			0.0	3.0-5.0 Gray/black fine to coarse SAND	
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-05	4.00	0.0	0-2.0 Brown SILT with little red SANDSTONE	
2			0.0		
3			0.0	2.0-5.0 Gray/black fine to coarse SAND	
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1088-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/03/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/03/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1088-06	2.50	0.0	0-4.0 Tan/brown sandy SILT with some GRAVEL	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				4.0-5.0 Black fine to coarse SAND	
END OF BORING (5 ft.)					
6					
7					
8					
9					
10					
11					
12					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1116-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 3.0-3.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-01	4.33	0.0	0-5.0 Brown SAND with SILT	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
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22					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1116-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 3.5-4.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-02	4.17	0	0-4.0 Brown sandy FILL with SILT	
2			0		
3			0		
4			0		
5			0		
4			162.5	4.0-5.0 Brown/gray SILT	
5			109		
5			100.6		
6				END OF BORING (5 ft.)	
7					
8					
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11					
12					
13					
14					
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19					
20					
21					
22					
23					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1116-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-03	3.50	0	0-5.0 Brown/gray SILT with coarse SAND	
2			0		
3			0		
4			2		
5			19.2		
			25.6		
			52.1		
			55.7		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
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22					
23					
24					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1116-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-04	4.25	0	0-3.5 Brown silty FILL with SAND	
2			0		
3			7.2		
4			0		
5			0		
			25.1	3.5-5.0 Brown fine SILT	
			28.7		
			83.6		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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16					
17					
18					
19					
20					
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22					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 2.0-2.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-05		0.8	0-3.5 light brown sandy FILL with SILT and GRAVEL	
2			0.7		
3			0.5		
4			1.2		
5			20.2		
6			2.3	3.5-5.0 Dark brown SILT	
7			6.7		
8			18.7		
9			1.0		
10			2.9		
11				END OF BORING (5 ft.)	
12					
13					
14					
15					
16					
17					
18					
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22					
23					
24					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-06		28.3	0-2.5 Brown silty FILL with SAND	
2			30.9		
3			50.2	2.5-5.0 Dark brown Silty FILL with GRAVEL	
4			151.9		
5			274.8		
			301.9		
			575.7		
			322.0		
			157.8		
			203.2		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 2.5-3.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-07		38.2	0-4.0 Brown sandy FILL with SILT	
2			40.1		
3			12.9		
4			60.4		
5			59.8		
			802.0	4.0-5.0 Dark brown SILT with GRAVEL	
			88.9		
			110.7	END OF BORING (5 ft.)	
			122.3		
			110.2		
6					
7					
8					
9					
10					
11					
12					
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14					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-08	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 1.5-2.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-08		102.3	0-2.5 Light brown sandy FILL with SILT	
2			249.8		
3			333.8	2.5-5.0 Dark brown SILT with fine SAND	
4			730.2		
5			542.2		
			502.7		
			130.8		
			112.7		
			6.3		
			12.8		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-09	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-09		0.0	0-1.5 Brown course SAND with GRAVEL	
2			0.0	1.5-4.0 Brown course SAND with FILL	
3			0.0		
4			0.0		
5			0.0	4.0-5.0 Brown/gray SILT with course SAND	
6				END OF BORING (5 ft.)	
7					
8					
9					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-10	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-10		0.0	0-3.0 Light brown SILT with coarse SAND	
2			0.0		
3			0.0		
4			0.0		
5			0.0		
4			12.2	3.0-5.0 Brown/gray SILT with fine SAND	
5			9.7		
			8.5		
6			5.6	END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
15					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-11	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-11		0.0	0-3.5 Brown sandy Fill with GRAVEL	
2			0.0		
3			0.0		
4			0.7		
5			11.2		
6			0.1	3.5-5.0 Brown/gray SILT	
7			0.3		
8			0.5		
9				END OF BORING (5 ft.)	
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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22					
23					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-12	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 2.0-2.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-12		0.7	0-2.0 Brown SAND with GRAVEL	
2			0.1		
3			21.2	2.0-5.0 Brown course SAND	
4			30.5		
5			45.2		
			12.5		
			8.8		
			17.3		
			15.6		
			11.9		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-13	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.0-3.5'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-13		0.0	0-3.0 Brown sandy FILL with SILT and GRAVEL	
2			0.0		
3			0.0		
4			0.0	3.0-5.0 Brown/black course SAND with SILT	
5			0.0		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-14	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 3.5-4.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-14		0.1	0-2.0 Brown course SAND	
2			2.5		
3			7.4		
4			10.7	2.0-3.0 Light brown/orange SILT	
5			12.3		
6			50.2	3.0-5.0 Brown/gray fine SAND	
7			95.6		
8			117.2		
9			82.6	END OF BORING (5 ft.)	
10			50.3		
11					
12					
13					
14					
15					
16					
17					
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Ransom Consulting, Inc.		Soil Boring Log		Boring No.: GPR-1116-15	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 08/01/2022	
Drilling Contractor: TPI		Driller:		Date Finish: 08/01/2022	
Hole Diameter: 2"		Drilling Method: Geoprobe		Permit No.:	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Ground Elevation: N/A	
		Sample Interval: 1.5-2.0'		Datum: N/A	
				Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1116-15		39.7	0-3.0 Brown sandy FILL with SILT	
2			35.6		
3			48.9		
4			322.1	3.0-5.0 Brown/gray SILT	
5			107.4		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-01	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-01	3.50	0	0-5.0 Brown/gray SILT with fine SAND	
2			118.2		
3			102.7		
4			98.3		
5			309.4		
			330.2		
			362.8		
			370.1		
			370		
			372.4		
6				END OF BORING (5 ft.)	
7					
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9					
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18					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-02	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-02	4.17	10.2	0-5.0 Brown/gray SILT	
2			18.3		
3			20.3		
4			19.4		
5			29.8		
			39.2		
			102.3		
			109.8		
			110.5		
			101.8		
6				END OF BORING (5 ft.)	
7					
8					
9					
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11					
12					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-03	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 3.5-4.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-03	4.25	19.2	0-5.0 Brown/gray SILT	
2			8.7		
3			9.1		
4			10.3		
5			12.7		
6				END OF BORING (5 ft.)	
7					
8					
9					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-04	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-04	4.00	0	0-3.0 Brown coarse SAND with SILT	
2			0		
3			0		
4			10.8	3.0-5.0 Brown SILT with GRAVEL	
5			15.2		
			10.7		
			12.4		
			17.9		
6				END OF BORING (5 ft.)	
7					
8					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-05	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.0-4.5'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-05	3.50	0	0-3.0 Brown silty FILL with GRAVEL	
2			0		
3			0		
4			26.7	3.0-5.0 Brown/gray SILT with fine SAND	
5			32.6		
			50.1		
			45.8		
6				END OF BORING (5 ft.)	
7					
8					
9					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-06	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1		3.75	0	0-3.0 Light brown/tan silty FILL with SAND	
2			0		
3			0		
4			0		
5	GPR1117-06		42.5		
			44.8	3.0-5.0 Brown/gray SILT with coarse SAND	
			40.9		
			50.8		
6				END OF BORING (5 ft.)	
7					
8					
9					
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12					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-07	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-07	4.17	0	0-3.5 Tan FILL with SILT and GRAVEL	
2			0		
3			0		
4			0		
5			0		
			24.5	3.5-5.0 Brown/gray SILT with coarse SAND	
			40.8		
			72.8		
6				END OF BORING (5 ft.)	
7					
8					
9					
10					
11					
12					
13					
14					
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Ransom Consulting, LLC		Soil Boring Log		Boring No.: GPR-1117-08	
Client: PESRM		Project Name: PES Refinery		Page 1 of 1	
Project No.: 200.00135		Location: Philadelphia, PA		Date Start: 07/18/22	
Drilling Contractor: TPI		Driller:		Date Finish: 07/18/22	
Hole Diameter: 2"		Drilling Method: Geoprobe		Ground Elevation: N/A	
Logged By: Tyler Short		Sampling Method: Acetate Liner		Datum: N/A	
		Sample Interval: 4.5-5.0'		Total Depth: 5.0'	
				Hammer wt./fall: N/A	
Depth (ft)	Sample No.	Recovery (Feet)	PID/FID (ppm)	Lithologic Description	Remarks
1	GPR1117-08	4.75	0	0-3.5 Brown silty FILL with GRAVEL	
2			0		
3			0		
4			7.1		
5			8		
			15.9	3.5-5.0 Brown/gray SILT with coarse SAND	
			29.8		
			57.9		
			60.2		
6				END OF BORING (5 ft.)	
7					
8					
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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR793-03R
Sheet 1 of 1

Date(s) Drilled 1/3/23	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 3.5 feet bgs	Sampling Method(s) Grab	Closest Tank GPR 793
Borehole Backfill Soil Cuttings	Location	



Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, dark brown, damp, well graded, dense; fill, petroleum like odor	18.4	
							67.8	
							100.5	
							398.8	
							257.2	
	36/60		GPR793-03R-2.5-3.0				485.9	Sample GPR793-03R-2.5-3.0 from 2.5-3.0' bgs
			GPR793-03R-3.0-3.5				341.2	Sample GPR793-03R-3.0-3.5 from 3.0-3.5' bgs
						↓ Saturated at 3.5' bgs	358.6	
				SP		SAND, dark brown, wet, loose, poorly graded; fill, petroleum like odor	384.1	
							335.8	
5						End of boring		
10								

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR799-08
Sheet 1 of 1

Date(s) Drilled 1/3/23	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 5 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 3.5 feet bgs	Sampling Method(s) Grab	Closest Tank GPR 799
Borehole Backfill Soil Cuttings	Location	


Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, light brown, damp, dense, well graded; fill	5.3	
			GPR799-08-1.0-1.5				10.0	Sample GPR799-08-1.0-1.5 from 1.0-1.5' bgs
							18.7	
							14.8	
	36/60						2.3	
			GPR799-08-3.0-3.5	SP		SAND, black, moist, loose, poorly graded; fill, potential staining and petroleum like odor ↓ Saturated at 3.5' bgs	11.5	Sample GPR799-08-3.0-3.5 from 3.0-3.5' bgs
							272.1	
							565.6	
							492.8	
5						End of boring	174.0	
10								

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR794-10
Sheet 1 of 1

Date(s) Drilled 1/3/23	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 5 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 3.0 feet bgs	Sampling Method(s) Grab	Closest Tank GPR 794
Borehole Backfill Soil Cuttings	Location	



Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, brown, damp, loose, well graded; fill	52.9	
							57.3	
							229.6	
			GPR794-10-1.5-2.0		↓	Grades to black; potential staining and petroleum like odor	286.2	Sample GPR794-10-1.5-2.0 from 1.5-2.0' bgs
			GPR794-10-2.0-2.5		↓		344.2	Sample GPR794-10-2.0-2.5 from 2.0-2.5' bgs
	36/60						222.5	
					↓	Saturated at 3.0' bgs	203.3	
					↓	Grades to tan	215.2	
					↓	Grades to black	568.1	
5						End of boring	548.8	
10								

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR794-09
Sheet 1 of 1

Date(s) Drilled 1/3/23	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 5 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 3.5 feet bgs	Sampling Method(s) Grab	Closest Tank GPR 794
Borehole Backfill Soil Cuttings	Location	




Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, light brown to gray, damp, dense, well graded; fill	40.7 88.9 274.0 510.2 9228 5217 6697	Sample GPR794-09-1.5-2.0 from 1.5-2.0' bgs Sample GPR794-09-2.0-2.5 and GPR794-09-2.0-2.5D from 2.0-2.5' bgs Sample GPR794-09-3.0-3.5 from 3.0-3.5' bgs
	42/60		GPR794-09-1.5-2.0 GPR794-09-2.0-2.5 and GPR794-09-2.0-2.5D GPR794-09-3.0-3.5	SP		SAND, black, wet, loose, poorly graded; fill, saturated at 3.5' bgs, potential staining and petroleum like odor	15000 15000 10932	
5						End of boring		
10								

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR792-03R
Sheet 1 of 1

Date(s) Drilled 1/3/23	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 5 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 2.5 feet bgs	Sampling Method(s) Grab	Closest Tank GPR 792
Borehole Backfill Soil Cuttings	Location	

Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, brown, damp, loose, poorly graded; fill	33.3	
			GPR792-03R-1.5-2.0				257.5	Sample GPR792-03R-1.5-2.0 from 1.5-2.0' bgs
			GPR792-03R-2.0-2.5				299.6	Sample GPR792-03R-2.0-2.5 from 2.0-2.5' bgs
	24/60					↓ Saturated at 2.5' bgs	395.0	
				SP		SAND, black, wet, loose, poorly graded; fill, potential staining and petroleum like odor	504.9	
							875.4	
							766.0	
							507.6	
5						End of boring		
10								

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-01
Sheet 1 of 1

Date(s) Drilled: 12/21/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 13 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation:
Groundwater Level and Date Measured: 1.72' bgs	Sampling Method(s): Grab	Closest Tank: GPR 494
Borehole Backfill: N/A	Location:	

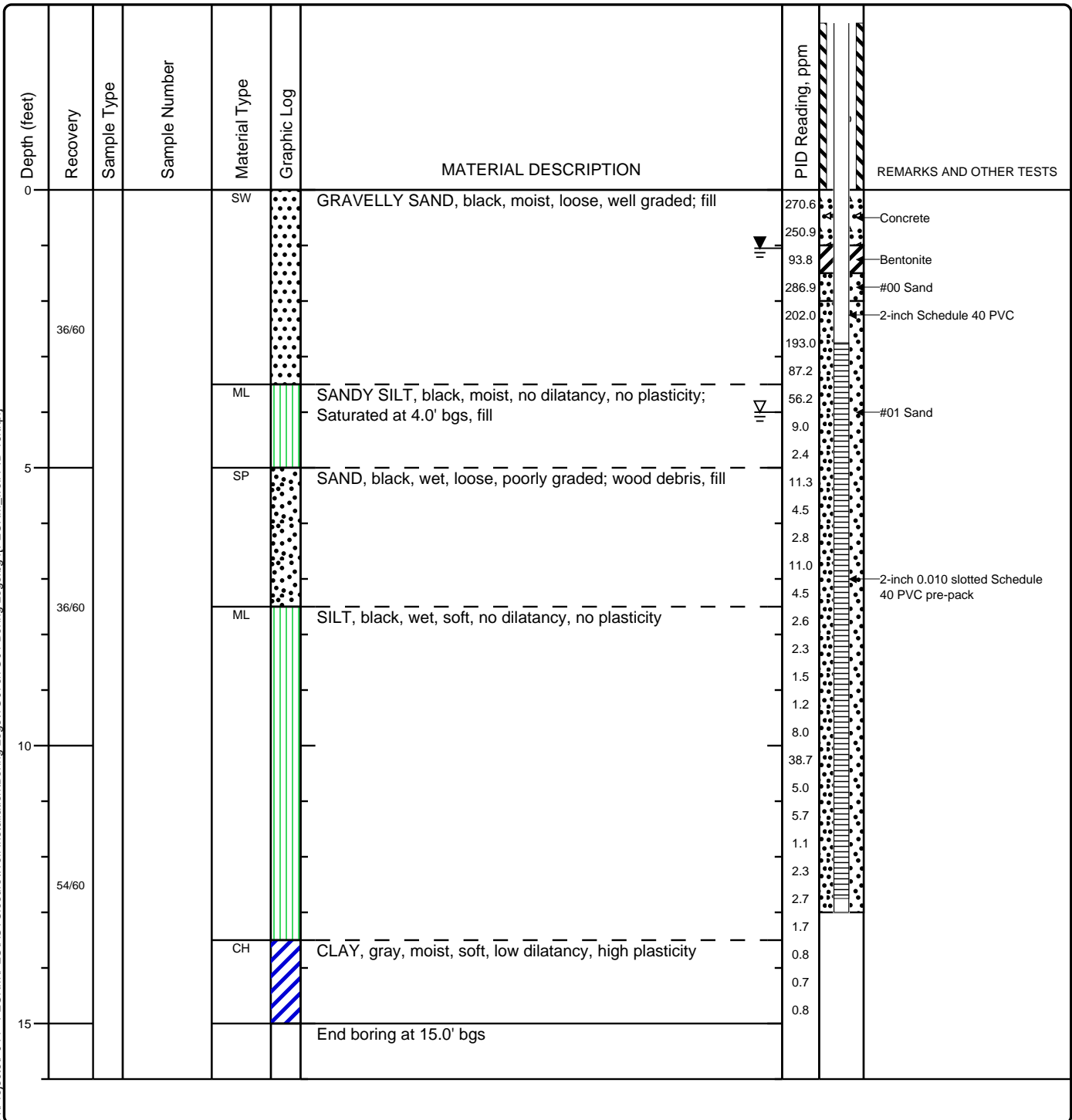
Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0			TG07-MW-01-0.0-0.5	GW		SANDY GRAVEL, brown, moist, loose, well graded; fill, saturated	0.1 0.0 0.0 0.0	Sample TG07-MW-01-0.0-0.5 from 0.0-0.5' bgs Bentonite #00 Sand 2-inch Schedule 40 PVC
36/60						grades to light brown SAND, gray, wet, loose, poorly graded, fine grained; fill, Petroleum like odor	0.1 15.6 39.0 50.0 11.9 53.5 265.6 229.7 137.3	#01 Sand 2-inch 0.010 Slotted Schedule 40 PVC Pre-pack
36/60				ML		SILT, gray, wet, soft, no dilatancy, no plasticity	86.2 66.0 74.7 34.2 24.6 9.8 10.2 15.7	
12/36				CH		CLAY, gray, moist, soft, low dilatancy, high plasticity	10.2 9.0 5.9 0.8	
						End boring at 13.0' bgs		

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-02
Sheet 1 of 1

Date(s) Drilled: 12/20/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 15 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured: 1.05' bgs	Sampling Method(s)	Closest Tank: GPR 1117
Borehole Backfill: N/A	Location	

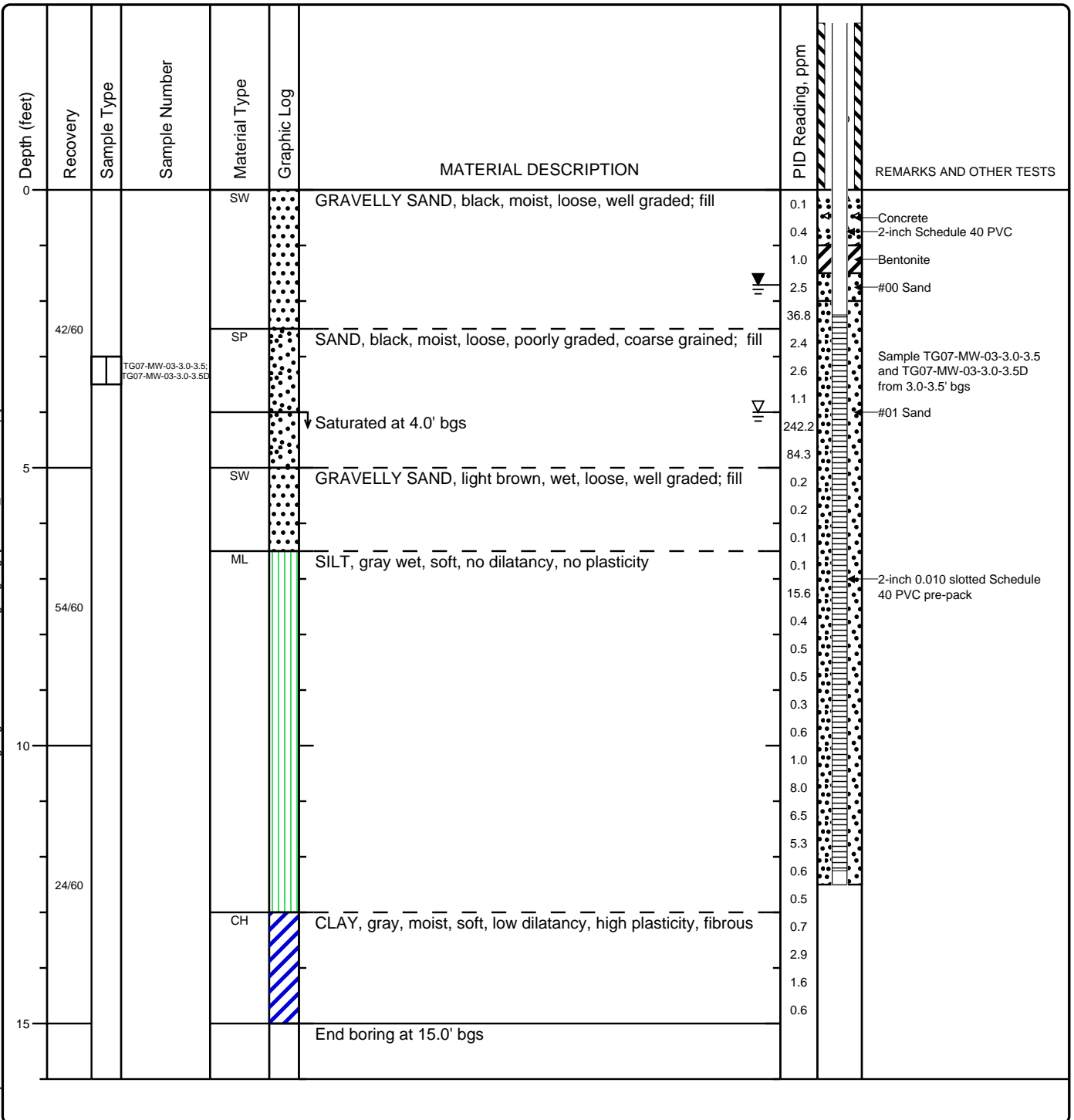


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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-03
Sheet 1 of 1

Date(s) Drilled 12/21/22	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 15 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 1.71' bgs	Sampling Method(s) Grab	Closest Tank GPR 1116
Borehole Backfill N/A	Location	

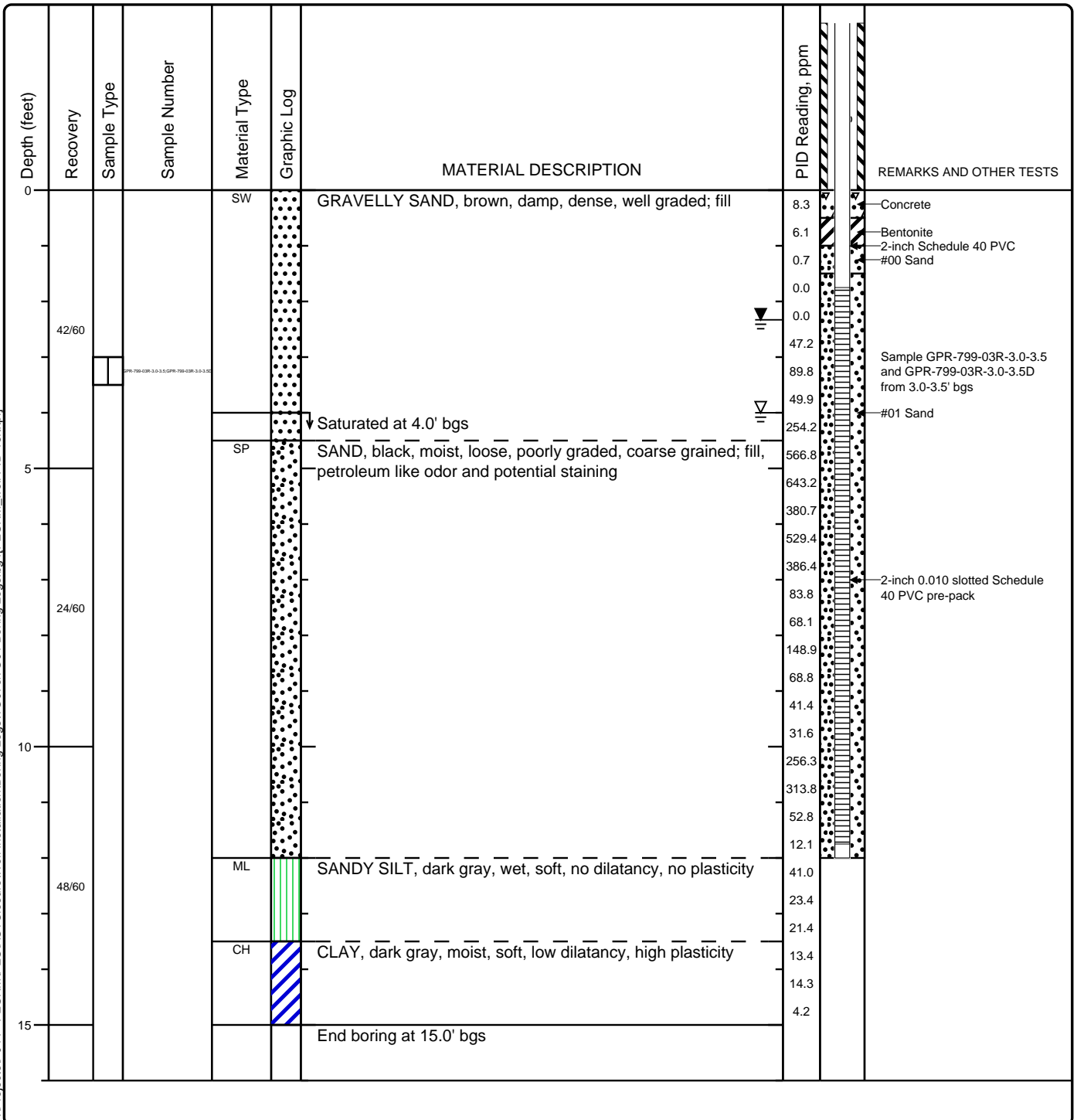


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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring GPR-799-03R
Sheet 1 of 1

Date(s) Drilled: 12/21/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 15 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured: 2.33' bgs	Sampling Method(s): Grab	Closest Tank: GPR 799
Borehole Backfill: N/A	Location	



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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-05
Sheet 1 of 1

Date(s) Drilled 12/21/22	Logged By S. Metzger	Checked By M. McDonald
Drilling Method Direct Push	Drill Bit Size/Type 2"x5' macrocore	Total Depth of Borehole 15 feet bgs
Drill Rig Type 7822DT	Drilling Contractor TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured 2.56' bgs	Sampling Method(s) Grab	Closest Tank GPR 790
Borehole Backfill N/A	Location	

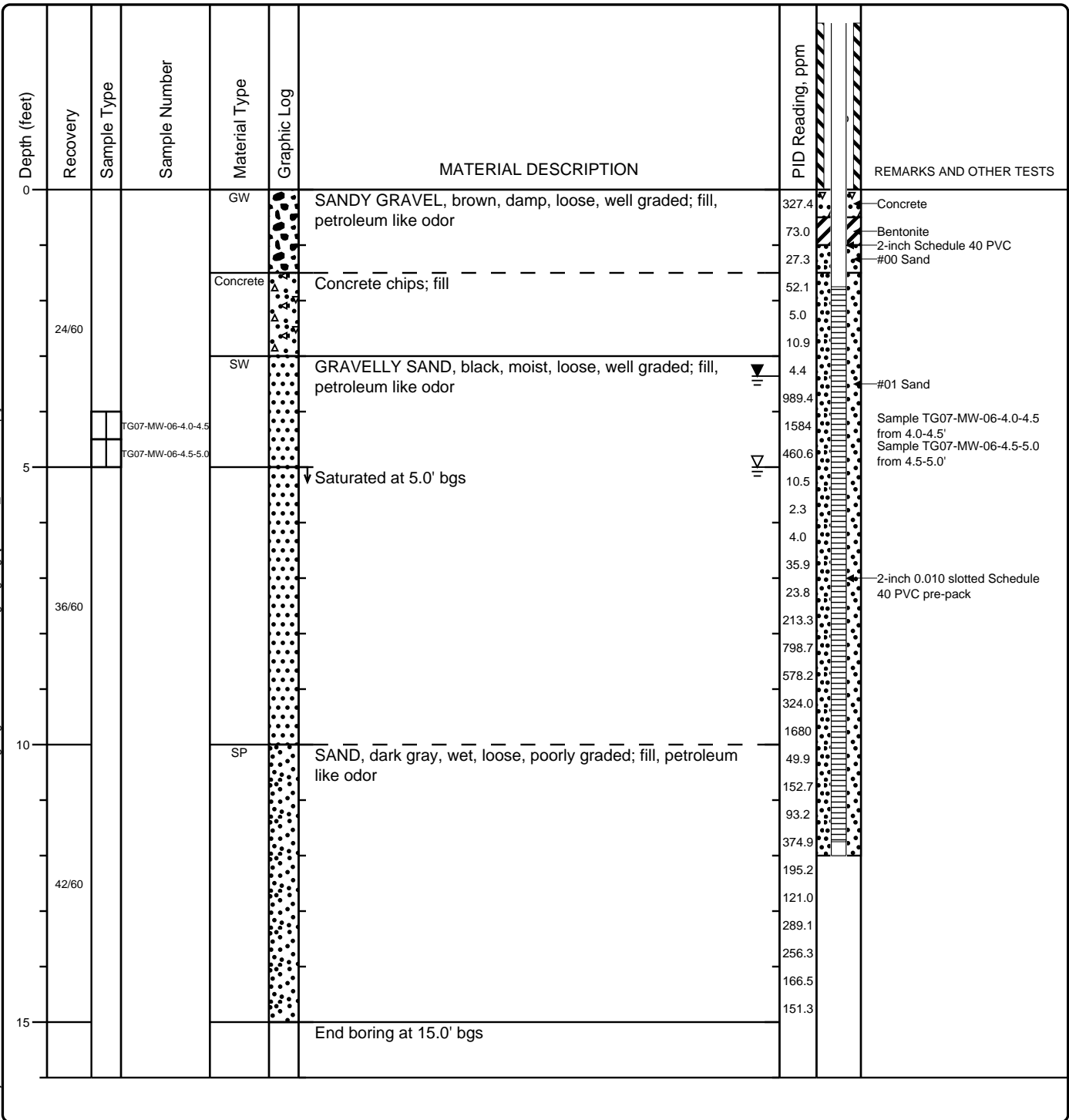
Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	REMARKS AND OTHER TESTS
0				SW		GRAVELLY SAND, brown, moist, dense, well graded; fill, petroleum like odor	6.6	Concrete
							4.5	Bentonite
							8.0	2-inch Schedule 40 PVC
								#00 Sand
	30/60						67.4	
							32.5	
							38.2	
							26.7	#01 Sand
							1647	
				SM		SILTY SAND, black, damp, dense, poorly graded, fine grained; fill, petroleum like smell and potential staining	2273	Sample TG07-MW-05-4.0-4.5 from 4.0-4.5' bgs
5			TG07-MW-05-4.5-5.0				1744	Sample TG07-MW-05-4.5-5.0 from 4.5-5.0' bgs
				GW		SANDY GRAVEL, black, wet, well graded, coarse grained; fill, petroleum like odor and potential staining	778.1	
	12/60						683.3	
							553.8	
							775.0	2-inch 0.010 slotted Schedule 40 PVC pre-pack
							856.2	
							789.0	
							632.6	
							620.8	
							171.2	
				SP		SAND, dark gray, wet, loose, poorly graded; fill, petroleum like odor	112.2	
10							306.5	
							132.9	
							230.2	
							197.1	
	36/60			ML		SANDY SILT, dark gray, wet, soft, no dilatancy, no plasticity; petroleum like odor	92.5	
							288.5	
							39.2	
							51.0	
							21.7	
15						End boring at 15.0' bgs	19.3	

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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-06
Sheet 1 of 1

Date(s) Drilled: 12/22/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 15 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation:
Groundwater Level and Date Measured: 3.36' bgs	Sampling Method(s): Grab	Closest Tank: GPR 791
Borehole Backfill: N/A	Location:	

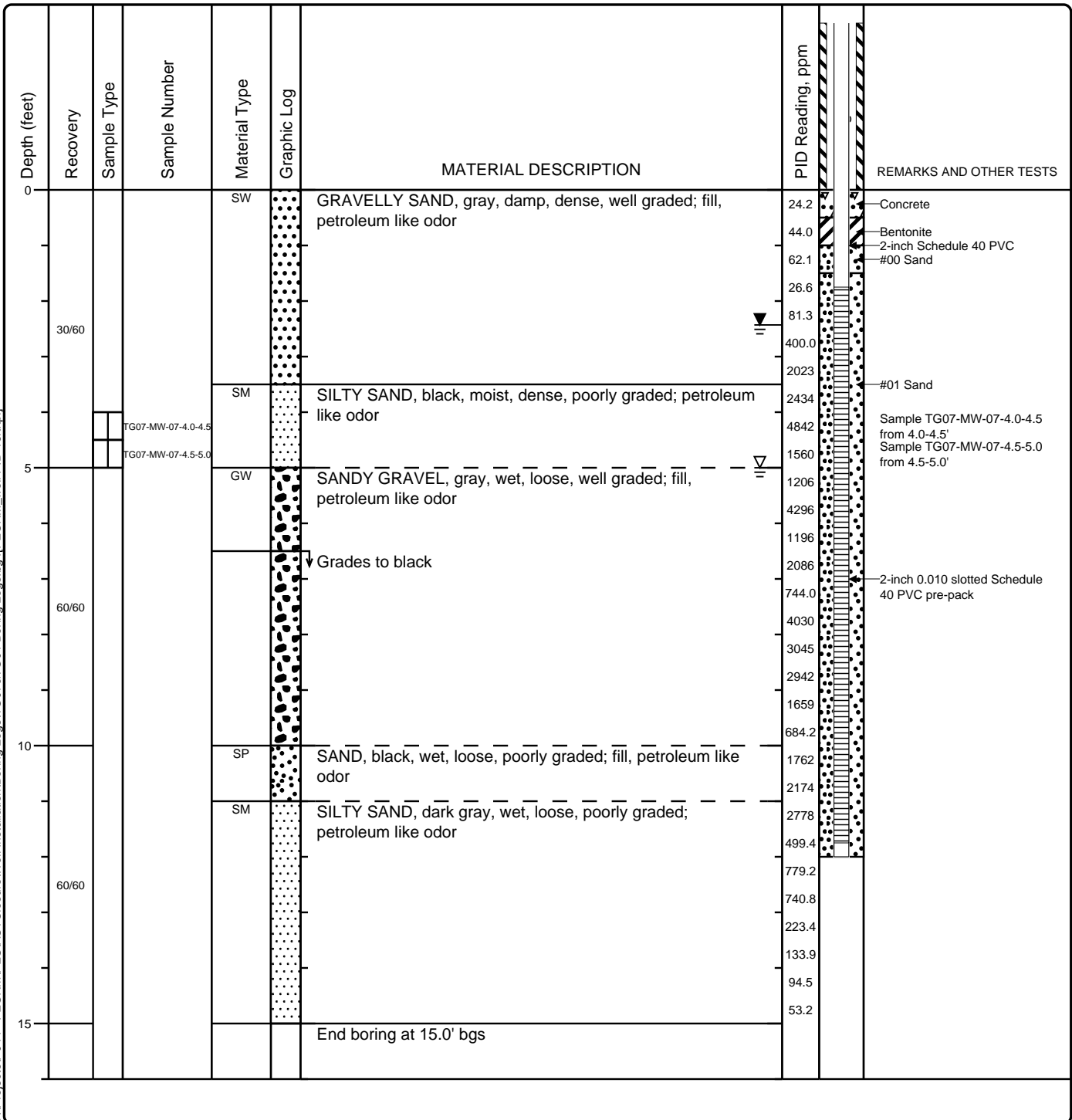


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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-07
Sheet 1 of 1

Date(s) Drilled: 12/21/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 15 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured: 2.43' bgs	Sampling Method(s): Grab	Closest Tank: GPR 794
Borehole Backfill: N/A	Location	

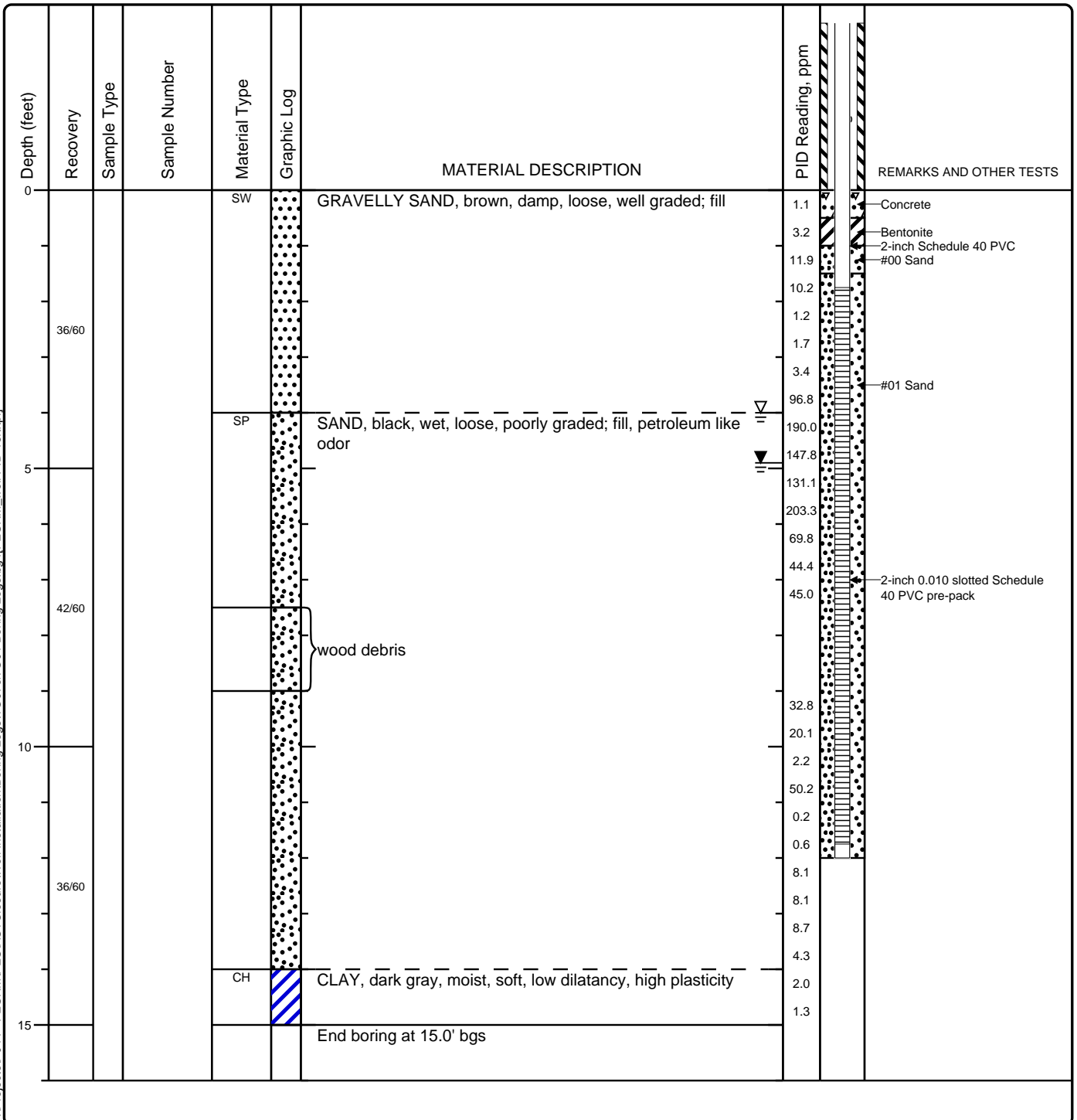


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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Log of Boring TG07-MW-08
Sheet 1 of 1

Date(s) Drilled: 12/22/22	Logged By: S. Metzger	Checked By: M. McDonald
Drilling Method: Direct Push	Drill Bit Size/Type: 2"x5' macrocore	Total Depth of Borehole: 15 feet bgs
Drill Rig Type: 7822DT	Drilling Contractor: TPI Environmental, Inc.	Approximate Surface Elevation
Groundwater Level and Date Measured: 4.90' bgs	Sampling Method(s)	Closest Tank: GPU 768
Borehole Backfill: N/A	Location	



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Project: **PESRM AST Closure**
 Project Location: **3144 Passyunk Ave**
 Project Number: **P044.001.002**

Key to Log of Boring Sheet 1 of 1

Depth (feet)	Recovery	Sample Type	Sample Number	Material Type	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10

COLUMN DESCRIPTIONS

- | | |
|---|---|
| <p>1 Depth (feet): Depth in feet below the ground surface.</p> <p>2 Recovery : Percent Recovery</p> <p>3 Sample Type: Type of soil sample collected at the depth interval shown.</p> <p>4 Sample Number: Sample identification number.</p> <p>5 Material Type: Type of material encountered.</p> | <p>6 Graphic Log: Graphic depiction of the subsurface material encountered.</p> <p>7 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.</p> <p>8 PID Reading, ppm: The reading from a photo-ionization detector, in parts per million.</p> <p>9 Well Log: Graphical representation of well installed upon completion of drilling and sampling.</p> <p>10 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|---|---|







FIELD AND LABORATORY TEST ABBREVIATIONS

<p>CHEM: Chemical tests to assess corrosivity</p> <p>COMP: Compaction test</p> <p>CONS: One-dimensional consolidation test</p> <p>LL: Liquid Limit, percent</p>	<p>PI: Plasticity Index, percent</p> <p>SA: Sieve analysis (percent passing No. 200 Sieve)</p> <p>UC: Unconfined compressive strength test, Qu, in ksf</p> <p>WA: Wash sieve (percent passing No. 200 Sieve)</p>
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



MATERIAL GRAPHIC SYMBOLS

- | | |
|--|---|
| <p> Bentonite</p> <p> Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)</p> | <p> Portland Cement Concrete</p> <p> Poorly graded SAND (SP)</p> <p> Well graded SAND (SW)</p> |
|--|---|

TYPICAL SAMPLER GRAPHIC SYMBOLS

- | | |
|--|--|
| <p> Auger sampler</p> <p> Bulk Sample</p> <p> 3-inch-OD California w/ brass rings</p> | <p> CME Sampler</p> <p> Grab Sample</p> <p> 2.5-inch-OD Modified California w/ brass liners</p> |
|--|--|

OTHER GRAPHIC SYMBOLS

-  Water level (at time of drilling, ATD)
-  Water level (after waiting, AW)
-  Minor change in material properties within a stratum
-  Inferred/gradational contact between strata
- Queried contact between strata

GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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Figure B-1

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/21/22 TIME 1025
 WELL INSTALLATION BEGAN:
 DATE 12/21/22 TIME 1040
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 835
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-01
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

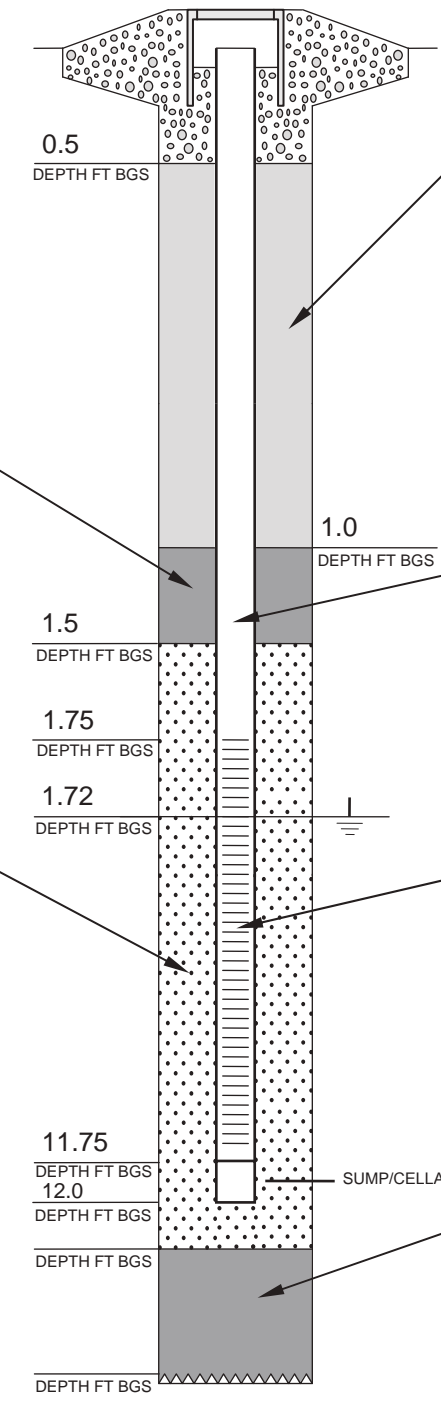
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 1.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/21/22 TIME 745
 WELL INSTALLATION BEGAN:
 DATE 12/21/22 TIME 810
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1418
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-02
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 13.0'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

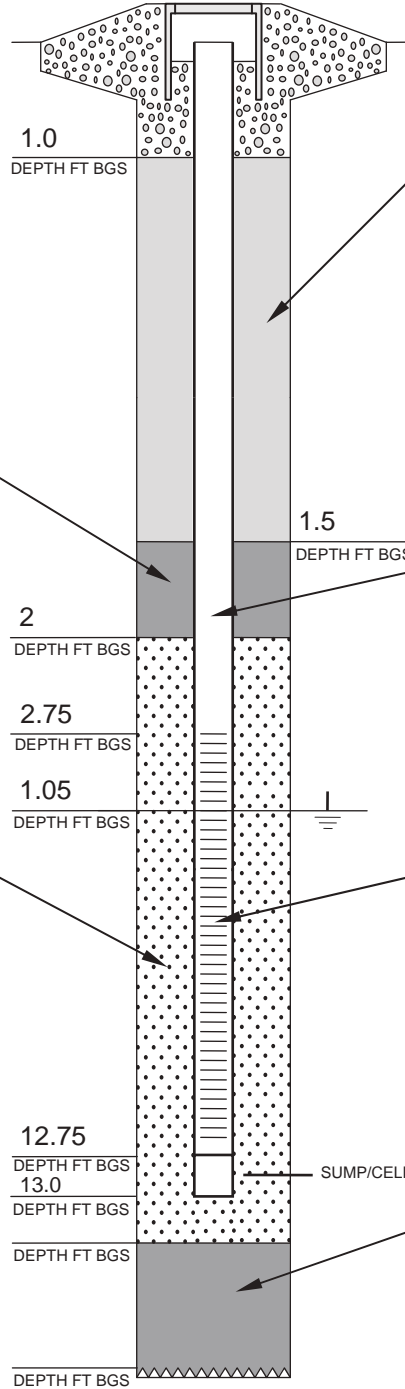
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/21/22 TIME 900
 WELL INSTALLATION BEGAN:
 DATE 12/21/22 TIME 920
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 930
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-03
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.5'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

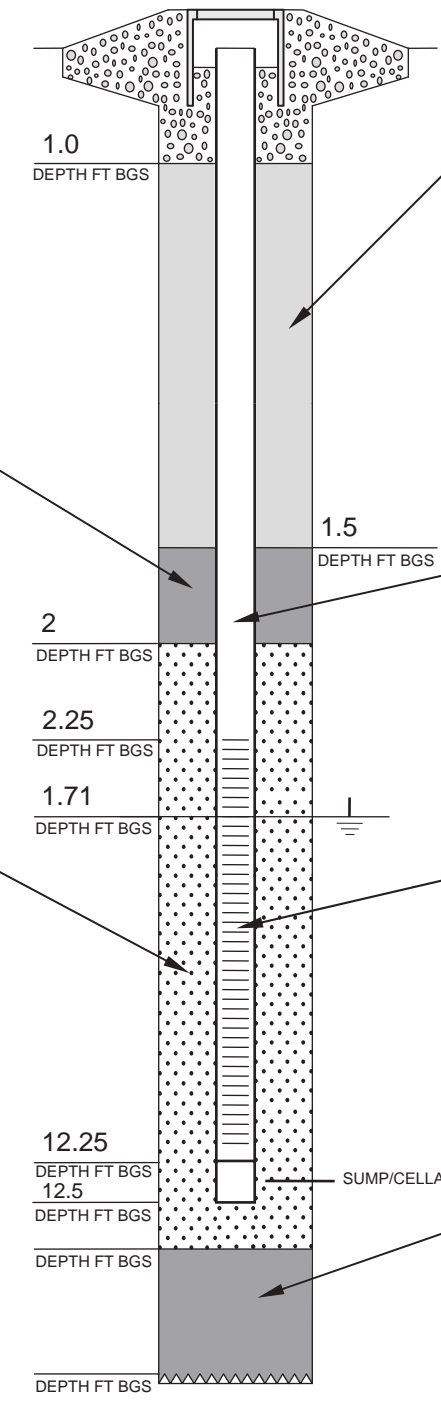
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/21/22 TIME 1432
 WELL INSTALLATION BEGAN:
 DATE 12/21/22 TIME 1452
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1215
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-04
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

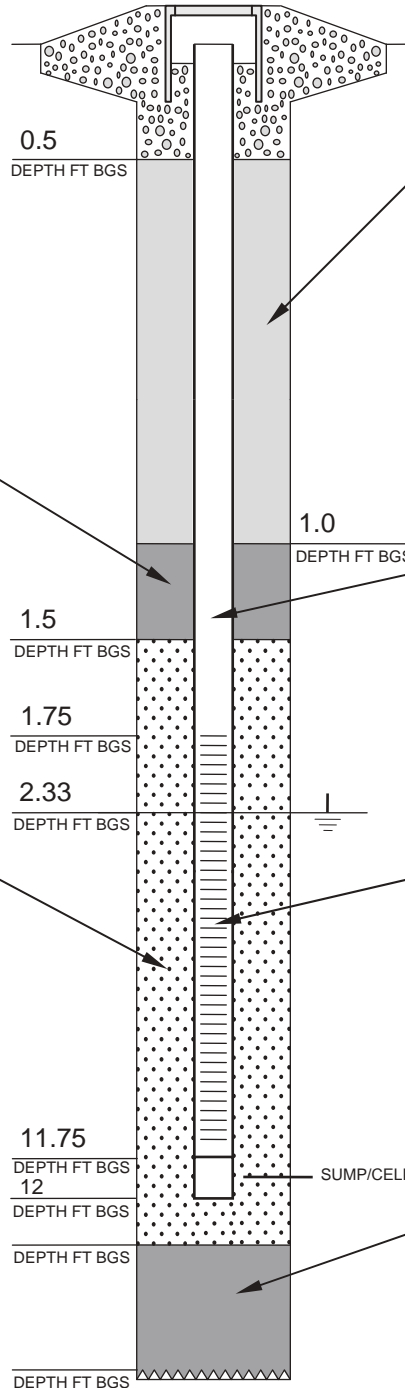
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/21/22 TIME 1319
 WELL INSTALLATION BEGAN:
 DATE 12/21/22 TIME 1325
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1245
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-05
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

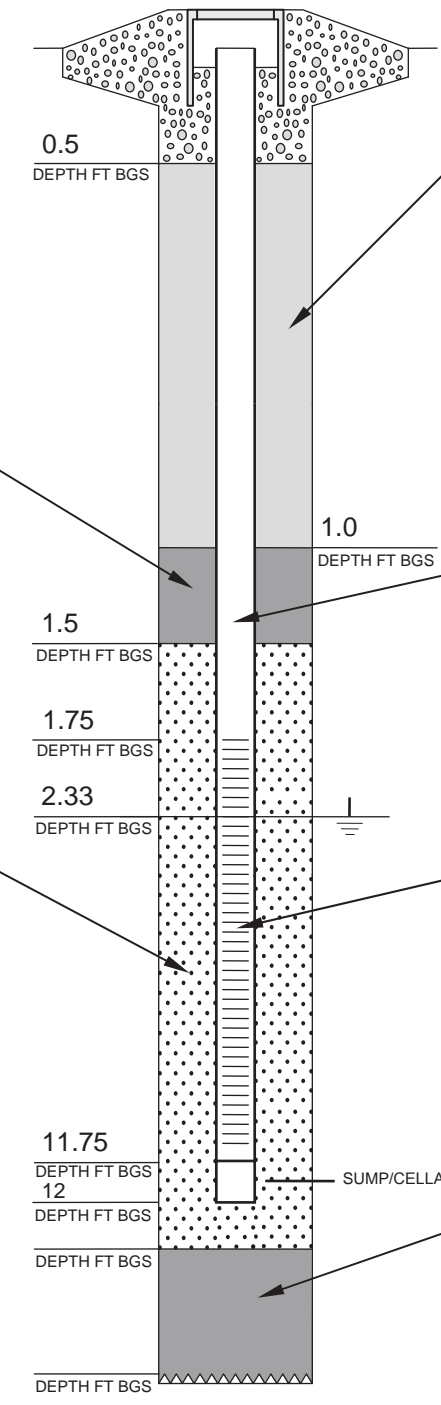
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/22/22 TIME 828
 WELL INSTALLATION BEGAN:
 DATE 12/22/22 TIME 840
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1149
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-06
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

FILTER PACK

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

SURVEY INFORMATION

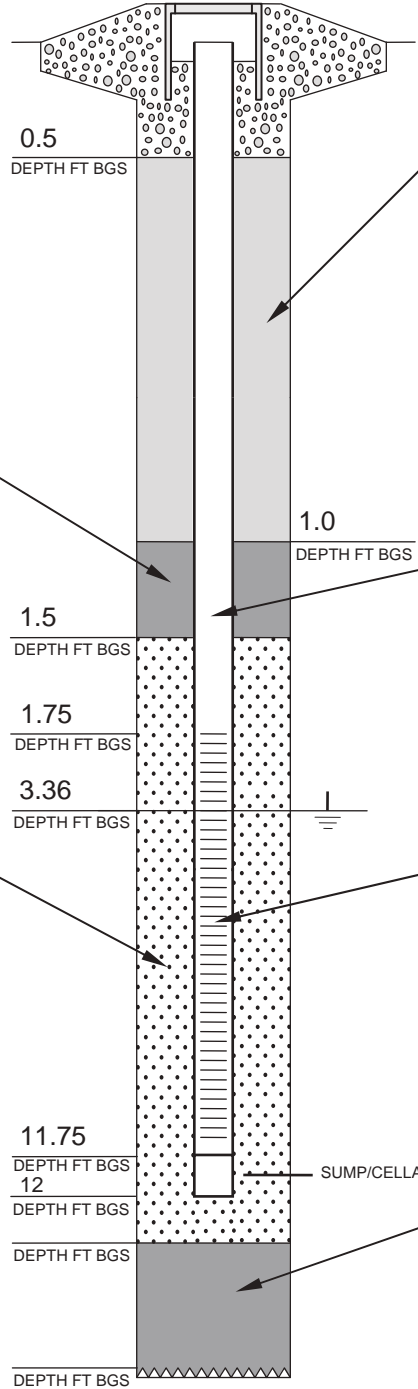
TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/22/22 TIME 828
 WELL INSTALLATION BEGAN:
 DATE 12/22/22 TIME 840
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1149
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-06
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

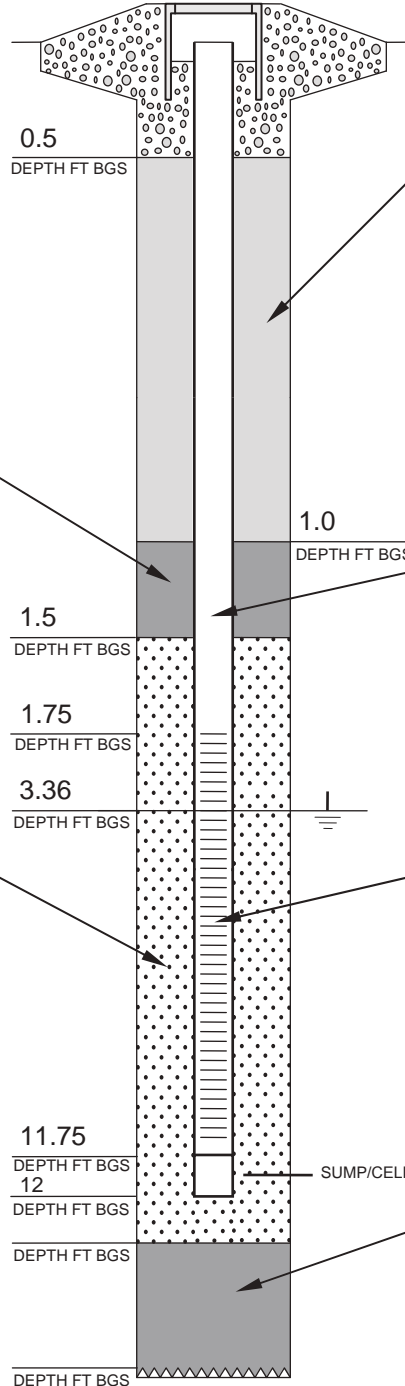
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
 DATE 12/22/22 TIME 940
 WELL INSTALLATION BEGAN:
 DATE 12/22/22 TIME 1000
 WELL COMPLETION FINISHED:
 DATE 12/22/22 TIME 1120
 DRILLING CO. TPI Environmental
 DRILLER B. Frace
 LICENSE _____
 DRILL RIG 7822DT
 DRILLING METHOD:
 HOLLOW STEM AUGER
 SONIC
 OTHER: Direct Push
 DIAMETER OF AUGERS:
 ID 3.0" OD _____

SURFACE COMPLETION

FLUSH MOUNT
 ABOVE GROUND W/BUMPER POST
 CONCRETE ASPHALT

MONITORING WELL

MONITORING WELL NO. TG07-MW-08
 PROJECT PESRM AST Closure
 SITE 3144 W. Passyunk Ave.
 BOREHOLE NO. N/A
 WELL PERMIT NO. N/A
 TOC TO BOTTOM OF WELL 12.0'

ANNULAR SEAL

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 (12.5 lbs)
 GROUT FORMULA
 PORTLAND CEMENT _____
 BENTONITE PDS Bentonite
 WATER _____
 PREPARED MIX
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED
 POURED TREMIE

Choker Sand

AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 PELLETS, SIZE _____
 CHIPS, SIZE _____
 #00 Sand
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED
 POURED TREMIE
 AMOUNT OF WATER USED _____

FILTER PACK

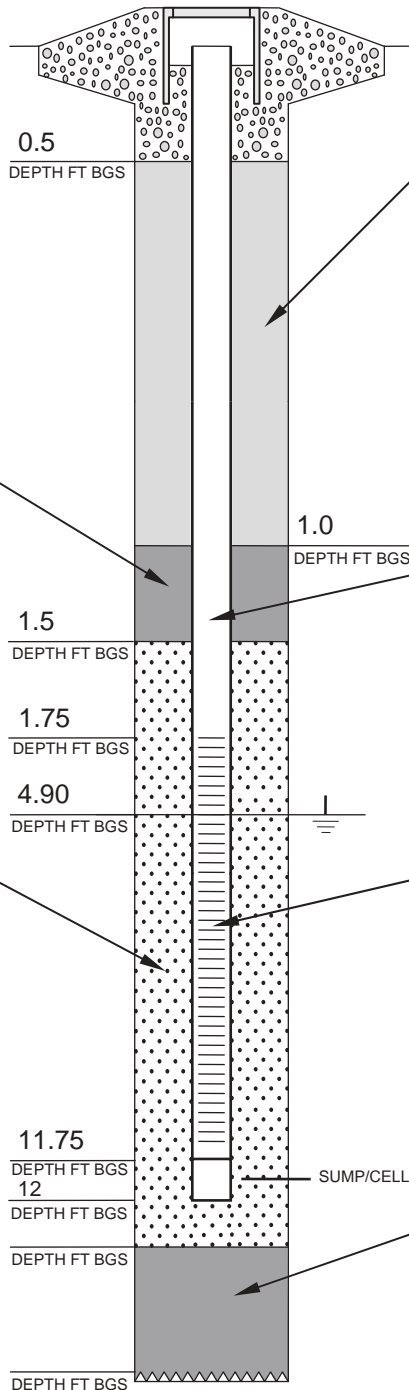
AMOUNT CALCULATED _____
 AMOUNT USED 0.25 bags (12.5 lbs)
 SAND, SIZE #1 Sand
 FORMATION COLLAPSE:
 FROM _____ TO _____
 PRODUCT Superior Quartz
 MFG. BY Filpro
 METHOD INSTALLED:
 POURED TREMIE

SURVEY INFORMATION

TOC ELEVATION _____
 GROUND ELEVATION _____
 NORTHING COORD. _____
 EASTING COORD. _____
 DATE SURVEYED _____
 SURVEY CO. _____
 TOC MEASURING POINT: _____

CENTRALIZERS USED?

YES NO
 CENTRALIZER DEPTHS: _____



CASING

SCHEDULE 40 PVC

 PRODUCT _____
 MFG. BY _____
 CASING DIAMETER:
 ID 2" OD 2.375"
 LENGTH OF CASING 2.75'

WELL SCREEN

SCHEDULE 40 PVC
 Schedule 40 PVC pre-pack
 PRODUCT _____
 MFG. BY: Geoprobe
 CASING DIAMETER:
 ID 2.0" OD 2.75"
 SLOT SIZE 0.010
 LENGTH OF SCREEN 10.0'
 LENGTH OF SUMP .25"

BOREHOLE BACKFILL

AMOUNT CALCULATED _____
 AMOUNT USED _____
 BENTONITE CHIPS, SIZE _____
 BENTONITE PELLETS, SIZE _____
 SLURRY _____
 FORMATION COLLAPSE
 FROM _____ TO _____
 PRODUCT _____
 MFG. BY _____
 METHOD INSTALLED:
 POURED TREMIE

Appendix H

Release Notification





September 1, 2022

Mr. Ron Estel
Pennsylvania Department of Environmental Protection
Southeast Regional Office
Division of Storage Tanks
2 East Main Street
Norristown, PA 19401

sent via electronic mail

**Subject: Philadelphia Energy Solutions Refining and Marketing, LLC
PADEP Notification of Release Form – Tank Group 07
PADEP Facility ID #51-33624 – Point Breeze Refinery
Incident No. 57973
Second Notification
3144 W. Passyunk Avenue, Philadelphia, PA 19141**

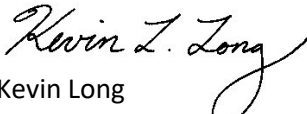
Dear Mr. Estel:


Enclosed please find a copy of the Pennsylvania Department of Environmental Protection's (PADEP) Notification of Release Form for the Philadelphia Energy Solutions Refining and Marketing, LLC (PESRM) Point Breeze Refinery. The PADEP was notified via telephone on August 24, 2022, that Aboveground Storage Tank (AST) Site Assessment sampling, performed in Tank Group 07, identified constituents in soil at concentrations greater than the applicable PADEP Medium Specific Concentrations (MSCs). Specifically, concentrations greater than applicable MSCs were identified at tank GP R 494 (029A), GP R 767 (046A), GP R 791 (006A), GP R 792 (035A), GP R 793 (036A), and GP R 794 (037A). This notification is the second incident reported in Tank Group 07 (Incident #57973). Pursuant to discussions with our PADEP case team, this and any subsequent notifications required in Tank Group 07 will be combined with the incident number #57973.

Please contact me at kevin.long@terraphase.com / 609-236-8171 x93 or Nick Scala at nick.scala@terraphase.com / 609-236-8171 x92 with any questions.

Sincerely,

for Terraphase Engineering Inc.


Kevin Long
Principal Consultant


Nicholas Scala, PG, LSRP
Principal Geologist

KL/NS:cs

Enclosure: PADEP Notification of Release Form (Tank Group 07)

September 1, 2022
Mr. Ron Estel
PADEP Notification of Release Form - Tank Group 07

cc: Joseph Jeray (jjeray@hilcoglobal.com)
Stephanie Eggert (seggert@hilcoglobal.com)
Charles Barksdale (cbarksdale@hilcoglobal.com)
Bob Armstrong (rarmstrong@NorthStar.com)
Lisa Strobridge (PADEP – lstrobridge@pa.gov)
Ralph DiPietro (Philadelphia L & I – ralph.dipietro@phila.gov)

NOTIFICATION OF RELEASE (*Owners and Operators*)

FACILITY I.D. NUMBER 51 - 33624

Initial
 Follow-Up

NOTIFICATION OF CONTAMINATION (*Certified Installers and Inspectors*)

INFORMATION FOR OWNERS AND OPERATORS (O/O)

The Storage Tank Program's Corrective Action Process (CAP) regulations establish requirements for owners and operators of storage tank systems and storage tank facilities to report confirmed releases and, in certain cases, suspected releases.

Suspected Release Reporting: Upon the completion of a suspected release investigation from which it could not be determined whether a release has occurred, the owner or operator must, within 15 days of the indication of the suspected release, complete and submit this form to the appropriate regional office of the Department (Subsection 245.304(c)(2)).

Confirmed Release Reporting: The owner or operator must notify the appropriate regional office of the Department by telephone as soon as practicable, but no later than 24 hours, after the confirmation of a release (Subsections 245.305(a) and (b)). Within 15 days of that telephone notification, the owner or operator must complete and submit this form to the appropriate regional office of the Department, to each municipality in which the release occurred, and to each municipality where that release has impacted environmental media or water supplies, buildings, or sewer or other utility lines (Subsections 245.305(c) and (e)). And if new impacts to environmental media or water supplies, buildings, or sewer or other utility lines are discovered after that initial written notification, the owner or operator must, within 15 days of the discovery of the new impact, complete and submit this form to the Department and to each impacted municipality (Subsections 245.305(d) and (e)).

INFORMATION FOR CERTIFIED INSTALLERS AND INSPECTORS (I/I)

In accordance with the Storage Tank Program's certification regulations, certified installers and inspectors must complete and submit this form to the Department within 48 hours of observing any of the following while performing services as a certified installer or inspector: a release of a regulated substance; suspected or confirmed contamination of soil, surface or groundwater from regulated substances; or a regulated substance in a containment structure or facility (Subsections 245.132(a)(4) and 245.132(a)(6)).

INSTRUCTIONS

Record the storage tank facility I.D. number at the top right-hand corner of each page of this form.

Owners and Operators (O/O): Indicate if this is an initial or follow-up notification by marking the appropriate box found in the top right-hand corner of this page.

- To report a Suspected Release, complete all information in Sections I, II, IIIA, IIIC, VI, VIII and IX.
- To report a Confirmed Release, complete all information in Sections I, II, IIIA, IIIB, IIIC, IV, V, VIII and IX.

Certified Installers and Inspectors (I/I): Complete all information in Sections I, II, IIIA, IIIC, VI or VII, VIII, and IX. Attach a copy of the failed, valid tightness test results, if applicable.

PLEASE SEND COMPLETED ORIGINAL FORM TO:

PA Department of Environmental Protection
Environmental Cleanup and Brownfields Program
Storage Tank Section

(and the appropriate address below, depending on where the FACILITY is located)

<p>Northwest Region 230 Chestnut Street Meadville, PA 16335-3481 PHONE: 814-332-6945 / 800-373-3398 FAX: 814-332-6121 Counties: Armstrong, Butler, Clarion, Crawford, Elk, Erie, Forest, Indiana, Jefferson, Lawrence, McKean, Mercer, Venango, Warren</p>	<p>North-central Region 208 W. Third Street, Suite 101 Williamsport, PA 17701 PHONE: 570-327-3636 FAX: 570-327-3420 Counties: Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union</p>	<p>Northeast Region 2 Public Square Wilkes-Barre, PA 18701-1915 PHONE: 570-826-2511 FAX: 570-820-4907 Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming</p>
<p>Southwest Region 400 Waterfront Drive Pittsburgh, PA 15222 PHONE: 412-442-4000 FAX: 412-442-4194 Counties: Allegheny, Beaver, Cambria, Fayette, Greene, Somerset, Washington, Westmoreland</p>	<p>South-central Region 909 Elmerton Avenue Harrisburg, PA 17110 PHONE: 717-705-4705 / 800-541-2050 FAX: 717-705-4830 Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York</p>	<p>Southeast Region 2 East Main Street Norristown, PA 19401 PHONE: 484-250-5900 FAX: 484-250-5961 Counties: Bucks, Chester, Delaware, Montgomery, Philadelphia</p>

I. FACILITY INFORMATION (Both O/O and I/I)			II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)		
Facility Name <u>Philadelphia Refinery Point Breeze</u>	Facility I.D. Number <u>51-33624</u>		Owner Name <u>Philadelphia Energy Solutions Refining and Marketing, LLC</u>		
Street Address (P.O. Box not acceptable) <u>3144 W. Passyunk Avenue</u>			Address <u>111 S. Wacker Dr, Suite 3000</u>		
City <u>Philadelphia</u>	State <u>PA</u>	Zip Code <u>19141 - 5299</u>	City <u>Chicago</u>	State <u>IL</u>	Zip Code <u>60606 -</u>
County <u>Philadelphia</u>	Municipality <u>Philadelphia</u>		Telephone Number <u>(312) 796 - 6564</u>		
Contact Person <u>Anne Garr</u>	Telephone Number <u>(312) 796 - 6564</u>		Operator Name <u>Anne Garr</u>		Telephone Number <u>(312) 796 - 6564</u>

III. REGULATED SUBSTANCE INFORMATION		
A. Type of Product(s) Involved (Mark All That Apply <input checked="" type="checkbox"/>): <u>Both O/O and I/I</u>	B. Quantity (Gallons) of Product(s) Released: <u>O/O Only</u>	C. Contamination Suspected [S] or Confirmed [C] (Mark All That Apply <input checked="" type="checkbox"/>): <u>Both O/O and I/I</u>
Leaded Gasoline <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Unleaded Gasoline <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Aviation Gasoline <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Kerosene <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Jet Fuel <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Diesel Fuel <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
New Motor Oil <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Used Motor Oil <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Fuel Oil No. 1 <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Fuel Oil No. 2 <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Fuel Oil No. 4 <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Fuel Oil No. 5 <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Fuel Oil No. 6 <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]
Other (Specify) <u>Frac Bottoms, Recovered Oil</u> <u>benzene, cumene, tetraethylene glycol</u> <input checked="" type="checkbox"/> <u>U N K N O W N</u> <input type="checkbox"/> [S] <input checked="" type="checkbox"/> [C]
Unknown <input type="checkbox"/> <input type="checkbox"/> [S] <input type="checkbox"/> [C]

IV. CONFIRMED RELEASE INFORMATION (O/O Only)		
Date Release was Confirmed: <u>08 / 24 / 2022</u> <small>m d y</small>	Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified: Date: <u>9 / 1 / 2022</u> Municipality <u>Philadelphia</u> <small>m d y</small>	
Date Owner/Operator Verbally Notified Appropriate Regional Office of Confirmed Release and Office Notified: Date: <u>08 / 24 / 2022</u> Office <u>Southeast Region</u> <small>m d y</small>	Date: <u> / / </u> Municipality <u> </u> <small>m d y</small>	
Source (Mark All That Apply <input checked="" type="checkbox"/>): Tank (DEP Assigned Nos. 006A, 029A, 034A, 035A, 036A, 037A, 046A) <input checked="" type="checkbox"/> <th style="width: 33%;">How Discovered (Mark All That Apply <input checked="" type="checkbox"/>): During Closure..... <input checked="" type="checkbox"/> <th style="width: 33%;">Environmental Media Affected and Impacts (Mark All That Apply <input checked="" type="checkbox"/>): Soil <input checked="" type="checkbox"/> </th></th>	How Discovered (Mark All That Apply <input checked="" type="checkbox"/>): During Closure..... <input checked="" type="checkbox"/> <th style="width: 33%;">Environmental Media Affected and Impacts (Mark All That Apply <input checked="" type="checkbox"/>): Soil <input checked="" type="checkbox"/> </th>	Environmental Media Affected and Impacts (Mark All That Apply <input checked="" type="checkbox"/>): Soil <input checked="" type="checkbox"/>
Piping System (Aboveground Regulated) <input checked="" type="checkbox"/>	Lining Installation..... <input type="checkbox"/>	Sediment <input type="checkbox"/>
Piping System (Underground Regulated)..... <input type="checkbox"/>	Routine Leak Detection <input type="checkbox"/>	Surface Water <input type="checkbox"/>
Piping System (Non-Regulated)..... <input type="checkbox"/>	Third Party Inspection..... <input type="checkbox"/>	Ground Water <input type="checkbox"/>
Dispenser/Dispensing Equipment <input type="checkbox"/>	Tightness Testing Activities <input type="checkbox"/>	Bedrock <input type="checkbox"/>
Spill Prevention Equipment..... <input type="checkbox"/>	Visible Product or Odor Reports <input type="checkbox"/>	Water Supplies <input type="checkbox"/>
Submersible Turbine Pump Head/Fittings..... <input type="checkbox"/>	Water in Tank..... <input type="checkbox"/>	Vapors/Product in Buildings <input type="checkbox"/>
Containment/Sump Failure <input type="checkbox"/>	Construction <input type="checkbox"/>	Vapors/Product in Sewer/Utility Lines <input type="checkbox"/>
Other (Specify) <input type="checkbox"/>	Upgrade/Repair <input type="checkbox"/>	Ecological Receptors..... <input type="checkbox"/>
Unknown <input type="checkbox"/>		

Cause (Mark All That Apply <input checkbox"="" checked="" type="checkbox>):</th> </tr> </thead> <tbody> <tr> <td>Faulty Installation..... <input type="/> <td>Supply Well Sample Results..... <input type="checkbox"/></td>		Supply Well Sample Results..... <input type="checkbox"/>
Corrosion..... <input type="checkbox"/>	Monitoring Well Sample Results..... <input type="checkbox"/>	
Physical/Mechanical Failure..... <input type="checkbox"/>	Property Transfer..... <input type="checkbox"/>	
Spill During Delivery..... <input type="checkbox"/>	Other (Specify) <u>Site Assessment Sampling</u> <input checked="" type="checkbox"/>	
Overfill at Delivery..... <input type="checkbox"/>	Unknown..... <input type="checkbox"/>	
Vehicle Gas Tank Overfill..... <input type="checkbox"/>		
Product Delivery Hose Rupture..... <input type="checkbox"/>		
Accident/Natural Disaster..... <input type="checkbox"/>		
Other (Specify)..... <input type="checkbox"/>		
Unknown..... <input type="checkbox"/>		

V. INTERIM REMEDIAL ACTIONS (O/O Only)

Indicate the Interim Remedial Actions Planned, Initiated or Completed (Mark All That Apply

	Planned	Initiated	Completed	Not Applicable
Regulated Substance Removed from Storage Tanks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fire, Explosion and Safety Hazards Mitigated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Contaminated Soil Excavated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free Product Recovered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water Supplies Identified and Sampled.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Temporary Water Supplies Provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other (Specify) <u>Site Characterization</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VI. SUSPECTED RELEASE / CONTAMINATION INFORMATION (Both O/O and I/I)

Date the Indication of a Suspected Release / Contamination was Observed: 08 / 24 / 2022
 m d y

Indication of Suspected Release / Contamination (Mark All That Apply

- Unusual Level of Vapors
- Erratic Behavior of Product Dispensing Equipment
- Release Detection Results Indicate a Release
- Discovery of Holes in the Storage Tank
- Containment Sump Test Failure
- Spill Prevention Equipment Test Failure
- Other (Specify) Site Assessment Sampling Results

VII. CONFIRMED CONTAMINATION INFORMATION (I/I Only)

Date the Confirmed Contamination was Observed: 08 / 24 / 2022
 m d y

Extent of Confirmed Contamination (Mark All That Apply

- Product Stained or Product Saturated Soil or Backfill
- Ponded Product
- Free Product or Sheen on Ponded Water
- Free Product or Sheen on the Ground Water Surface
- Free Product or Sheen on Surface Water
- Other (Specify) Site Assessment Sampling Results

VIII. ADDITIONAL INFORMATION (Both O/O and I/I)

Provide any additional, relevant, available information concerning the release or contamination. If reporting a confirmed release, include specific details about the source and cause of the release, the affected environmental media, and any impacts to water supplies, buildings, or sewer or other utility lines. Owners or Operators reporting a suspected release should describe what procedures were followed to investigate the indication(s) of the suspected release noted in Section VI. Provide both DEP-assigned and owner/operator-assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

Work is being performed at the Site in accordance with the Aboveground Storage Tank Closure Work Plan (AST Work Plan) (Terraphase 2021). The PADEP approved the AST Work Plan on April 23, 2021. Pursuant to the AST Work Plan, Site Assessment sampling is being performed in Tank Groups. This notification is provided to PADEP to report that the Site Assessment sampling performed in Tank Group 07 has identified chemical concentrations in soil at levels above applicable Statewide Health Medium Specific Concentrations (MSCs). The following chemicals were detected in soil samples at concentrations greater than the applicable MSCs: benzene, cumene, ethyl benzene, toluene, benzo(a)pyrene and lead. Site characterization will be performed to understand the nature and extent of these concentrations above MSCs and to further assess whether these conditions actually reflect a release to the environment from these ASTs.

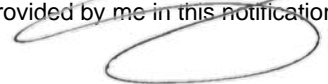
This notification is a follow-up to the previous incident reported in Tank Group 07 (Incident #57973). Pursuant to discussions with our PADEP case team, this and any subsequent notifications required in Tank Group 07 will be combined with the incident number #57973.

IX. CERTIFICATION (Both O/O and I/I)

OWNER OR OPERATOR CERTIFICATION

I, Anne R. Garr, Assistant Secretary, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.


Signature of Owner or Operator

08 / 25 / 2022
Date

CERTIFIED INSTALLER CERTIFICATION

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

Date

Installer Certification Number

Company Certification Number

CERTIFIED INSPECTOR CERTIFICATION

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Inspector

Date

Inspector Certification Number

Company Certification Number

NOTIFICATION OF RELEASE (*Owners and Operators*)

FACILITY I.D. NUMBER 51 - 33624

Initial
 Follow-Up

NOTIFICATION OF CONTAMINATION (*Certified Installers and Inspectors*)

INFORMATION FOR OWNERS AND OPERATORS (O/O)

The Storage Tank Program's Corrective Action Process (CAP) regulations establish requirements for owners and operators of storage tank systems and storage tank facilities to report confirmed releases and, in certain cases, suspected releases.

Suspected Release Reporting: Upon the completion of a suspected release investigation from which it could not be determined whether a release has occurred, the owner or operator must, within 15 days of the indication of the suspected release, complete and submit this form to the appropriate regional office of the Department (Subsection 245.304(c)(2)).

Confirmed Release Reporting: The owner or operator must notify the appropriate regional office of the Department by telephone as soon as practicable, but no later than 24 hours, after the confirmation of a release (Subsections 245.305(a) and (b)). Within 15 days of that telephone notification, the owner or operator must complete and submit this form to the appropriate regional office of the Department, to each municipality in which the release occurred, and to each municipality where that release has impacted environmental media or water supplies, buildings, or sewer or other utility lines (Subsections 245.305(c) and (e)). And if new impacts to environmental media or water supplies, buildings, or sewer or other utility lines are discovered after that initial written notification, the owner or operator must, within 15 days of the discovery of the new impact, complete and submit this form to the Department and to each impacted municipality (Subsections 245.305(d) and (e)).

INFORMATION FOR CERTIFIED INSTALLERS AND INSPECTORS (I/I)

In accordance with the Storage Tank Program's certification regulations, certified installers and inspectors must complete and submit this form to the Department within 48 hours of observing any of the following while performing services as a certified installer or inspector: a release of a regulated substance; suspected or confirmed contamination of soil, surface or groundwater from regulated substances; or a regulated substance in a containment structure or facility (Subsections 245.132(a)(4) and 245.132(a)(6)).

INSTRUCTIONS

Record the storage tank facility I.D. number at the top right-hand corner of each page of this form.

Owners and Operators (O/O): Indicate if this is an initial or follow-up notification by marking the appropriate box found in the top right-hand corner of this page.

- To report a Suspected Release, complete all information in Sections I, II, IIIA, IIIC, VI, VIII and IX.
- To report a Confirmed Release, complete all information in Sections I, II, IIIA, IIIB, IIIC, IV, V, VIII and IX.

Certified Installers and Inspectors (I/I): Complete all information in Sections I, II, IIIA, IIIC, VI or VII, VIII, and IX. Attach a copy of the failed, valid tightness test results, if applicable.

PLEASE SEND COMPLETED ORIGINAL FORM TO:

PA Department of Environmental Protection
Environmental Cleanup and Brownfields Program
Storage Tank Section

(and the appropriate address below, depending on where the FACILITY is located)

<p>Northwest Region 230 Chestnut Street Meadville, PA 16335-3481 PHONE: 814-332-6945 / 800-373-3398 FAX: 814-332-6121 Counties: Armstrong, Butler, Clarion, Crawford, Elk, Erie, Forest, Indiana, Jefferson, Lawrence, McKean, Mercer, Venango, Warren</p>	<p>North-central Region 208 W. Third Street, Suite 101 Williamsport, PA 17701 PHONE: 570-327-3636 FAX: 570-327-3420 Counties: Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union</p>	<p>Northeast Region 2 Public Square Wilkes-Barre, PA 18701-1915 PHONE: 570-826-2511 FAX: 570-820-4907 Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming</p>
<p>Southwest Region 400 Waterfront Drive Pittsburgh, PA 15222 PHONE: 412-442-4000 FAX: 412-442-4194 Counties: Allegheny, Beaver, Cambria, Fayette, Greene, Somerset, Washington, Westmoreland</p>	<p>South-central Region 909 Elmerton Avenue Harrisburg, PA 17110 PHONE: 717-705-4705 / 800-541-2050 FAX: 717-705-4830 Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York</p>	<p>Southeast Region 2 East Main Street Norristown, PA 19401 PHONE: 484-250-5900 FAX: 484-250-5961 Counties: Bucks, Chester, Delaware, Montgomery, Philadelphia</p>

I. FACILITY INFORMATION (Both O/O and I/I)	II. OWNER/OPERATOR INFORMATION (Both O/O and I/I)
Facility Name <u>Philadelphia Refinery Point Breeze</u> Facility I.D. Number <u>51-33624</u> Street Address (P.O. Box not acceptable) <u>3144 W. Passyunk Avenue</u> City <u>Philadelphia</u> State <u>PA</u> Zip Code <u>19141 - 5299</u> County <u>Philadelphia</u> Municipality <u>Philadelphia</u> Contact Person <u>Anne Garr</u> Telephone Number <u>(312) 796 - 6564</u>	Owner Name <u>Philadelphia Energy Solutions Refining and Marketing, LLC</u> Address <u>111 S. Wacker Dr, Suite 3000</u> City <u>Chicago</u> State <u>IL</u> Zip Code <u>60606 -</u> Telephone Number <u>(312) 796 - 6564</u> Operator Name <u>Anne Garr</u> Telephone Number <u>(312) 796 - 6564</u>

III. REGULATED SUBSTANCE INFORMATION

A. Type of Product(s) Involved (Mark All That Apply <input checked="" type="checkbox"/>): <u>Both O/O and I/I</u>	B. Quantity (Gallons) of Product(s) Released: <u>O/O Only</u>	C. Contamination Suspected [S] or Confirmed [C] (Mark All That Apply <input checked="" type="checkbox"/>): <u>Both O/O and I/I</u>
Leaded Gasoline <input type="checkbox"/> [S] [C]
Unleaded Gasoline <input type="checkbox"/> [S] [C]
Aviation Gasoline <input type="checkbox"/> [S] [C]
Kerosene <input type="checkbox"/> [S] [C]
Jet Fuel <input type="checkbox"/> [S] [C]
Diesel Fuel <input type="checkbox"/> [S] [C]
New Motor Oil <input type="checkbox"/> [S] [C]
Used Motor Oil <input type="checkbox"/> [S] [C]
Fuel Oil No. 1 <input type="checkbox"/> [S] [C]
Fuel Oil No. 2 <input type="checkbox"/> [S] [C]
Fuel Oil No. 4 <input type="checkbox"/> [S] [C]
Fuel Oil No. 5 <input type="checkbox"/> [S] [C]
Fuel Oil No. 6 <input type="checkbox"/> [S] [C]
Other (Specify) <u>Benzene, UDEX Feed</u> <input checked="" type="checkbox"/> <u>U N K N O W N</u> [S] <input checked="" type="checkbox"/> [C]
Unknown <input type="checkbox"/> [S] [C]

IV. CONFIRMED RELEASE INFORMATION (O/O Only)

Date Release was Confirmed: <u>08 / 10 / 2022</u> (m / d / y)	Date Owner/Operator Sent Copy of this Written Notification to Local Municipality(ies) and Name of Municipality(ies) Notified: Date: <u>08 / 19 / 2022</u> Municipality <u>Philadelphia</u> (m / d / y)
Date Owner/Operator Verbally Notified Appropriate Regional Office of Confirmed Release and Office Notified: Date: <u>08 / 10 / 2022</u> Office <u>Southeast Region</u> (m / d / y)	Date: _____ Municipality _____ (m / d / y)

Source (Mark All That Apply <input checked="" type="checkbox"/>):	How Discovered (Mark All That Apply <input checked="" type="checkbox"/>):	Environmental Media Affected and Impacts (Mark All That Apply <input checked="" type="checkbox"/>):
Tank (DEP Assigned Nos. <u>005A,007A,030A,039A</u>) <input checked="" type="checkbox"/>	During Closure..... <input checked="" type="checkbox"/>	Soil <input checked="" type="checkbox"/>
Piping System (Aboveground Regulated) <input checked="" type="checkbox"/>	Lining Installation..... <input type="checkbox"/>	Sediment <input type="checkbox"/>
Piping System (Underground Regulated)..... <input type="checkbox"/>	Routine Leak Detection <input type="checkbox"/>	Surface Water <input type="checkbox"/>
Piping System (Non-Regulated)..... <input type="checkbox"/>	Third Party Inspection..... <input type="checkbox"/>	Ground Water <input type="checkbox"/>
Dispenser/Dispensing Equipment..... <input type="checkbox"/>	Tightness Testing Activities <input type="checkbox"/>	Bedrock <input type="checkbox"/>
Spill Prevention Equipment..... <input type="checkbox"/>	Visible Product or Odor Reports <input type="checkbox"/>	Water Supplies <input type="checkbox"/>
Submersible Turbine Pump Head/Fittings..... <input type="checkbox"/>	Water in Tank..... <input type="checkbox"/>	Vapors/Product in Buildings <input type="checkbox"/>
Containment/Sump Failure <input type="checkbox"/>	Construction <input type="checkbox"/>	Vapors/Product in Sewer/Utility Lines <input type="checkbox"/>
Other (Specify) <input type="checkbox"/>	Upgrade/Repair <input type="checkbox"/>	Ecological Receptors..... <input type="checkbox"/>
Unknown <input type="checkbox"/>	Supply Well Sample Results..... <input type="checkbox"/>	
Cause (Mark All That Apply <input checked="" type="checkbox"/>):	Monitoring Well Sample Results <input type="checkbox"/>	
Faulty Installation..... <input type="checkbox"/>	Property Transfer..... <input type="checkbox"/>	
Corrosion..... <input type="checkbox"/>	Other (Specify) <u>Site Assessment Sampling</u> <input checked="" type="checkbox"/>	
Physical/Mechanical Failure..... <input type="checkbox"/>	Unknown <input type="checkbox"/>	
Spill During Delivery <input type="checkbox"/>		
Overfill at Delivery..... <input type="checkbox"/>		
Vehicle Gas Tank Overfill <input type="checkbox"/>		
Product Delivery Hose Rupture..... <input type="checkbox"/>		
Accident/Natural Disaster <input type="checkbox"/>		
Other (Specify) <input type="checkbox"/>		
Unknown <input type="checkbox"/>		

V. INTERIM REMEDIAL ACTIONS (O/O Only)

Indicate the Interim Remedial Actions Planned, Initiated or Completed (Mark All That Apply

	Planned	Initiated	Completed	Not Applicable
Regulated Substance Removed from Storage Tanks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fire, Explosion and Safety Hazards Mitigated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Contaminated Soil Excavated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free Product Recovered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water Supplies Identified and Sampled.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Temporary Water Supplies Provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other (Specify) <u>Site Characterization</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VI. SUSPECTED RELEASE / CONTAMINATION INFORMATION (Both O/O and I/I)

Date the Indication of a Suspected Release / Contamination was Observed: 08 / 10 / 2022
 m d y

Indication of Suspected Release / Contamination (Mark All That Apply

- Unusual Level of Vapors
- Erratic Behavior of Product Dispensing Equipment
- Release Detection Results Indicate a Release
- Discovery of Holes in the Storage Tank
- Containment Sump Test Failure
- Spill Prevention Equipment Test Failure
- Other (Specify) Site Assessment Sampling Results

VII. CONFIRMED CONTAMINATION INFORMATION (I/I Only)

Date the Confirmed Contamination was Observed: 08 / 10 / 2022
 m d y

Extent of Confirmed Contamination (Mark All That Apply

- Product Stained or Product Saturated Soil or Backfill
- Ponded Product
- Free Product or Sheen on Pondered Water
- Free Product or Sheen on the Ground Water Surface
- Free Product or Sheen on Surface Water
- Other (Specify) Site Assessment Sampling Results

VIII. ADDITIONAL INFORMATION (Both O/O and I/I)

Provide any additional, relevant, available information concerning the release or contamination. If reporting a confirmed release, include specific details about the source and cause of the release, the affected environmental media, and any impacts to water supplies, buildings, or sewer or other utility lines. Owners or Operators reporting a suspected release should describe what procedures were followed to investigate the indication(s) of the suspected release noted in Section VI. Provide both DEP-assigned and owner/operator-assigned tank number(s), where applicable. Use additional 8½" x 11" sheets of paper, if necessary.

Work is being performed at the Site in accordance with the Aboveground Storage Tank Closure Work Plan (AST Work Plan) (Terraphase 2021). The PADEP approved the AST Work Plan on April 23, 2021. Pursuant to the AST Work Plan, Site Assessment sampling is being performed in Tank Groups. This notification is provided to PADEP to report that the Site Assessment sampling performed in Tank Group 07 has identified chemical concentrations in soil at levels above applicable Statewide Health Medium Specific Concentrations (MSCs). The following chemicals were detected in soil samples at concentrations greater than the applicable MSCs: benzene and lead. Site characterization will be performed to understand the nature and extent of these concentrations above MSCs and to further assess whether these conditions actually reflect a release to the environment from these ASTs.

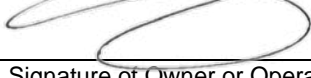
This notification is the initial incident reported in Tank Group 07 (Incident #57973). Pursuant to discussions with our PADEP case team, this and any subsequent notifications required in Tank Group 07 will be combined with the incident number #57973.

IX. CERTIFICATION (Both O/O and I/I)

OWNER OR OPERATOR CERTIFICATION

I, Anne R. Garr, Assistant Secretary, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the owner or operator of the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.


Signature of Owner or Operator

08 / 17 / 2022
Date

CERTIFIED INSTALLER CERTIFICATION

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified installer who performed tank handling activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Installer

Date

Installer Certification Number

Company Certification Number

CERTIFIED INSPECTOR CERTIFICATION

I, _____, hereby certify, under penalty of law as provided in 18 Pa.
(Print Name)

C.S.A. §4904 (relating to unsworn falsification to authorities) that I am the certified inspector who performed inspection activities at the above referenced storage tank facility and that the information provided by me in this notification is true, accurate and complete to the best of my knowledge and belief.

Signature of Certified Inspector

Date

Inspector Certification Number

Company Certification Number

Appendix I

Site Assessment and Site Characterization Soil and Groundwater Results



Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR1088-01	GPR1088-01	GPR1088-02	GPR1088-03	GPR1088-04	GPR1088-04	GPR1088-05	GPR1088-06
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR1088-01-SS01	DUP-50	GPR1088-02-SS01	GPR1088-03-SS01	GPR1088-04-SS01	DUP-51	GPR1088-05-SS01	GPR1088-06-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/3/2022	8/3/2022	8/3/2022	8/3/2022
Comments					Field Duplicate				Field Duplicate			
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	NA	NA	NA	NA	NA
m,p-xylene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
ortho-xylene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	8.5	8	8	8	6.2	6.1	8.9	6.7
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR1116-01	GPR1116-02	GPR1116-03	GPR1116-04	GPR1116-05	GPR1116-05	GPR1116-06	GPR1116-07
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR1116-01-SS01	GPR1116-02-SS01	GPR1116-03-SS01	GPR1116-04-SS01	GPR1116-05-SS01	DUP-48	GPR1116-06-SS01	GPR1116-07-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.0 - 3.5	3.5 - 4.0	4.5 - 5.0	4.5 - 5.0	2.0 - 2.5	3.0 - 3.5	3.0 - 3.5	2.5 - 3.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					7/18/2022	7/18/2022	7/18/2022	7/18/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022
Comments	Field Duplicate											
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	ND (0.00073)	0.017 (0.00092)	0.0012 (0.00072)	0.00056 J (0.00059)	0.053 (0.047)	ND (0.00088)	ND (0.38)	0.037 J (0.046)
Cumene	1000	6.1	87	1000	0.028 (0.0015)	0.0091 (0.0018)	0.015 (0.0014)	0.024 (0.0012)	0.8 (0.094)	0.004 (0.0018)	<u>18 (0.77)</u>	<u>8.4 (0.093)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00073)	ND (0.00092)	ND (0.00072)	ND (0.00059)	ND (0.047)	ND (0.00088)	ND (0.38)	ND (0.046)
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0015)	ND (0.0018)	ND (0.0014)	ND (0.0012)	ND (0.094)	ND (0.0018)	ND (0.77)	ND (0.093)
Ethyl Benzene	2300	15	1300	820	0.0012 J (0.0015)	0.0031 (0.0018)	0.0004 J (0.0014)	0.001 J (0.0012)	0.022 J (0.094)	ND (0.0018)	0.19 J (0.77)	0.087 J (0.093)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0029)	ND (0.0037)	ND (0.0029)	ND (0.0023)	ND (0.19)	ND (0.0035)	ND (1.5)	ND (0.18)
Toluene	8000	76	650	9800	0.00081 J (0.0015)	0.02 (0.0018)	0.0008 J (0.0014)	0.0017 (0.0012)	0.078 J (0.094)	ND (0.0018)	ND (0.77)	0.17 (0.093)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.026 (0.0029)	0.029 (0.0037)	0.0095 (0.0029)	0.022 (0.0023)	0.78 (0.19)	0.0038 (0.0035)	<u>1.2 J (1.5)</u>	<u>2.7 (0.18)</u>
1,3,5-Trimethylbenzene	220	0.92	99	240	0.016 (0.0029)	0.00097 J (0.0037)	0.00056 J (0.0029)	0.0089 (0.0023)	ND (0.19)	0.0012 J (0.0035)	0.15 J (1.5)	0.12 J (0.18)
m,p-xylene	--	--	--	--	0.03 (0.0029)	0.016 (0.0037)	0.00085 J (0.0029)	0.0082 (0.0023)	0.063 J (0.19)	0.0011 J (0.0035)	0.92 J (1.5)	0.3 (0.18)
ortho-xylene	--	--	--	--	0.012 (0.0015)	0.0055 (0.0018)	0.0031 (0.0014)	0.0068 (0.0012)	0.056 J (0.094)	0.0016 J (0.0018)	0.24 J (0.77)	0.13 (0.093)
Xylenes (total)	240	1.5	51	340	0.042 (0.0015)	0.022 (0.0018)	0.004 J (0.0014)	0.015 (0.0012)	0.12 J (0.094)	0.0027 J (0.0018)	1.2 J (0.77)	0.43 (0.093)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	0.14 J (0.15)	0.34 (0.18)	0.3 (0.14)	0.28 (0.12)	0.055 J (0.13)	ND (0.14)	0.18 (0.12)	ND (6.6)
Benzo(a)anthracene	430	--	3200	--	0.38 (0.15)	0.81 (0.18)	0.39 (0.14)	0.49 (0.12)	0.24 (0.13)	0.04 J (0.14)	0.27 (0.12)	ND (6.6)
Benzo(a)pyrene	43	--	7.7	--	0.58 (0.2)	1.2 (0.24)	0.42 (0.19)	0.66 (0.16)	0.4 (0.17)	ND (0.18)	0.41 (0.16)	ND (8.8)
Benzo(b)fluoranthene	430	--	3200	--	0.57 (0.15)	1.1 (0.18)	0.49 (0.14)	0.67 (0.12)	0.42 (0.13)	0.042 J (0.14)	0.44 (0.12)	ND (6.6)
Benzo(g,h,i)perylene	4600	--	14000	--	0.33 (0.2)	0.54 (0.24)	0.22 (0.19)	0.52 (0.16)	0.26 (0.17)	0.028 J (0.18)	0.31 (0.16)	ND (8.8)
Chrysene	43000	--	320000	--	0.42 (0.15)	0.92 (0.18)	0.77 (0.14)	0.52 (0.12)	0.27 (0.13)	0.044 J (0.14)	0.3 (0.12)	ND (6.6)
Fluorene	6200	--	18000	--	0.11 J (0.24)	0.35 (0.3)	0.75 (0.24)	0.16 J (0.2)	0.056 J (0.22)	0.087 J (0.23)	0.22 (0.2)	1.4 J (11)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>0.94 (0.24)</u>	<u>2 (0.3)</u>	0.52 (0.24)	<u>2.8 (0.2)</u>	0.35 (0.22)	0.16 J (0.23)	<u>1.1 (0.2)</u>	ND (11)
Phenanthrene	4600	--	14000	--	0.32 (0.15)	0.94 (0.18)	1.5 (0.14)	0.52 (0.12)	0.15 (0.13)	0.19 (0.14)	0.67 (0.12)	2.8 J (6.6)
Pyrene	4600	--	14000	--	0.49 (0.15)	1.2 (0.18)	0.68 (0.14)	0.54 (0.12)	0.21 (0.13)	0.1 J (0.14)	0.55 (0.12)	ND (6.6)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	19.4 (2.87)	97.8 (3.52)	1360 (2.83)	20.2 (2.31)	67.9 (2.49)	206 (13.4)	104 (2.25)	119 (2.25)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR1116-08	GPR1116-08R	GPR1116-08R	GPR1116-09	GPR1116-10	GPR1116-11	GPR1116-12	GPR1116-13
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR1116-08-SS01	TG07-MW-03-3.0-3.5	TG07-MW-03-3.0-3.5D	GPR1116-09-SS01	GPR1116-10-SS01	GPR1116-11-SS01	GPR1116-12-SS01	GPR1116-13-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	1.5 - 2.0	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5	2.0 - 2.5	3.0 - 3.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/1/2022	12/21/2022	12/21/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022
Comments	Field Duplicate											
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>28 (0.19)</u>	0.036 (0.00052)	ND (0.0005)	ND (0.00051)	0.0003 J (0.00051)	ND (0.041)	0.052 (0.033)	0.00064 J (0.00065)
Cumene	1000	6.1	87	1000	0.022 J (0.078)	0.0068 (0.001)	0.0074 (0.00099)	0.00064 J (0.001)	0.00054 J (0.001)	0.068 J (0.083)	3.8 (0.066)	0.0034 (0.0013)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.039)	NA	NA	ND (0.00051)	ND (0.00051)	ND (0.041)	ND (0.033)	ND (0.00065)
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.078)	NA	NA	ND (0.001)	ND (0.001)	ND (0.083)	ND (0.066)	ND (0.0013)
Ethyl Benzene	2300	15	1300	820	0.34 (0.078)	ND (0.001)	ND (0.00099)	ND (0.001)	0.00022 J (0.001)	0.015 J (0.083)	0.12 (0.066)	0.0011 J (0.0013)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.16)	ND (0.0021)	ND (0.002)	ND (0.002)	ND (0.002)	ND (0.16)	ND (0.13)	ND (0.0026)
Toluene	8000	76	650	9800	6.8 (0.078)	ND (0.001)	ND (0.00099)	ND (0.001)	0.00084 J (0.001)	ND (0.083)	0.29 (0.066)	0.0029 (0.0013)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.1 J (0.16)	0.0026 (0.0021)	0.0018 J (0.002)	ND (0.002)	0.00072 J (0.002)	ND (0.16)	<u>16 (0.13)</u>	0.0048 (0.0026)
1,3,5-Trimethylbenzene	220	0.92	99	240	0.025 J (0.16)	ND (0.0021)	ND (0.002)	ND (0.002)	0.00025 J (0.002)	ND (0.16)	<u>3.8 (0.13)</u>	0.0018 J (0.0026)
m,p-xylene	--	--	--	--	1 (0.16)	0.001 J (0.0021)	0.00099 J (0.002)	ND (0.002)	0.001 J (0.002)	0.084 J (0.16)	1.1 (0.13)	0.0086 (0.0026)
ortho-xylene	--	--	--	--	0.075 J (0.078)	0.00084 J (0.001)	0.00087 J (0.00099)	ND (0.001)	0.00056 J (0.001)	0.026 J (0.083)	0.16 (0.066)	0.0056 (0.0013)
Xylenes (total)	240	1.5	51	340	1.1 J (0.078)	0.0018 J (0.001)	0.0019 J (0.00099)	ND (0.001)	0.0016 J (0.001)	0.11 J (0.083)	1.3 (0.066)	0.014 (0.0013)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	ND (0.12)	NA	NA	ND (0.12)	0.22 (0.13)	0.039 J (0.12)	0.45 (0.11)	0.48 (0.12)
Benzo(a)anthracene	430	--	3200	--	0.029 J (0.12)	NA	NA	ND (0.12)	0.4 (0.13)	0.13 (0.12)	0.34 (0.11)	0.85 (0.12)
Benzo(a)pyrene	43	--	7.7	--	ND (0.17)	0.067 J (0.15)	0.085 J (0.15)	ND (0.16)	1.4 (0.17)	0.17 (0.16)	0.62 (0.15)	0.97 (0.16)
Benzo(b)fluoranthene	430	--	3200	--	0.035 J (0.12)	NA	NA	ND (0.12)	1.2 (0.13)	0.18 (0.12)	0.68 (0.11)	0.92 (0.12)
Benzo(g,h,i)perylene	4600	--	14000	--	ND (0.17)	NA	NA	ND (0.16)	0.94 (0.17)	0.092 J (0.16)	0.31 (0.15)	0.45 (0.16)
Chrysene	43000	--	320000	--	0.03 J (0.12)	NA	NA	ND (0.12)	0.52 (0.13)	0.16 (0.12)	0.92 (0.11)	0.86 (0.12)
Fluorene	6200	--	18000	--	0.024 J (0.21)	NA	NA	ND (0.2)	0.14 J (0.22)	0.036 J (0.2)	1.2 (0.19)	0.53 (0.21)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.21)	0.081 (0.038)	0.098 (0.038)	ND (0.2)	<u>2.2 (0.22)</u>	0.16 J (0.2)	0.32 (0.19)	<u>1.3 (0.21)</u>
Phenanthrene	4600	--	14000	--	0.062 J (0.12)	NA	NA	ND (0.12)	0.34 (0.13)	0.083 J (0.12)	1.6 (0.11)	1.5 (0.12)
Pyrene	4600	--	14000	--	0.041 J (0.12)	NA	NA	ND (0.12)	0.38 (0.13)	0.16 (0.12)	0.62 (0.11)	1.5 (0.12)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	85.3 (12.2)	NA	NA	40.8 (2.31)	13.9 (2.48)	193 (2.3)	97.5 (2.15)	375 (2.37)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR1116-14	GPR1116-15	GPR1117-01	GPR1117-02	GPR1117-03	GPR1117-03R	GPR1117-04	GPR1117-05
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR1116-14-SS01	GPR1116-15-SS01	GPR1117-01-SS01	GPR1117-02-SS01	GPR1117-03-SS01	GPR1117-03R-0.0-0.5	GPR1117-04-SS01	GPR1117-05-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.5 - 4.0	1.5 - 2.0	4.5 - 5.0	4.0 - 4.5	3.5 - 4.0	0.0 - 0.5	4.5 - 5.0	4.0 - 4.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/1/2022	8/1/2022	7/18/2022	7/18/2022	7/18/2022	1/3/2023	7/18/2022	7/18/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.0012 (0.00093)	0.05 J (0.097)	ND (0.00087)	ND (0.00083)	0.00024 J (0.00071)	0.00032 J (0.0005)	0.11 J (0.28)	0.0011 (0.0011)
Cumene	1000	6.1	87	1000	0.02 (0.0019)	1.1 (0.19)	0.0055 (0.0017)	0.001 J (0.0017)	0.00049 J (0.0014)	0.11 (0.00099)	3.7 (0.56)	ND (0.0022)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00093)	ND (0.097)	ND (0.00087)	ND (0.00083)	ND (0.00071)	NA	ND (0.28)	ND (0.0011)
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0019)	ND (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	NA	ND (0.56)	ND (0.0022)
Ethyl Benzene	2300	15	1300	820	0.00041 J (0.0019)	0.27 (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	ND (0.00099)	0.23 J (0.56)	ND (0.0022)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0037)	ND (0.39)	ND (0.0035)	ND (0.0033)	ND (0.0028)	ND (0.002)	ND (1.1)	ND (0.0044)
Toluene	8000	76	650	9800	ND (0.0019)	0.35 (0.19)	ND (0.0017)	ND (0.0017)	ND (0.0014)	ND (0.00099)	0.34 J (0.56)	ND (0.0022)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.0014 J (0.0037)	<u>2.6 (0.39)</u>	0.0023 J (0.0035)	0.0017 J (0.0033)	0.00085 J (0.0028)	ND (0.002)	<u>1.3 (1.1)</u>	ND (0.0044)
1,3,5-Trimethylbenzene	220	0.92	99	240	0.0012 J (0.0037)	0.38 J (0.39)	0.0016 J (0.0035)	0.0015 J (0.0033)	ND (0.0028)	ND (0.002)	0.41 J (1.1)	ND (0.0044)
m,p-xylene	--	--	--	--	0.0012 J (0.0037)	1.1 (0.39)	ND (0.0035)	ND (0.0033)	ND (0.0028)	ND (0.002)	0.92 J (1.1)	ND (0.0044)
ortho-xylene	--	--	--	--	0.0013 J (0.0019)	0.27 (0.19)	0.0014 J (0.0017)	0.00098 J (0.0017)	0.00048 J (0.0014)	ND (0.00099)	0.2 J (0.56)	ND (0.0022)
Xylenes (total)	240	1.5	51	340	0.0025 J (0.0019)	1.4 (0.19)	0.0014 J (0.0017)	0.00098 J (0.0017)	0.00048 J (0.0014)	ND (0.00099)	1.1 J (0.56)	ND (0.0022)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	0.18 (0.16)	1.3 (0.14)	0.22 (0.17)	0.29 (0.14)	1.4 (0.14)	NA	0.96 (0.12)	0.54 (0.22)
Benzo(a)anthracene	430	--	3200	--	0.42 (0.16)	3.7 (0.14)	0.72 (0.17)	0.76 (0.14)	0.88 (0.14)	NA	2.9 (0.12)	0.67 (0.22)
Benzo(a)pyrene	43	--	7.7	--	0.43 (0.22)	5.2 (0.18)	1 (0.22)	1.1 (0.19)	0.84 (0.19)	0.76 (0.16)	3.1 (0.16)	0.64 (0.3)
Benzo(b)fluoranthene	430	--	3200	--	0.44 (0.16)	5.1 (0.14)	0.97 (0.17)	1 (0.14)	0.79 (0.14)	NA	3.4 (0.12)	0.75 (0.22)
Benzo(g,h,i)perylene	4600	--	14000	--	0.19 J (0.22)	3.8 (0.18)	0.5 (0.22)	0.58 (0.19)	0.41 (0.19)	NA	1.6 (0.16)	0.36 (0.3)
Chrysene	43000	--	320000	--	0.36 (0.16)	3.7 (0.14)	0.79 (0.17)	0.88 (0.14)	1 (0.14)	NA	2.8 (0.12)	0.66 (0.22)
Fluorene	6200	--	18000	--	0.74 (0.27)	0.52 (0.23)	0.26 J (0.28)	0.27 (0.24)	2.7 (0.24)	NA	1 (0.2)	0.19 J (0.37)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.37 (0.27)	<u>3.9 (0.23)</u>	<u>1.1 (0.28)</u>	<u>2 (0.24)</u>	<u>6.3 (0.24)</u>	0.46 (0.039)	<u>2 (0.2)</u>	0.32 J (0.37)
Phenanthrene	4600	--	14000	--	1.5 (0.16)	2.8 (0.14)	0.86 (0.17)	0.8 (0.14)	8.9 (0.14)	NA	3.5 (0.12)	1.2 (0.22)
Pyrene	4600	--	14000	--	0.62 (0.16)	4.3 (0.14)	1.2 (0.17)	1.5 (0.14)	3.2 (0.14)	NA	4.8 (0.12)	1.1 (0.22)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	60.2 (3.22)	189 (2.68)	157 (6.55)	125 (5.59)	133 (5.8)	NA	66.9 (2.44)	619 (4.42)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR1117-06	GPR1117-07	GPR1117-08	GPR494-01	GPR494-02	GPR494-03	GPR494-04	GPR494-05
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR1117-06-SS01	GPR1117-07-SS01	GPR1117-08-SS01	GPR494-01-SS01	GPR494-02-SS01	GPR494-03-SS01	GPR494-04-SS01	GPR494-05-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	1.5 - 2.0	4.0 - 4.5	2.5 - 3.0	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					7/18/2022	7/18/2022	7/18/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.0012 (0.00094)	0.00049 J (0.00097)	0.0054 (0.00059)	ND (0.025)	0.037 (0.036)	0.0004 J (0.00048)	0.00036 J (0.00061)	ND (0.068)
Cumene	1000	6.1	87	1000	0.0012 J (0.0019)	ND (0.0019)	0.00028 J (0.0012)	ND (0.049)	0.63 (0.072)	0.034 (0.00096)	0.0072 (0.0012)	2.1 (0.14)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00094)	ND (0.00097)	ND (0.00059)	ND (0.025)	ND (0.036)	ND (0.00048)	ND (0.00061)	ND (0.068)
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0019)	ND (0.0019)	ND (0.0012)	ND (0.049)	ND (0.072)	ND (0.00096)	ND (0.0012)	ND (0.14)
Ethyl Benzene	2300	15	1300	820	ND (0.0019)	ND (0.0019)	ND (0.0012)	0.022 J (0.049)	0.064 J (0.072)	0.0012 (0.00096)	0.001 J (0.0012)	0.046 J (0.14)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0038)	ND (0.0039)	ND (0.0024)	ND (0.099)	ND (0.14)	ND (0.0019)	ND (0.0024)	ND (0.27)
Toluene	8000	76	650	9800	0.002 (0.0019)	ND (0.0019)	ND (0.0012)	ND (0.049)	0.047 J (0.072)	0.00082 J (0.00096)	0.0011 J (0.0012)	0.089 J (0.14)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.009 (0.0038)	ND (0.0039)	ND (0.0024)	0.22 (0.099)	0.061 J (0.14)	0.0017 J (0.0019)	0.001 J (0.0024)	0.15 J (0.27)
1,3,5-Trimethylbenzene	220	0.92	99	240	0.0025 J (0.0038)	ND (0.0039)	ND (0.0024)	0.06 J (0.099)	ND (0.14)	0.0004 J (0.0019)	0.0074 (0.0024)	ND (0.27)
m,p-xylene	--	--	--	--	0.0036 J (0.0038)	ND (0.0039)	ND (0.0024)	0.078 J (0.099)	0.078 J (0.14)	0.0064 (0.0019)	0.0027 (0.0024)	0.16 J (0.27)
ortho-xylene	--	--	--	--	0.0012 J (0.0019)	ND (0.0019)	ND (0.0012)	0.038 J (0.049)	0.14 (0.072)	0.0068 (0.00096)	0.0041 (0.0012)	0.086 J (0.14)
Xylenes (total)	240	1.5	51	340	0.0048 J (0.0019)	ND (0.0019)	ND (0.0012)	0.12 J (0.049)	0.22 J (0.072)	0.013 (0.00096)	0.0068 (0.0012)	0.25 J (0.14)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	0.22 (0.14)	0.098 J (0.17)	0.3 (0.13)	4.8 (1.1)	7.1 (1.1)	4 (0.54)	0.59 (0.56)	4.7 (1.2)
Benzo(a)anthracene	430	--	3200	--	0.53 (0.14)	0.26 (0.17)	0.59 (0.13)	9.7 (1.1)	20 (1.1)	7.8 (0.54)	3.9 (0.56)	11 (1.2)
Benzo(a)pyrene	43	--	7.7	--	0.72 (0.19)	0.3 (0.22)	0.54 (0.17)	7.7 (1.4)	<i>18 (1.5)</i>	7.4 (0.72)	7.4 (0.75)	<i>8.7 (1.6)</i>
Benzo(b)fluoranthene	430	--	3200	--	0.76 (0.14)	0.36 (0.17)	0.61 (0.13)	3.7 (1.1)	8.4 (1.1)	3.6 (0.54)	4.6 (0.56)	3.9 (1.2)
Benzo(g,h,i)perylene	4600	--	14000	--	0.49 (0.19)	0.2 J (0.22)	0.26 (0.17)	2.5 (1.4)	7 (1.5)	2.4 (0.72)	3.5 (0.75)	2.7 (1.6)
Chrysene	43000	--	320000	--	0.74 (0.14)	0.27 (0.17)	0.58 (0.13)	13 (1.1)	34 (1.1)	14 (0.54)	9.7 (0.56)	16 (1.2)
Fluorene	6200	--	18000	--	0.12 J (0.24)	0.11 J (0.28)	0.12 J (0.21)	5.2 (1.8)	9 (1.9)	4.8 (0.91)	0.57 J (0.93)	8.1 (2)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>1.2 (0.24)</u>	0.45 (0.28)	0.14 J (0.21)	<u>1.3 J (1.8)</u>	<u>1.4 J (1.9)</u>	ND (0.91)	0.36 J (0.93)	<u>0.94 J (2)</u>
Phenanthrene	4600	--	14000	--	0.52 (0.14)	0.39 (0.17)	1.1 (0.13)	30 (1.1)	71 (1.1)	29 (0.54)	1.1 (0.56)	36 (1.2)
Pyrene	4600	--	14000	--	0.76 (0.14)	0.39 (0.17)	1 (0.13)	11 (1.1)	39 (1.1)	20 (0.54)	8.6 (0.56)	15 (1.2)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	687 (2.85)	981 (3.24)	20.4 (2.46)	517 (2.11)	90.3 (2.21)	12.9 (2.12)	238 (2.14)	32 (2.37)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR494-06	GPR494-07	GPR494-08	GPR494-08R	GPR494-09	GPR790-01	GPR790-02	GPR790-03
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR494-06-SS01	GPR494-07-SS01	GPR494-08-SS01	TG07-MW-01-0.0-0.5	GPR494-09-SS01	GPR790-01-SS01	GPR790-02-SS01	GPR790-03-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	4.5 - 5.0	4.5 - 5.0	3.0 - 3.5	0.0 - 0.5	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/2/2022	8/2/2022	8/2/2022	12/21/2022	8/2/2022	8/1/2022	8/1/2022	8/1/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.00059 (0.00056)	0.0005 J (0.00059)	0.016 (0.0006)	0.0088 (0.00043)	ND (0.00069)	520 (3.4)	130 (0.3)	2.8 (0.26)
Cumene	1000	6.1	87	1000	0.0091 (0.0011)	0.14 (0.0012)	0.0029 (0.0014)	ND (0.00086)	ND (0.0014)	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00056)	ND (0.00059)	ND (0.0006)	NA	ND (0.00069)	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0011)	ND (0.0012)	ND (0.0012)	NA	ND (0.0014)	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.00067 J (0.0011)	0.0028 (0.0012)	0.0036 (0.0012)	ND (0.00086)	ND (0.0014)	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0022)	ND (0.0024)	ND (0.0024)	ND (0.0017)	ND (0.0028)	NA	NA	NA
Toluene	8000	76	650	9800	0.0012 (0.0011)	0.0043 (0.0012)	0.0057 (0.0012)	ND (0.00086)	ND (0.0014)	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	0.002 J (0.0022)	0.018 (0.0024)	0.012 (0.0028)	ND (0.0017)	ND (0.0028)	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0022)	0.0025 (0.0024)	0.0039 (0.0028)	ND (0.0017)	ND (0.0028)	NA	NA	NA
m,p-xylene	--	--	--	--	0.0032 (0.0022)	0.041 (0.0024)	0.012 (0.0024)	0.00084 J (0.0017)	ND (0.0028)	NA	NA	NA
ortho-xylene	--	--	--	--	0.0052 (0.0011)	0.02 (0.0012)	0.0083 (0.0012)	0.00071 J (0.00086)	ND (0.0014)	NA	NA	NA
Xylenes (total)	240	1.5	51	340	0.0084 (0.0011)	0.061 (0.0012)	0.02 (0.0012)	0.0016 J (0.00086)	ND (0.0014)	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	1.8 (1.1)	2.8 (0.58)	23 (4)	NA	0.13 (0.12)	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	2.8 (1.1)	3.5 (0.58)	71 (4)	NA	0.73 (0.12)	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	2.1 (1.4)	2.7 (0.78)	54 (5.4)	0.62 (0.46)	1.1 (0.16)	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	1.2 (1.1)	1.1 (0.58)	28 (4)	NA	1.2 (0.12)	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	0.75 J (1.4)	0.7 J (0.78)	18 (5.4)	NA	0.51 (0.16)	NA	NA	NA
Chrysene	43000	--	320000	--	3.1 (1.1)	7 (0.58)	170 (4)	NA	0.7 (0.12)	NA	NA	NA
Fluorene	6200	--	18000	--	1.4 J (1.8)	6.6 (0.98)	11 (6.7)	NA	0.03 J (0.2)	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.42 J (1.8)	ND (0.98)	4.8 J (6.7)	ND (0.11)	0.059 J (0.2)	NA	NA	NA
Phenanthrene	4600	--	14000	--	7.6 (1.1)	30 (0.58)	110 (4)	NA	0.45 (0.12)	NA	NA	NA
Pyrene	4600	--	14000	--	2.3 (1.1)	7.8 (0.58)	130 (4)	NA	0.84 (0.12)	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	78.1 (2.06)	19.3 (2.28)	114 (2.26)	NA	70.9 (2.36)	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR790-04	GPR790-05	GPR790-05R	GPR790-05R	GPR790-06	GPR790-07	GPR790-08	GPR791-01
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR790-04-SS01	GPR790-05-SS01	TG07-MW-05-4.0-4.5	TG07-MW-05-4.5-5.0	GPR790-06-SS01	GPR790-07-SS01	GPR790-08-0.0-0.5	GPR791-01-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.0 - 3.5	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	0.0 - 0.5	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/1/2022	8/1/2022	12/21/2022	12/21/2022	8/1/2022	8/1/2022	1/3/2023	8/1/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.2 J (0.59)	3000 (26)	2300 (5.9)	1700 (4.9)	4.6 (0.42)	34 (6.5)	0.00076 (0.00051)	1200 (2.4)
Cumene	1000	6.1	87	1000	NA	NA	240 (12)	99 (4.9)	NA	NA	0.0063 (0.001)	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	NA	NA	25 (12)	12 (4.9)	NA	NA	0.00019 J (0.001)	NA
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	ND (24)	ND (9.9)	NA	NA	ND (0.002)	NA
Toluene	8000	76	650	9800	NA	NA	350 (12)	230 (4.9)	NA	NA	0.00074 J (0.001)	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	65 (24)	27 (9.9)	NA	NA	0.00039 J (0.002)	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	33 (24)	14 (9.9)	NA	NA	ND (0.002)	NA
m,p-xylene	--	--	--	--	NA	NA	120 (24)	57 (9.9)	NA	NA	0.00068 J (0.002)	NA
ortho-xylene	--	--	--	--	NA	NA	21 (12)	9.2 (4.9)	NA	NA	ND (0.001)	NA
Xylenes (total)	240	1.5	51	340	NA	NA	140 (0.12)	66 (4.9)	NA	NA	0.00068 J (0.001)	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	NA	ND (0.77)	ND (0.77)	NA	NA	0.47 (0.16)	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	NA	7.5 (0.19)	5 (0.19)	NA	NA	0.036 J (0.04)	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR791-02	GPR791-03	GPR791-04	GPR791-04R	GPR791-04R	GPR791-05	GPR791-06	GPR791-07
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR791-02-SS01	GPR791-03-SS01	GPR791-04-SS01	TG07-MW-06-4.0-4.5	TG07-MW-06-4.5-5.0	GPR791-05-SS01	GPR791-06-SS01	GPR791-07-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.5 - 4.0	4.0 - 4.5	3.0 - 3.5	4.0 - 4.5	4.5 - 5.0	3.0 - 3.5	3.0 - 3.5	3.0 - 3.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/1/2022	8/1/2022	8/1/2022	12/22/2022	12/22/2022	8/1/2022	8/1/2022	8/1/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>4 J (4.5)</u>	160 (0.49)	1300 (5)	170 (6.2)	140 (3)	<u>9.8 (0.6)</u>	380 (1.8)	<u>13 (0.29)</u>
Cumene	1000	6.1	87	1000	NA	NA	NA	3400 (12)	1900 (12)	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	NA	NA	NA	2.7 (0.62)	1 J (6)	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	NA	NA	NA	ND (1.2)	ND (12)	NA	NA	NA
Toluene	8000	76	650	9800	NA	NA	NA	3.6 (0.62)	3.8 J (6)	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	NA	NA	<u>4.9 (1.2)</u>	<u>2.8 J (12)</u>	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	NA	NA	0.28 J (1.2)	ND (12)	NA	NA	NA
m,p-xylene	--	--	--	--	NA	NA	NA	2.1 (1.2)	ND (12)	NA	NA	NA
ortho-xylene	--	--	--	--	NA	NA	NA	0.53 J (0.62)	ND (6)	NA	NA	NA
Xylenes (total)	240	1.5	51	340	NA	NA	NA	<u>2.6 J (0.62)</u>	ND (6)	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	NA	NA	0.18 (0.15)	ND (0.73)	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	NA	NA	<u>5.4 (0.037)</u>	0.37 (0.18)	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR791-08	GPR791-09	GPR791-09	GPR792-01	GPR792-02	GPR792-02	GPR792-03	GPR792-03R
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR791-08-SS01	GPR791-09-0.0-0.5	GPR791-09-2.0-2.5	GPR792-01-SS01	GPR792-02-SS01	DUP-49	GPR792-03-SS01	GPR792-03R-1.5-2.0
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	4.0 - 4.5	0.0 - 0.5	2.0 - 2.5	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	1.5 - 2.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					8/1/2022	1/3/2023	1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/2/2022	1/3/2023
Comments	Field Duplicate											
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>7.1 (0.36)</u>	0.0046 (0.00041)	0.0035 (0.00049)	NA	NA	NA	NA	0.32 (0.14)
Cumene	1000	6.1	87	1000	NA	0.14 (0.00081)	0.0043 (0.00099)	2400 (15)	4700 (49)	4700 (59)	12000 (88)	160 (0.56)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	NA	0.00061 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	0.06 J (0.28)
Methyl tert-butyl ether	2400	16	390	5900	NA	ND (0.0016)	ND (0.002)	NA	NA	NA	NA	ND (0.56)
Toluene	8000	76	650	9800	NA	0.0045 (0.00081)	0.00064 J (0.00099)	NA	NA	NA	NA	ND (0.28)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	0.00067 J (0.0016)	ND (0.002)	NA	NA	NA	NA	0.12 J (0.56)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	0.00028 J (0.0016)	ND (0.002)	NA	NA	NA	NA	0.067 J (0.56)
m,p-xylene	--	--	--	--	NA	0.0021 (0.0016)	ND (0.002)	NA	NA	NA	NA	ND (0.56)
ortho-xylene	--	--	--	--	NA	0.00045 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	ND (0.28)
Xylenes (total)	240	1.5	51	340	NA	0.0026 J (0.00081)	ND (0.00099)	NA	NA	NA	NA	ND (0.28)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	0.51 (0.14)	ND (0.15)	NA	NA	NA	NA	ND (0.75)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	0.12 (0.036)	ND (0.037)	NA	NA	NA	NA	ND (0.19)
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR792-03R	GPR792-04	GPR792-05	GPR792-06	GPR792-07	GPR793-01	GPR793-02	GPR793-03
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR792-03R-2.0-2.5	GPR792-04-SS01	GPR792-05-SS01	GPR792-06-SS01	GPR792-07-SS01	GPR793-01-SS01	GPR793-02-SS01	GPR793-03-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	2.0 - 2.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.0 - 4.5	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022	8/2/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	0.46 (0.12)	NA	NA	NA	NA	NA	NA	NA
Cumene	1000	6.1	87	1000	<u>160 (1)</u>	5000 (54)	8900 (65)	4600 (70)	1400 (12)	5500 (92)	11000 (100)	15000 (120)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.052 J (0.25)	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.5)	NA	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	ND (0.25)	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	0.14 J (0.5)	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	0.074 J (0.5)	NA	NA	NA	NA	NA	NA	NA
m,p-xylene	--	--	--	--	ND (0.5)	NA	NA	NA	NA	NA	NA	NA
ortho-xylene	--	--	--	--	ND (0.25)	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (0.25)	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	ND (2.8)	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.71)	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR793-03R	GPR793-03R	GPR793-04	GPR793-05	GPR793-06	GPR794-01	GPR794-01R	GPR794-02
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR793-03R-2.5-3.0	GPR793-03R-3.0-3.5	GPR793-04-SS01	GPR793-05-SS01	GPR793-06-SS01	GPR794-01-SS01	GPR794-01R-SS01	GPR794-02-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	2.5 - 3.0	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	3.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					1/3/2023	1/3/2023	8/2/2022	8/2/2022	8/2/2022	8/3/2022	10/21/2022	8/3/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	ND (2.5)	ND (2.8)	NA	NA	NA	<u>2200 (14)</u>	NA	<u>2800 (8.3)</u>
Cumene	1000	6.1	87	1000	<u>1500 (50)</u>	<u>2200 (22)</u>	<u>14000 (110)</u>	<u>1900 (9.2)</u>	<u>1800 (11)</u>	<u>4000 (29)</u>	NA	<u>3000 (16)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	ND (1.2)	NA	ND (2.1)
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	ND (2.3)	NA	ND (4.1)
Ethyl Benzene	2300	15	1300	820	ND (5)	ND (5.6)	NA	NA	NA	<u>74 (2.3)</u>	NA	<u>26 (4.1)</u>
Methyl tert-butyl ether	2400	16	390	5900	ND (10)	ND (11)	NA	NA	NA	ND (4.6)	NA	ND (8.3)
Toluene	8000	76	650	9800	ND (5)	ND (5.6)	NA	NA	NA	<u>3400 (29)</u>	NA	<u>1200 (4.1)</u>
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (10)	ND (11)	NA	NA	NA	<u>32 (4.6)</u>	NA	<u>8.4 (8.3)</u>
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (10)	ND (11)	NA	NA	NA	<u>16 (4.6)</u>	NA	<u>3.9 J (8.3)</u>
m,p-xylene	--	--	--	--	ND (10)	ND (11)	NA	NA	NA	240 (4.6)	NA	86 (8.3)
ortho-xylene	--	--	--	--	ND (5)	ND (5.6)	NA	NA	NA	55 (2.3)	NA	25 (4.1)
Xylenes (total)	240	1.5	51	340	ND (5)	ND (5.6)	NA	NA	NA	<u>300 (2.3)</u>	NA	<u>110 (4.1)</u>
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	0.51 J (1.2)	NA	ND (1.3)
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	0.27 J (1.2)	NA	0.46 J (1.3)
Benzo(a)pyrene	43	--	7.7	--	ND (0.72)	ND (2.9)	NA	NA	NA	ND (1.5)	NA	ND (1.7)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	ND (1.2)	NA	0.47 J (1.3)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	ND (1.5)	NA	ND (1.7)
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	0.35 J (1.2)	NA	0.44 J (1.3)
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	2 (1.9)	NA	0.47 J (2.1)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	ND (0.18)	ND (0.73)	NA	NA	NA	<u>3.5 (1.9)</u>	NA	<u>1 J (2.1)</u>
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	8.7 (1.2)	NA	2.9 (1.3)
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	0.71 J (1.2)	NA	0.86 J (1.3)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	ND (9.5)	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	408 (2.32)	NA	347 (2.56)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR794-02R	GPR794-03	GPR794-03R	GPR794-04	GPR794-04R	GPR794-05	GPR794-05R	GPR794-06
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR794-02R-SS01	GPR794-03-SS01	GPR794-03R-SS01	GPR794-04-SS01	GPR794-04R-SS01	GPR794-05-SS01	GPR794-05R-SS01	GPR794-06-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	4.5 - 5.0	3.0 - 3.5	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	8/3/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	NA	0.41 (0.028)	NA	<u>7800 (43)</u>	NA	<u>2600 (13)</u>	NA	<u>2000 (5.9)</u>
Cumene	1000	6.1	87	1000	NA	0.38 (0.055)	NA	<u>12000 (87)</u>	NA	<u>2500 (27)</u>	NA	<u>4800 (59)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	ND (0.00045)	NA	ND (8.7)	NA	ND (1.7)	NA	ND (5.9)
1,2-Dichloroethane	16	0.11	8.1	33	NA	ND (0.0009)	NA	ND (17)	NA	ND (3.4)	NA	ND (12)
Ethyl Benzene	2300	15	1300	820	NA	0.02 (0.0009)	NA	<u>120 (17)</u>	NA	<u>31 (3.4)</u>	NA	<u>110 (12)</u>
Methyl tert-butyl ether	2400	16	390	5900	NA	ND (0.0018)	NA	ND (35)	NA	ND (6.7)	NA	ND (24)
Toluene	8000	76	650	9800	NA	0.21 (0.055)	NA	<u>6100 (87)</u>	NA	<u>1800 (27)</u>	NA	<u>4300 (59)</u>
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	0.004 (0.0018)	NA	<u>79 (35)</u>	NA	<u>7.7 (6.7)</u>	NA	<u>48 (24)</u>
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	0.0024 (0.0018)	NA	<u>35 (35)</u>	NA	<u>3.5 J (6.7)</u>	NA	<u>23 J (24)</u>
m,p-xylene	--	--	--	--	NA	0.06 (0.0018)	NA	430 (35)	NA	110 (6.7)	NA	390 (24)
ortho-xylene	--	--	--	--	NA	0.013 (0.0009)	NA	95 (17)	NA	25 (3.4)	NA	100 (12)
Xylenes (total)	240	1.5	51	340	NA	0.073 (0.0009)	NA	<u>520 (17)</u>	NA	<u>140 (3.4)</u>	NA	<u>490 (12)</u>
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	ND (0.11)	NA	0.46 J (1.2)	NA	0.07 J (0.12)	NA	0.67 J (1.1)
Benzo(a)anthracene	430	--	3200	--	NA	0.038 J (0.11)	NA	0.64 J (1.2)	NA	0.035 J (0.12)	NA	0.41 J (1.1)
Benzo(a)pyrene	43	--	7.7	--	NA	0.049 J (0.14)	NA	0.48 J (1.5)	NA	ND (0.16)	NA	ND (1.5)
Benzo(b)fluoranthene	430	--	3200	--	NA	0.065 J (0.11)	NA	0.78 J (1.2)	NA	ND (0.12)	NA	0.36 J (1.1)
Benzo(g,h,i)perylene	4600	--	14000	--	NA	0.03 J (0.14)	NA	0.41 J (1.5)	NA	ND (0.16)	NA	ND (1.5)
Chrysene	43000	--	320000	--	NA	0.038 J (0.11)	NA	1.4 (1.2)	NA	0.033 J (0.12)	NA	0.35 J (1.1)
Fluorene	6200	--	18000	--	NA	ND (0.18)	NA	1 J (1.9)	NA	0.17 J (0.2)	NA	1.4 J (1.9)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	ND (0.18)	NA	<u>3.1 (1.9)</u>	NA	<u>1.7 (0.2)</u>	NA	<u>6.3 (1.9)</u>
Phenanthrene	4600	--	14000	--	NA	0.037 J (0.11)	NA	1.9 (1.2)	NA	0.43 (0.12)	NA	3 (1.1)
Pyrene	4600	--	14000	--	NA	0.049 J (0.11)	NA	2 (1.2)	NA	0.058 J (0.12)	NA	0.94 J (1.1)
Tetraethylene Glycol	350000	--	96000	120000	ND (9.9)	NA	ND (9.9)	NA	ND (9.9)	NA	ND (9.3)	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	24.2 (2.2)	NA	63.8 (2.34)	NA	23.6 (2.35)	NA	429 (2.2)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR794-06R	GPR794-07	GPR794-07R	GPR794-08	GPR794-08R	GPR794-08R	GPR794-08R	GPR794-09
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR794-06R-SS01	GPR794-07-SS01	GPR794-07R-SS01	GPR794-08-SS01	GPR794-08R-SS01	TG07-MW-07-4.0-4.5	TG07-MW-07-4.5-5.0	GPR794-09-1.5-2.0
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	1.5 - 2.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					10/21/2022	8/3/2022	10/21/2022	8/3/2022	10/21/2022	12/21/2022	12/21/2022	1/3/2023
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	NA	<u>130 (0.22)</u>	NA	<u>12000 (30)</u>	NA	<u>2500 (5.6)</u>	<u>3700 (29)</u>	<u>1 (0.024)</u>
Cumene	1000	6.1	87	1000	NA	<u>330 (2.2)</u>	NA	<u>7600 (60)</u>	NA	<u>750 (11)</u>	<u>1600 (5.8)</u>	<u>18 (0.098)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	ND (0.22)	NA	ND (0.76)	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	ND (0.45)	NA	ND (1.5)	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	NA	1.5 (0.45)	NA	<u>120 (1.5)</u>	NA	<u>48 (11)</u>	<u>93 (5.8)</u>	0.11 (0.049)
Methyl tert-butyl ether	2400	16	390	5900	NA	ND (0.89)	NA	ND (3)	NA	ND (22)	ND (12)	ND (0.098)
Toluene	8000	76	650	9800	NA	8.7 (0.45)	NA	<u>6200 (60)</u>	NA	<u>240 (11)</u>	<u>540 (5.8)</u>	0.42 (0.049)
1,2,4-Trimethylbenzene	180	0.92	70	250	NA	0.81 J (0.89)	NA	<u>35 (3)</u>	NA	<u>140 (22)</u>	<u>330 (12)</u>	ND (0.098)
1,3,5-Trimethylbenzene	220	0.92	99	240	NA	0.2 J (0.89)	NA	<u>15 (3)</u>	NA	<u>57 (22)</u>	<u>140 (12)</u>	ND (0.098)
m,p-xylene	--	--	--	--	NA	3.1 (0.89)	NA	390 (3)	NA	240 (22)	460 (12)	0.32 (0.098)
ortho-xylene	--	--	--	--	NA	ND (0.45)	NA	86 (1.5)	NA	54 (11)	100 (5.8)	ND (0.049)
Xylenes (total)	240	1.5	51	340	NA	<u>3.1 (0.45)</u>	NA	<u>480 (1.5)</u>	NA	<u>290 (11)</u>	<u>560 (5.8)</u>	0.32 (0.049)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	ND (0.11)	NA	ND (1.2)	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	0.027 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	NA	ND (0.15)	NA	ND (1.6)	NA	ND (1.5)	ND (1.5)	0.19 (0.14)
Benzo(b)fluoranthene	430	--	3200	--	NA	0.034 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	ND (0.15)	NA	ND (1.6)	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	0.041 J (0.11)	NA	ND (1.2)	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	ND (0.18)	NA	0.75 J (2)	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	NA	0.054 J (0.18)	NA	<u>8.7 (2)</u>	NA	<u>36 (0.39)</u>	<u>52 (0.38)</u>	0.031 J (0.036)
Phenanthrene	4600	--	14000	--	NA	0.19 (0.11)	NA	2.3 (1.2)	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	0.077 J (0.11)	NA	0.28 J (1.2)	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	ND (9.1)	NA	ND (9.7)	NA	ND (9.3)	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	3.73 (2.21)	NA	132 (2.4)	NA	NA	NA	NA

- Notes:**
- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
 - 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
 - 3 Underlined concentrations exceed the Routine Worker Soil VI.
 - 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
 - 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:
 ND - Not Detected
 NA - Not Analyzed
 J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR794-09	GPR794-09	GPR794-10	GPR798-01	GPR798-02	GPR798-03	GPR798-04	GPR798-04
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR794-09-2.0-2.5	GPR794-09-2.0-2.5D	GPR794-10-1.5-2.0	GPR798-01-SS01	GPR798-02-SS01	GPR798-03-SS01	GPR798-04-SS01	DUP-47
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	2.0 - 2.5	2.0 - 2.5	1.5 - 2.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					1/3/2023	1/3/2023	1/3/2023	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022
Comments					Field Duplicate				Field Duplicate			
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>2.6 (0.024)</u>	<u>1.1 (0.023)</u>	0.35 (0.047)	<u>3.4 (0.094)</u>	<u>6.2 (0.12)</u>	0.4 (0.069)	<u>14 (0.43)</u>	<u>5900 (58)</u>
Cumene	1000	6.1	87	1000	<u>20 (0.12)</u>	<u>14 (0.093)</u>	<u>42 (0.47)</u>	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.32 (0.049)	0.21 (0.046)	0.02 J (0.094)	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (0.097)	ND (0.093)	ND (0.19)	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	1.7 (0.049)	0.83 (0.046)	0.27 (0.094)	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	0.047 J (0.097)	0.042 J (0.093)	ND (0.19)	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	0.016 J (0.097)	0.017 J (0.093)	ND (0.19)	NA	NA	NA	NA	NA
m,p-xylene	--	--	--	--	1 (0.097)	0.72 (0.093)	0.076 J (0.19)	NA	NA	NA	NA	NA
ortho-xylene	--	--	--	--	0.11 (0.049)	0.092 (0.046)	ND (0.094)	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	1.1 (0.049)	0.81 (0.046)	0.076 J (0.094)	NA	NA	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.087 J (0.14)	0.058 J (0.14)	0.047 J (0.14)	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.27 (0.036)	0.2 (0.036)	0.3 (0.036)	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR798-04R	GPR798-04R	GPR798-05	GPR798-06	GPR798-07	GPR799-01	GPR799-02	GPR799-03
Field Sample ID	Routine	Routine	Construction	Soil Migration	TG07-MW-04-1.5-2.0	TG07-MW-04-2.0-2.5	GPR798-05-SS01	GPR798-06-SS01	GPR798-07-SS01	GPR799-01-SS01	GPR799-02-SS01	GPR799-03-SS01
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	1.5 - 2.0	2.0 - 2.5	4.5 - 5.0	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5	4.0 - 4.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					1/3/2023	1/3/2023	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	440 (3)	170 (0.72)	<u>1.4 (0.052)</u>	<u>2.2 (0.13)</u>	<u>7.8 (0.1)</u>	<u>2.2 (0.27)</u>	<u>1.6 (0.056)</u>	<u>16 (0.45)</u>
Cumene	1000	6.1	87	1000	<u>41 (1.2)</u>	<u>42 (0.36)</u>	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	ND (1.2)	0.081 J (0.36)	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	2400	16	390	5900	ND (2.4)	ND (0.72)	NA	NA	NA	NA	NA	NA
Toluene	8000	76	650	9800	ND (1.2)	0.28 J (0.36)	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (2.4)	0.51 J (0.72)	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (2.4)	0.24 J (0.72)	NA	NA	NA	NA	NA	NA
m,p-xylene	--	--	--	--	ND (2.4)	ND (0.72)	NA	NA	NA	NA	NA	NA
ortho-xylene	--	--	--	--	ND (1.2)	0.17 J (0.36)	NA	NA	NA	NA	NA	NA
Xylenes (total)	240	1.5	51	340	ND (1.2)	0.17 J (0.36)	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	0.076 J (0.15)	ND (0.17)	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	<u>1 (0.038)</u>	0.23 (0.043)	NA	NA	NA	NA	NA	NA
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location					GPR799-03R	GPR799-03R	GPR799-04	GPR799-05	GPR799-06	GPR799-07	GPR799-08	GPR799-08
Field Sample ID	Routine	Routine	Construction	Soil Migration	GPR-799-03R-3.0-3.5	GPR-799-03R-3.5-4.0	GPR799-04-SS01	GPR799-05-SS01	GPR799-06-SS01	GPR799-07-SS01	GPR799-08-1.0-1.5	GPR799-08-3.0-3.5
Collection Depth (ft bgs)	Worker Soil	Worker Soil VI	Worker Soil	to GW	3.0 - 3.5	3.5 - 4.0	4.0 - 4.5	4.0 - 4.5	4.5 - 5.0	4.5 - 5.0	1.0 - 1.5	3.0 - 3.5
Sample Method	Direct Contact		Direct Contact		Grab	Grab	Grab	Grab	Grab	Grab	Grab	Grab
Sample Date					12/21/2022	12/21/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	1/3/2023	1/3/2023
Comments												
Volatile Organic Compounds												
Benzene	63	0.46	8.7	98	<u>2.6 (0.031)</u>	<u>1.2 (0.04)</u>	<u>22 (0.22)</u>	<u>2.7 (0.046)</u>	<u>1.3 (0.052)</u>	<u>0.71 (0.1)</u>	0.2 (0.00047)	<u>0.77 (0.4)</u>
Cumene	1000	6.1	87	1000	0.78 (0.062)	<u>8.2 (0.079)</u>	NA	NA	NA	NA	0.0044 (0.00094)	<u>700 (4)</u>
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	16	0.11	8.1	33	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Benzene	2300	15	1300	820	0.025 J (0.062)	0.13 (0.079)	NA	NA	NA	NA	ND (0.00094)	0.13 J (0.8)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.12)	ND (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
Toluene	8000	76	650	9800	0.089 (0.062)	0.44 (0.079)	NA	NA	NA	NA	0.0048 (0.00094)	ND (0.8)
1,2,4-Trimethylbenzene	180	0.92	70	250	0.043 J (0.12)	0.8 (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
1,3,5-Trimethylbenzene	220	0.92	99	240	0.018 J (0.12)	0.63 (0.16)	NA	NA	NA	NA	ND (0.0019)	ND (1.6)
m,p-xylene	--	--	--	--	0.16 (0.12)	0.43 (0.16)	NA	NA	NA	NA	ND (0.0019)	0.46 J (1.6)
ortho-xylene	--	--	--	--	0.11 (0.062)	0.098 (0.079)	NA	NA	NA	NA	ND (0.00094)	ND (0.8)
Xylenes (total)	240	1.5	51	340	0.27 (0.062)	0.53 (0.079)	NA	NA	NA	NA	ND (0.00094)	0.46 J (0.8)
Semivolatile Organic Compounds												
Anthracene	46000	--	46000	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	43	--	7.7	--	1.1 (0.8)	0.58 J (0.71)	NA	NA	NA	NA	ND (0.15)	0.83 (0.17)
Benzo(b)fluoranthene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	43000	--	320000	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	6200	--	18000	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	430	--	3200	--	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	41	0.54	6	27	0.36 (0.2)	<u>2.2 (0.18)</u>	NA	NA	NA	NA	0.032 J (0.037)	<u>1.6 (0.042)</u>
Phenanthrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	4600	--	14000	--	NA	NA	NA	NA	NA	NA	NA	NA
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA	NA
Physical Properties												
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Lead	2520	--	2520	45000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I1
Summary of PESRM Soil Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	GPU767-01	GPU767-02	GPU767-03	GPU767-04	GPU767-05	GPU767-06	GPU767-07				
Field Sample ID	GPU767-01-SS01	GPU767-02-SS01	GPU767-03-SS01	GPU767-04-SS01	GPU767-05-SS01	GPU767-06-SS01	GPU767-07-SS01				
Collection Depth (ft bgs)	3.0 - 3.5	4.5 - 5.0	4.5 - 5.0	4.5 - 5.0	4.0 - 4.5	3.0 - 3.5	3.0 - 3.5				
Sample Method	Grab	Grab	Grab	Grab	Grab	Grab	Grab				
Sample Date	8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022				
Comments											
Volatile Organic Compounds											
Benzene	63	0.46	8.7	98	ND (0.00069)	0.00007 J (0.00008)	0.071 (0.034)	0.021 J (0.036)	0.044 (0.029)	ND (0.00047)	ND (0.001)
Cumene	1000	6.1	87	1000	0.0011 J (0.0014)	0.0093 (0.00018)	1.6 (0.067)	4.8 (0.071)	<u>24 (0.24)</u>	0.001 (0.00094)	0.00049 J (0.002)
1,2-Dibromoethane	1.2	0.0071	1.8	3.2	ND (0.00069)	ND (0.00008)	ND (0.00048)	ND (0.036)	ND (0.029)	ND (0.00047)	ND (0.001)
1,2-Dichloroethane	16	0.11	8.1	33	ND (0.0014)	ND (0.00018)	ND (0.00095)	ND (0.071)	ND (0.059)	ND (0.00094)	ND (0.002)
Ethyl Benzene	2300	15	1300	820	ND (0.0014)	0.00016 J (0.00018)	0.03 J (0.067)	0.047 J (0.071)	0.12 (0.059)	ND (0.00094)	ND (0.002)
Methyl tert-butyl ether	2400	16	390	5900	ND (0.0028)	ND (0.00035)	ND (0.0019)	ND (0.14)	ND (0.12)	ND (0.0019)	ND (0.004)
Toluene	8000	76	650	9800	ND (0.0014)	0.00018 (0.00018)	0.052 J (0.067)	0.17 (0.071)	0.062 (0.059)	ND (0.00094)	ND (0.002)
1,2,4-Trimethylbenzene	180	0.92	70	250	ND (0.0028)	0.00027 J (0.00035)	0.032 J (0.13)	0.037 J (0.14)	0.075 J (0.12)	ND (0.0019)	ND (0.004)
1,3,5-Trimethylbenzene	220	0.92	99	240	ND (0.0028)	0.0001 J (0.00035)	0.016 J (0.13)	ND (0.14)	0.017 J (0.12)	ND (0.0019)	ND (0.004)
m,p-xylene	--	--	--	--	ND (0.0028)	0.00026 J (0.00035)	0.049 J (0.13)	0.14 (0.14)	0.19 (0.12)	ND (0.0019)	ND (0.004)
ortho-xylene	--	--	--	--	ND (0.0014)	0.00011 J (0.00018)	0.022 J (0.067)	ND (0.071)	0.021 J (0.059)	ND (0.00094)	ND (0.002)
Xylenes (total)	240	1.5	51	340	ND (0.0014)	0.00037 J (0.00018)	0.071 J (0.067)	0.14 (0.071)	0.21 J (0.059)	ND (0.00094)	ND (0.002)
Semivolatile Organic Compounds											
Anthracene	46000	--	46000	--	ND (0.11)	0.058 J (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	0.053 J (0.1)	ND (0.1)
Benzo(a)anthracene	430	--	3200	--	0.044 J (0.11)	0.12 (0.12)	ND (0.12)	0.037 J (0.12)	ND (0.11)	0.33 (0.1)	ND (0.1)
Benzo(a)pyrene	43	--	7.7	--	0.07 J (0.15)	0.14 J (0.16)	ND (0.16)	0.049 J (0.16)	ND (0.15)	0.42 (0.14)	ND (0.14)
Benzo(b)fluoranthene	430	--	3200	--	0.1 J (0.11)	0.15 (0.12)	ND (0.12)	0.054 J (0.12)	ND (0.11)	0.56 (0.1)	ND (0.1)
Benzo(g,h,i)perylene	4600	--	14000	--	0.076 J (0.15)	0.077 J (0.16)	ND (0.16)	0.064 J (0.16)	0.025 J (0.15)	0.29 (0.14)	ND (0.14)
Chrysene	43000	--	320000	--	0.046 J (0.11)	0.12 (0.12)	ND (0.12)	0.093 J (0.12)	0.024 J (0.11)	0.38 (0.1)	ND (0.1)
Fluorene	6200	--	18000	--	ND (0.19)	0.085 J (0.2)	ND (0.2)	ND (0.19)	ND (0.18)	0.03 J (0.18)	ND (0.17)
Indeno(1,2,3-cd)pyrene	430	--	3200	--	0.077 J (0.15)	0.091 J (0.16)	ND (0.16)	ND (0.16)	ND (0.15)	0.35 (0.14)	ND (0.14)
Naphthalene	41	0.54	6	27	ND (0.19)	0.048 J (0.2)	ND (0.2)	ND (0.19)	ND (0.18)	0.068 J (0.18)	ND (0.17)
Phenanthrene	4600	--	14000	--	ND (0.11)	0.24 (0.12)	ND (0.12)	ND (0.12)	ND (0.11)	0.19 (0.1)	ND (0.1)
Pyrene	4600	--	14000	--	0.032 J (0.11)	0.18 (0.12)	ND (0.12)	0.09 J (0.12)	0.022 J (0.11)	0.34 (0.1)	ND (0.1)
Tetraethylene Glycol	350000	--	96000	120000	NA	NA	NA	NA	NA	NA	NA
Physical Properties											
pH	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Metals											
Lead	2520	--	2520	45000	380 (2.2)	115 (2.3)	72 (2.3)	121 (2.22)	12.5 (2.23)	688 (2.05)	87 (2.01)

Notes:

- 1 All concentrations reported in mg/kg (ppm); detection limits in parentheses.
- 2 Boldfaced concentrations exceed the Routine Worker Soil Direct Contact.
- 3 Underlined concentrations exceed the Routine Worker Soil VI.
- 4 Italicized concentrations exceed the Construction Worker Soil Direct Contact.
- 5 Grey-shaded concentrations exceed the Soil Migration to GW.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table I2
Summary of Soil QAQC Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC
Field Sample ID	TB-071822	FB-071822-01	FB-071822-02	FB-071822-3	FB-071822-4	TB-080122	FB-080122-1	FB-080122-2	FB-080122-3	FB-080122-4	TB-080222	FB-080222-1	FB-080222-2
Sample Date	7/18/2022	7/18/2022	7/18/2022	7/18/2022	7/18/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022	8/1/2022	8/2/2022	8/2/2022	8/2/2022
Comments	Trip Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Field Blank	Field Blank	Trip Blank	Field Blank	Field Blank
Volatile Organic Compounds	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organic Compounds													
Benzo(a)anthracene	NA	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	0.02 J (0.05)	ND (0.05)	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	0.01 J (0.05)	ND (0.05)	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	ND (0.1)	ND (0.1)	NA	NA	NA	0.02 J (0.1)	ND (0.1)	NA	NA	NA
Fluorene	NA	NA	NA	ND (0.1)	ND (0.1)	NA	NA	NA	ND (0.1)	ND (0.1)	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	ND (0.1)	ND (0.1)	NA	NA	NA	0.05 J (0.1)	ND (0.1)	NA	NA	NA
Phenanthrene	NA	NA	NA	ND (0.05)	ND (0.05)	NA	NA	NA	0.03 J (0.05)	ND (0.05)	NA	NA	NA
Physical Properties													
pH [SU]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	NA	NA	NA

Notes:

1 All concentrations reported in ug/L (ppb); detection limits in parentheses.

2 Only compounds with at least one detection are

Abbreviations:

ND - Not Detected
 NA - Not Analyzed

J - Estimated Concentration

Table I2
Summary of Soil QAQC Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC	QAQC
Field Sample ID	FB-080222-3	FB-080222-4	TB-080322	FB-080322-1	FB-080322-2	TB-081522	FB-081522	TB-221222-1	TB-230104-1
Sample Date	8/2/2022	8/2/2022	8/3/2022	8/3/2022	8/3/2022	8/15/2022	8/15/2022	12/22/2022	1/4/2023
Comments	Field Blank	Field Blank	Trip Blank	Field Blank	Field Blank	Trip Blank	Field Blank	Trip Blank	Trip Blank
Volatile Organic Compounds	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semivolatile Organic Compounds									
Benzo(a)anthracene	ND (0.05)	0.02 J (0.05)	NA	ND (0.05)	ND (0.05)	NA	ND (0.05)	NA	NA
Benzo(b)fluoranthene	ND (0.05)	ND (0.05)	NA	ND (0.05)	ND (0.05)	NA	0.02 J (0.05)	NA	NA
Benzo(g,h,i)perylene	ND (0.1)	ND (0.1)	NA	ND (0.1)	ND (0.1)	NA	ND (0.1)	NA	NA
Fluorene	ND (0.1)	ND (0.1)	NA	ND (0.1)	ND (0.1)	NA	0.06 J (0.1)	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	0.02 J (0.1)	NA	NA
Naphthalene	ND (0.1)	ND (0.1)	NA	ND (0.1)	ND (0.1)	NA	ND (0.1)	NA	NA
Phenanthrene	ND (0.05)	ND (0.05)	NA	ND (0.05)	ND (0.05)	NA	0.04 J (0.05)	NA	NA
Physical Properties									
pH [SU]	7	6.8	NA	6.1	6.3	NA	NA	NA	NA
Metals	ND	ND	NA	ND	ND	NA	ND	NA	NA

Notes:

1 All concentrations reported in ug/L (ppb); detection limits in parentheses.

2 Only compounds with at least one detection are

Abbreviations:

ND - Not Detected
 NA - Not Analyzed

J - Estimated Concentration

Table I3
Summary of Groundwater Analytical Results
Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	Routine		Construction	Off-Site	GW Migration	TG07-MW-01	TG07-MW-02	TG07-MW-03	TG07-MW-04	TG07-MW-05	TG07-MW-07	TG07-MW-08	
Field Sample ID	Nonpotable	Worker GW	Worker GW	Resident GW	to SW	230105	230104	230104	230105	230105	230106	230105	
Sample Method	GW Use	Vol to Outdoor	Worker GW VI	Direct Contact	VI	Grab	Grab	Grab	Grab	Grab	Grab	Grab	
Sample Date		Air				1/5/2023	1/4/2023	1/4/2023	1/5/2023	1/5/2023	1/6/2023	1/5/2023	
Comments													
Volatile Organic Compounds													
Benzene	300	550000	3800	4000	250	130000	ND (0.5)	17 (0.5)	0.36 J (0.5)	36 (1)	<u>11000 (50)</u>	<u>240000 (1000)</u>	ND (12)
Cumene	37000	9100000	63000	30000	4000	2600	0.34 J (0.5)	67 (0.5)	4 (0.5)	290 (1)	<u>7200 (50)</u>	<u>5300 (200)</u>	<u>4400 (12)</u>
1,2-Dibromoethane	17	16000	110	910	160	--	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
1,2-Dichloroethane	330	170000	1200	4900	82	3100000	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (50)	ND (200)	ND (12)
Ethyl Benzene	2000	22000000	150000	40000	9700	13000	ND (0.5)	0.42 J (0.5)	ND (0.5)	1.9 (1)	34 J (50)	360 (200)	ND (12)
Methyl tert-butyl ether	21000	29000000	210000	190000	42000	11000000	ND (1)	0.36 J (1)	ND (1)	ND (2)	ND (100)	ND (400)	ND (25)
Toluene	25000	100000000	700000	200000	45000	52000	ND (0.75)	1.4 (0.75)	0.23 J (0.75)	3.8 (1.5)	200 (75)	<u>27000 (300)</u>	ND (19)
1,2,4-Trimethylbenzene	8700	1400000	9700	15000	630	33000	0.25 J (2.5)	0.5 J (2.5)	3.4 (2.5)	1.4 J (5)	30 J (250)	220 J (1000)	ND (62)
1,3,5-Trimethylbenzene	8800	1300000	9100	15000	590	71000	ND (2.5)	0.24 J (2.5)	ND (2.5)	0.72 J (5)	ND (250)	ND (1000)	ND (62)
Xylenes (total)	3700	1900000	13000	17000	860	210000	ND (1)	1.5 J (1)	1.2 J (1)	6.7 (2)	41 J (100)	<u>1700 J (400)</u>	ND (25)
Semivolatile Organic Compounds													
Anthracene	240000	--	--	19000000	--	40000	0.05 J (0.1)	0.24 (0.1)	0.1 (0.1)	0.43 (0.1)	0.27 (0.1)	0.25 (0.1)	0.24 (0.1)
Benzo(a)anthracene	100	--	--	1400000	--	13	0.08 (0.05)	0.11 (0.05)	0.04 J (0.05)	0.14 (0.05)	0.07 (0.05)	0.12 J (0.25)	0.18 (0.05)
Benzo(a)pyrene	10	--	--	5800	--	1.3	0.02 J (0.1)	0.07 J (0.1)	ND (0.1)	0.07 J (0.1)	0.04 J (0.1)	0.07 J (0.1)	0.02 J (0.1)
Benzo(b)fluoranthene	160	--	--	1400000	--	13	0.02 J (0.05)	0.07 (0.05)	ND (0.05)	0.07 (0.05)	0.03 J (0.05)	0.04 J (0.05)	0.03 J (0.05)
Benzo(g,h,i)perylene	44000	--	--	5800000	--	12	0.01 J (0.1)	0.04 J (0.1)	ND (0.1)	0.02 J (0.1)	ND (0.1)	0.01 J (0.1)	ND (0.1)
Chrysene	16000	--	--	140000000	--	1300	0.03 J (0.1)	0.07 J (0.1)	ND (0.1)	0.11 (0.1)	0.04 J (0.1)	ND (0.5)	0.07 J (0.1)
Fluorene	97000	--	--	7800000	--	7000	0.13 (0.1)	2.2 (0.1)	0.58 (0.1)	4.8 (0.1)	2.7 (0.1)	2 (0.1)	2.9 (0.1)
Indeno(1,2,3-cd)pyrene	100	--	--	1400000	--	13	ND (0.1)	0.04 J (0.1)	ND (0.1)	0.02 J (0.1)	0.01 J (0.1)	0.02 J (0.1)	0.01 J (0.1)
Naphthalene	390	120000	880	280	67	43000	ND (0.1)	0.9 (0.1)	0.13 (0.1)	ND (0.1)	17 (0.1)	<u>130 (0.5)</u>	3.1 (0.1)
Phenanthrene	73000	--	--	5800000	--	1000	0.2 (0.05)	1.8 (0.05)	0.63 (0.05)	4.6 (0.05)	2.4 (0.05)	2.6 (0.05)	1.8 (0.05)
Pyrene	50000	--	--	5800000	--	3000	0.14 (0.1)	0.36 (0.1)	0.11 (0.1)	0.42 (0.1)	0.22 (0.1)	0.3 (0.1)	0.86 (0.1)
Metals													
Lead	--	--	--	--	--	2500	0.593 J (1)	7.913 (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)

Notes:

- All concentrations reported in ug/L (ppb); detection limits in parentheses.
- Underlined concentrations exceed the Nonpotable GW Use.
- No concentrations exceed the Routine Worker GW Vol to Outdoor Air.
- Italicized concentrations exceed the Routine Worker GW VI.
- Boldfaced concentrations exceed the Construction Worker GW Direct Contact.
- Grey-shaded concentrations exceed the Off-Site Resident GW VI.
- Blue font concentrations exceed the GW Migration to SW.

Abbreviations:

ND - Not Detected
J - Estimated Concentration

Table I4

Summary of QAQC Analytical Results

Tank Group 07

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Location	QAQC	QAQC
Field Sample ID	TB-230104-2	FB-230104-2
Sample Date	1/4/2023	1/4/2023
Comments	Trip Blank	Field Blank
Volatile Organic Compounds	ND	ND
Semivolatile Organic Compounds		
Benzo(a)anthracene	NA	0.04 J (0.05)
Naphthalene	NA	0.09 J (0.1)
Metals	NA	ND

Notes:

- 1 All concentrations reported in ug/L (ppb); detection limits in parentheses.
- 2 Only compounds with at least one detection are shown.

Abbreviations:

- ND - Not Detected
- NA - Not Analyzed
- J - Estimated Concentration

Table 15

Quality Control Methodology

Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Multiple VOC Runs Data Quality	Solution
If the surrogate recoveries for one run are within acceptance criteria and the other run has 3-4 surrogates outside of acceptance criteria :	The run with surrogate recoveries within acceptance criteria is selected as reportable.
If the surrogate recoveries for one run are within acceptance criteria and has some detections and the other run has 1-2 surrogates outside of acceptance criteria :	The run with surrogate recoveries within acceptance criteria is selected as reportable.
If one run has surrogate recoveries within acceptance criteria but is non-detect and the other run has 1-2 surrogates outside of acceptance criteria but has detections :	The run with detections is selected as reportable and the run with non-detects is not reported.
If both runs have detections and surrogate recoveries outside of acceptance criteria :	The run with more surrogates recoveries outside acceptance criteria is not reported and the run with fewer surrogate recoveries outside of acceptance criteria is selected as reportable.
If one run has surrogate recoveries outside of acceptance criteria but is non-detect and the other run has 1-2 more surrogates outside of acceptance criteria but has detections :	The run with detections is selected as reportable and the run with non-detects is not reported.
If both runs have the same number of surrogates with recovery outside the acceptance criteria:	If both results are detected, the higher of detections is selected as reportable; if one result is detected and one is non-detect, the detection is selected as reportable; if both results are non-detect, the lower reporting limit is selected as reportable .
If two VOC runs are reported and there are no QC issues for both runs:	If both results are detected, the higher of detections is selected as reportable; if one result is detected and one is non-detect, the detection is selected as reportable; if both results are non-detect, the lower reporting limit is selected as reportable .

Table 17
 RPD Calculations
 Tank Group 07
 Philadelphia Energy Solutions Refining and Marketing, LLC, Philadelphia, PA

Matrix	Dataset	Area	Location Code	Sample Name	Sample Date	Chem Group	PARAMNAME	CASRN	Total or Dissolved	RPD	Ratio	Primary Result	Primary Qualifier	Primary Limit	Duplicate Result	Duplicate Qualifier	Duplicate Limit	Average Result	Average Qualifier	Average Limit	Result Unit
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Benzene	71-43-2	T	193%	60.2	5.30E-02		4.70E-02		U	8.80E-04	2.67E-02	J	2.39E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Cumene	98-82-8	T	198%	200.0	8.00E-01		9.40E-02	4.00E-03		1.80E-03	4.02E-01		4.79E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	1,2-Dibromoethane	106-93-4	T	193%	53.4		U	4.70E-02		U	8.80E-04		U	2.39E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	1,2-Dichloroethane	107-06-2	T	192%	52.2		U	9.40E-02		U	1.80E-03		U	4.79E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Ethyl Benzene	100-41-4	T	170%	12.2	2.20E-02	J	9.40E-02		U	1.80E-03	1.15E-02	J	4.79E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Methyl tert-butyl ether	1634-04-4	T	193%	54.3		U	1.90E-01		U	3.50E-03		U	9.68E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Toluene	108-88-3	T	191%	43.3	7.80E-02	J	9.40E-02		U	1.80E-03	3.95E-02	J	4.79E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	1,2,4-Trimethylbenzene	95-63-6	T	198%	205.3	7.80E-01		1.90E-01	3.80E-03		3.50E-03	3.92E-01		9.68E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	1,3,5-Trimethylbenzene	108-67-8	T	197%	158.3		U	1.90E-01	1.20E-03	J	3.50E-03	4.81E-02	J	9.68E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	VOC	Xylenes (total)	1330-20-7	T	191%	44.1	1.19E-01	J	1.90E-01	2.70E-03	J	3.50E-03	6.09E-02	J	9.68E-02	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Anthracene	120-12-7	T	87%	2.5	5.50E-02	J	1.30E-01		U	1.40E-01	6.25E-02	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Benzo(a)anthracene	56-55-3	T	143%	6.0	2.40E-01		1.30E-01	4.00E-02	J	1.40E-01	1.40E-01	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Benzo(a)pyrene	50-32-8	T	76%	2.2	4.00E-01		1.70E-01		U	1.80E-01	2.45E-01	J	1.75E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Benzo(b)fluoranthene	205-99-2	T	164%	10.0	4.20E-01		1.30E-01	4.20E-02	J	1.40E-01	2.31E-01	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Benzo(g,h,i)perylene	191-24-2	T	161%	9.3	2.60E-01		1.70E-01	2.80E-02	J	1.80E-01	1.44E-01	J	1.75E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Chrysene	218-01-9	T	144%	6.1	2.70E-01		1.30E-01	4.40E-02	J	1.40E-01	1.57E-01	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Fluorene	86-73-7	T	43%	1.6	5.60E-02	J	2.20E-01	8.70E-02	J	2.30E-01	7.15E-02	J	2.25E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Naphthalene	91-20-3	T	75%	2.2	3.50E-01		2.20E-01	1.60E-01	J	2.30E-01	2.55E-01	J	2.25E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Phenanthrene	85-01-8	T	24%	1.3	1.50E-01		1.30E-01	1.90E-01		1.40E-01	1.70E-01	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	SVOC	Pyrene	129-00-0	T	71%	2.1	2.10E-01		1.30E-01	1.00E-01	J	1.40E-01	1.55E-01	J	1.35E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-05	GPR1116-05-SS01	8/1/2022	INORG	Lead	7439-92-1	T	101%	3.0	6.79E+01		2.49E+00	2.06E+02		1.34E+01	1.37E+02		7.95E+00	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Benzene	71-43-2	T	195%	72.0	3.60E-02		5.20E-04		U	5.00E-04	1.81E-02	J	5.10E-04	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Cumene	98-82-8	T	8%	1.1	6.80E-03		1.00E-03	7.40E-03		9.90E-04	7.10E-03		9.95E-04	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Ethyl Benzene	100-41-4	T	1%	1.0		U	1.00E-03		U	9.90E-04		U	9.95E-04	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Methyl tert-butyl ether	1634-04-4	T	5%	1.1		U	2.10E-03		U	2.00E-03		U	2.05E-03	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Toluene	108-88-3	T	1%	1.0		U	1.00E-03		U	9.90E-04		U	9.95E-04	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	1,2,4-Trimethylbenzene	95-63-6	T	36%	1.4	2.60E-03		2.10E-03	1.80E-03	J	2.00E-03	2.20E-03	J	2.05E-03	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	1,3,5-Trimethylbenzene	108-67-8	T	5%	1.1		U	2.10E-03		U	2.00E-03		U	2.05E-03	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	VOC	Xylenes (total)	1330-20-7	T	1%	1.0	1.84E-03	J	2.10E-03	1.86E-03	J	2.00E-03	1.85E-03	J	2.05E-03	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	SVOC	Benzo(a)pyrene	50-32-8	T	24%	1.3	6.70E-02	J	1.50E-01	8.50E-02	J	1.50E-01	7.60E-02	J	1.50E-01	mg/kg
Soil	AST	Tank Group 07	GPR1116-08	TG07-MW-03-3.0-3.5	12/21/2022	SVOC	Naphthalene	91-20-3	T	19%	1.2	8.10E-02		3.80E-02	9.80E-02		3.80E-02	8.95E-02		3.80E-02	mg/kg
Soil	AST	Tank Group 07	GPR792-02	GPR792-02-SS01	8/2/2022	VOC	Cumene	98-82-8	T	0%	1.0	4.70E+03		4.90E+01	4.70E+03		5.90E+01	4.70E+03		5.40E+01	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Benzene	71-43-2	T	81%	2.4	2.60E+00		2.40E-02	1.10E+00		2.30E-02	1.85E+00		2.35E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Cumene	98-82-8	T	35%	1.4	2.00E+01		1.20E-01	1.40E+01		9.30E-02	1.70E+01		1.07E-01	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Ethyl Benzene	100-41-4	T	42%	1.5	3.20E-01		4.90E-02	2.10E-01		4.60E-02	2.65E-01		4.75E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Methyl tert-butyl ether	1634-04-4	T	4%	1.0		U	9.70E-02		U	9.30E-02		U	9.50E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Toluene	108-88-3	T	69%	2.0	1.70E+00		4.90E-02	8.30E-01		4.60E-02	1.27E+00		4.75E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	1,2,4-Trimethylbenzene	95-63-6	T	11%	1.1	4.70E-02	J	9.70E-02	4.20E-02	J	9.30E-02	4.45E-02	J	9.50E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	1,3,5-Trimethylbenzene	108-67-8	T	6%	1.1	1.60E-02	J	9.70E-02	1.70E-02	J	9.30E-02	1.65E-02	J	9.50E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	VOC	Xylenes (total)	1330-20-7	T	31%	1.4	1.11E+00	J	9.70E-02	8.12E-01	J	9.30E-02	9.61E-01	J	9.50E-02	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	SVOC	Benzo(a)pyrene	50-32-8	T	40%	1.5	8.70E-02	J	1.40E-01	5.80E-02	J	1.40E-01	7.25E-02	J	1.40E-01	mg/kg
Soil	AST	Tank Group 07	GPR794-09	GPR794-09-2.0-2.5	1/3/2023	SVOC	Naphthalene	91-20-3	T	30%	1.4	2.70E-01		3.60E-02	2.00E-01		3.60E-02	2.35E-01		3.60E-02	mg/kg
Soil	AST	Tank Group 07	GPR798-04	GPR798-04-SS01	7/18/2022	VOC	Benzene	71-43-2	T	199%	421.4	1.40E+01		4.30E-01	5.90E+03		5.80E+01	2.96E+03		2.92E+01	mg/kg

Appendix J

Laboratory Reports





ANALYTICAL REPORT

PREPARED FOR

Attn: Mr. William Schmidt
Ransom Consulting LLC
2127 Hamilton Ave
Hamilton New Jersey 08619

JOB DESCRIPTION

PES Refinery

JOB NUMBER

680-223928-1

Definitions/Glossary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Sample Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-223928-1	GPR794-01R-SS01	Solid	10/21/22 12:00	10/25/22 10:30
680-223928-2	GPR794-02R-SS01	Solid	10/21/22 12:10	10/25/22 10:30
680-223928-3	GPR794-03R-SS01	Solid	10/21/22 12:20	10/25/22 10:30
680-223928-4	GPR794-04R-SS01	Solid	10/21/22 12:30	10/25/22 10:30
680-223928-5	GPR794-05R-SS01	Solid	10/21/22 12:40	10/25/22 10:30
680-223928-6	GPR794-06R-SS01	Solid	10/21/22 12:50	10/25/22 10:30
680-223928-7	GPR794-07R-SS01	Solid	10/21/22 13:00	10/25/22 10:30
680-223928-8	GPR794-08R-SS01	Solid	10/21/22 13:10	10/25/22 10:30

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Case Narrative

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Job ID: 680-223928-1

Laboratory: Eurofins Savannah

Narrative

**Job Narrative
680-223928-1**

Revision

Per client request, the sample ID's have been revised.

Comments

No additional comments.

Receipt

The samples were received on 10/25/2022 10:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.7° C.

GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Client Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-01R-SS01

Lab Sample ID: 680-223928-1

Date Collected: 10/21/22 12:00

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.8	U	9.5	2.8	mg/Kg			11/04/22 14:58	1

Client Sample ID: GPR794-02R-SS01

Lab Sample ID: 680-223928-2

Date Collected: 10/21/22 12:10

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 15:20	1

Client Sample ID: GPR794-03R-SS01

Lab Sample ID: 680-223928-3

Date Collected: 10/21/22 12:20

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 15:43	1

Client Sample ID: GPR794-04R-SS01

Lab Sample ID: 680-223928-4

Date Collected: 10/21/22 12:30

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.9	2.9	mg/Kg			11/04/22 16:06	1

Client Sample ID: GPR794-05R-SS01

Lab Sample ID: 680-223928-5

Date Collected: 10/21/22 12:40

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.7	U	9.3	2.7	mg/Kg			11/04/22 16:29	1

Client Sample ID: GPR794-06R-SS01

Lab Sample ID: 680-223928-6

Date Collected: 10/21/22 12:50

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.6	U	9.1	2.6	mg/Kg			11/04/22 16:51	1

Client Sample ID: GPR794-07R-SS01

Lab Sample ID: 680-223928-7

Date Collected: 10/21/22 13:00

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.8	U	9.7	2.8	mg/Kg			11/04/22 17:14	1

Eurofins Savannah

Client Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-08R-SS01

Lab Sample ID: 680-223928-8

Date Collected: 10/21/22 13:10

Matrix: Solid

Date Received: 10/25/22 10:30

Method: SW846 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.7	U	9.3	2.7	mg/Kg			11/04/22 17:37	1

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QC Sample Results

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Method: 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 680-748612/1-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetraethylene Glycol	2.9	U	9.8	2.9	mg/Kg			11/04/22 14:35	1

Lab Sample ID: LCS 680-748612/2-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Tetraethylene Glycol	39.6	41.7		mg/Kg		105	10 - 197

Lab Sample ID: LCSD 680-748612/3-A
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Tetraethylene Glycol	37.2	34.8		mg/Kg		94	10 - 197	18	50

Lab Sample ID: 680-223928-7 MS
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: GPR794-07R-SS01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Tetraethylene Glycol	2.8	U	38.8	12.3		mg/Kg		32	10 - 197

Lab Sample ID: 680-223928-7 MSD
Matrix: Solid
Analysis Batch: 748845

Client Sample ID: GPR794-07R-SS01
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Tetraethylene Glycol	2.8	U	40.0	20.2		mg/Kg		51	10 - 197	48	50

QC Association Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

GC Semi VOA

Leach Batch: 748612

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Soluble	Solid	DI Leach	
680-223928-2	GPR794-02R-SS01	Soluble	Solid	DI Leach	
680-223928-3	GPR794-03R-SS01	Soluble	Solid	DI Leach	
680-223928-4	GPR794-04R-SS01	Soluble	Solid	DI Leach	
680-223928-5	GPR794-05R-SS01	Soluble	Solid	DI Leach	
680-223928-6	GPR794-06R-SS01	Soluble	Solid	DI Leach	
680-223928-7	GPR794-07R-SS01	Soluble	Solid	DI Leach	
680-223928-8	GPR794-08R-SS01	Soluble	Solid	DI Leach	
MB 680-748612/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 680-748612/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 680-748612/3-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	
680-223928-7 MS	GPR794-07R-SS01	Soluble	Solid	DI Leach	
680-223928-7 MSD	GPR794-07R-SS01	Soluble	Solid	DI Leach	

Analysis Batch: 748845

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Soluble	Solid	8015D	748612
680-223928-2	GPR794-02R-SS01	Soluble	Solid	8015D	748612
680-223928-3	GPR794-03R-SS01	Soluble	Solid	8015D	748612
680-223928-4	GPR794-04R-SS01	Soluble	Solid	8015D	748612
680-223928-5	GPR794-05R-SS01	Soluble	Solid	8015D	748612
680-223928-6	GPR794-06R-SS01	Soluble	Solid	8015D	748612
680-223928-7	GPR794-07R-SS01	Soluble	Solid	8015D	748612
680-223928-8	GPR794-08R-SS01	Soluble	Solid	8015D	748612
MB 680-748612/1-A	Method Blank	Soluble	Solid	8015D	748612
LCS 680-748612/2-A	Lab Control Sample	Soluble	Solid	8015D	748612
LCSD 680-748612/3-A	Lab Control Sample Dup	Soluble	Solid	8015D	748612
680-223928-7 MS	GPR794-07R-SS01	Soluble	Solid	8015D	748612
680-223928-7 MSD	GPR794-07R-SS01	Soluble	Solid	8015D	748612

General Chemistry

Analysis Batch: 748590

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-223928-1	GPR794-01R-SS01	Total/NA	Solid	Moisture	
680-223928-2	GPR794-02R-SS01	Total/NA	Solid	Moisture	
680-223928-3	GPR794-03R-SS01	Total/NA	Solid	Moisture	
680-223928-4	GPR794-04R-SS01	Total/NA	Solid	Moisture	
680-223928-5	GPR794-05R-SS01	Total/NA	Solid	Moisture	
680-223928-6	GPR794-06R-SS01	Total/NA	Solid	Moisture	
680-223928-7	GPR794-07R-SS01	Total/NA	Solid	Moisture	
680-223928-8	GPR794-08R-SS01	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-01R-SS01

Lab Sample ID: 680-223928-1

Date Collected: 10/21/22 12:00

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.26 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 14:58	JCK	EET SAV
Instrument ID: CVGG2										
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
Instrument ID: NOEQUIP										

Client Sample ID: GPR794-02R-SS01

Lab Sample ID: 680-223928-2

Date Collected: 10/21/22 12:10

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 15:20	JCK	EET SAV
Instrument ID: CVGG2										
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
Instrument ID: NOEQUIP										

Client Sample ID: GPR794-03R-SS01

Lab Sample ID: 680-223928-3

Date Collected: 10/21/22 12:20

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.07 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 15:43	JCK	EET SAV
Instrument ID: CVGG2										
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
Instrument ID: NOEQUIP										

Client Sample ID: GPR794-04R-SS01

Lab Sample ID: 680-223928-4

Date Collected: 10/21/22 12:30

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.04 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:06	JCK	EET SAV
Instrument ID: CVGG2										
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
Instrument ID: NOEQUIP										

Lab Chronicle

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Client Sample ID: GPR794-05R-SS01

Lab Sample ID: 680-223928-5

Date Collected: 10/21/22 12:40

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.36 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:29	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-06R-SS01

Lab Sample ID: 680-223928-6

Date Collected: 10/21/22 12:50

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.48 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 16:51	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-07R-SS01

Lab Sample ID: 680-223928-7

Date Collected: 10/21/22 13:00

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.14 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 17:14	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Client Sample ID: GPR794-08R-SS01

Lab Sample ID: 680-223928-8

Date Collected: 10/21/22 13:10

Matrix: Solid

Date Received: 10/25/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5.37 g	5 mL	748612	11/03/22 11:48	GEM	EET SAV
Soluble	Analysis	8015D		1	1 mL	1 mL	748845	11/04/22 17:37	JCK	EET SAV
		Instrument ID: CVGG2								
Total/NA	Analysis	Moisture		1			748590	11/03/22 10:14	TD	EET SAV
		Instrument ID: NOEQUIP								

Laboratory References:

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Laboratory: Eurofins Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-23
ANAB	Dept. of Defense ELAP	L2463	09-22-24
Arkansas DEQ	State	19-015-0	02-01-23
California	State	2939	06-30-22 *
Connecticut	State	PH-0161	03-31-23
Florida	NELAP	E87052	06-23-23
Georgia	State	E87052	06-30-23
Georgia (DW)	State	803	06-30-23
Guam	State	19-007R	04-17-23
Hawaii	State	<cert No.>	06-30-23
Illinois	NELAP	200022	11-30-22
Indiana	State	C-GA-02	06-30-23
Iowa	State	353	07-01-23
Kentucky (UST)	State	NA	06-30-23
Louisiana	NELAP	30690	06-30-23
Louisiana (All)	NELAP	30690	06-30-23
Louisiana (DW)	State	LA009	12-31-22
Maine	State	GA00006	09-25-24
Maryland	State	250	12-31-22
Massachusetts	State	M-GA006	07-30-23
Michigan	State	9925	06-30-23
Mississippi	State	<cert No.>	06-30-23
Nebraska	State	NE-OS-7-04	06-30-23
New Jersey	NELAP	GA769	06-30-23
New Mexico	State	GA00006	06-30-23
New York	NELAP	10842	04-01-23
North Carolina (DW)	State	13701	07-31-23
North Carolina (WW/SW)	State	269	12-31-22
Pennsylvania	NELAP	68-00474	06-30-23
Puerto Rico	State	GA00006	01-01-23
South Carolina	State	98001	06-30-22 *
Tennessee	State	TN02961	06-30-23
Texas	NELAP	T1047004185-19-14	11-30-22
Texas	TCEQ Water Supply	T104704185	06-30-23
USDA	US Federal Programs	P330-18-00313	09-03-24
Virginia	NELAP	460161	06-14-23
Wisconsin	State	999819810	08-31-23
Wyoming	State	8TMS-L	06-30-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Savannah

Method Summary

Client: Ransom Consulting LLC
Project/Site: PES Refinery

Job ID: 680-223928-1

Method	Method Description	Protocol	Laboratory
8015D	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	EET SAV
Moisture	Percent Moisture	EPA	EET SAV
DI Leach	Deionized Water Leaching Procedure	ASTM	EET SAV

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

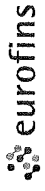
Laboratory References:

EET SAV = Eurofins Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



Chain of Custody Record

550316



ENVIRONMENTAL
TESTAMIN

Address _____

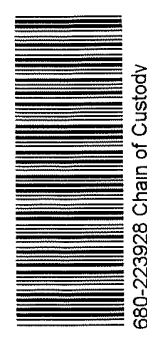
TAL-111

Regulatory Program: DW NPDES RCRA Other

Client Contact
 Company Name: RANSOM CONSULTING
 Address: 2127 HAMILTON AVE
 City/State/Zip: PRINCE HARRISON, NJ 08619
 Phone: (609) 584-0090
 Fax: _____
 Project Name: YES REFUSED - TAML CROPP07
 Site: YES REFUSED
 PO#: 200 00135

Project Manager: WALTER SCARFETT
 Tel/Email: WALTER SCARFETT @ DAVISALEXU
 Analysis Turnaround Time:
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below: STD
 2 weeks 1 week 2 days 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Gab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)
G-PR794-01R-5501	10/21	1200	G	S	1		
G-PR794-02R-5501		1210			1		
G-PR794-03R-5501		1220			1		
G-PR794-04R-5501		1230			1		
G-PR794-05R-5501		1240			1		
G-PR794-06R-5501		1250			1		
G-PR794-07R-5501		1300			1		
G-PR794-08R-5501		1310			1		



Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample
 Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:
SHIP TO SAVANNAH LAB
Temp 4.7 - 4.7

Relinquished by	Date/Time	Company	Custody Seal No	Relinquished by	Date/Time	Company
<u>[Signature]</u>	<u>10/21/07</u>	<u>RANSOM CONSULTING</u>		<u>[Signature]</u>	<u>10/24/07</u>	<u>Envirofins</u>
<u>[Signature]</u>	<u>10/24/07 17:30</u>			<u>[Signature]</u>	<u>10/24/07 17:30</u>	
<u>[Signature]</u>	<u>10/24/07 1900</u>			<u>[Signature]</u>	<u>10-25-07</u>	

Received in Laboratory by: [Signature]
 Date/Time: 10-25-07
 Company: Envirofins



Login Sample Receipt Checklist

Client: Ransom Consulting LLC

Job Number: 680-223928-1

Login Number: 223928

List Source: Eurofins Savannah

List Number: 1

Creator: Harley, Tynisha

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Eurofins Savannah

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the {0} Project Manager.

Authorization



Generated
11/15/2022 2:27:07 PM
Revision 1

Authorized for release by
Sheila Hoffman, Project Manager II
Sheila.Hoffman@et.eurofinsus.com
Designee for
Grace Chang, Project Manager II
Grace.Chang@et.eurofinsus.com
(732)593-2579



ANALYTICAL REPORT

Lab Number:	L2238159
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	07/25/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238159

Report Date: 07/25/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2238159-01	GPR799-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:30	07/18/22
L2238159-02	GPR799-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:40	07/18/22
L2238159-03	GPR799-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 09:50	07/18/22
L2238159-04	GPR799-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:00	07/18/22
L2238159-05	GPR799-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:10	07/18/22
L2238159-06	GPR799-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:20	07/18/22
L2238159-07	GPR799-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:30	07/18/22
L2238159-08	GPR798-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:40	07/18/22
L2238159-09	GPR798-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:50	07/18/22
L2238159-10	GPR798-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:00	07/18/22
L2238159-11	GPR798-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:10	07/18/22
L2238159-12	GPR798-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:20	07/18/22
L2238159-13	GPR798-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:30	07/18/22
L2238159-14	GPR798-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:40	07/18/22
L2238159-15	FB-071822-01	WATER	PHILADELPHIA, PA	07/18/22 14:00	07/18/22
L2238159-16	FB-071822-02	WATER	PHILADELPHIA, PA	07/18/22 14:10	07/18/22
L2238159-17	DUP-47	SOIL	PHILADELPHIA, PA	07/18/22 00:00	07/18/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative (continued)

Report Revision

July 25, 2022: The Client IDs were amended on L2238159-01 through -14.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2238159-01D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (131%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-02: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (156%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-03D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (65%) due to interference with the Internal Standard.

L2238159-07D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (166%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-08D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (136%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-09: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (232%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-09: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (68%) due to interference with the Internal Standard.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Case Narrative (continued)

L2238159-10: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (216%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-11D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (63%) due to interference with the Internal Standard.

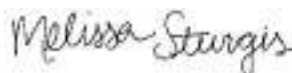
L2238159-12: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (249%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-13D: The surrogate recovery is outside the acceptance criteria for toluene-d8 (146%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238159-13D: The surrogate recovery is outside the method acceptance criteria for dibromofluoromethane (46%) due to interference with the Internal Standard.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 07/25/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-01 D
 Client ID: GPR799-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 00:07
 Analyst: JC
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	2.2		mg/kg	0.27	0.089	5
---------	-----	--	-------	------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	131	Q	70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-02
 Client ID: GPR799-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 18:24
 Analyst: JC
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	1.6		mg/kg	0.056	0.018	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	156	Q	70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-03 D
 Client ID: GPR799-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:50
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:00
 Analyst: JC
 Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	16.		mg/kg	0.45	0.15	5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	84		70-130
Toluene-d8	114		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	65	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-04 D
 Client ID: GPR799-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:41
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
-----------	--------	-----------	-------	----	-----	-----------------

Volatile Organics by EPA 5035 High - Westborough Lab						
--	--	--	--	--	--	--

Benzene	22.		mg/kg	0.22	0.073	4
---------	-----	--	-------	------	-------	---

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	130		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-05
 Client ID: GPR799-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 19:17
 Analyst: JC
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	2.7		mg/kg	0.046	0.015	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-06
 Client ID: GPR799-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 19:44
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	1.3		mg/kg	0.052	0.017	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-07 D
 Client ID: GPR799-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 22:49
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	0.71		mg/kg	0.10	0.034	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	166	Q	70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-08 D
 Client ID: GPR798-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:15
 Analyst: JC
 Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	3.4		mg/kg	0.094	0.031	2
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	136	Q	70-130
Dibromofluoromethane	86		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-09
 Client ID: GPR798-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:50
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 20:11
 Analyst: JC
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	6.2		mg/kg	0.12	0.040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	232	Q	70-130
Dibromofluoromethane	68	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-10
 Client ID: GPR798-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 20:37
 Analyst: JC
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	0.40		mg/kg	0.069	0.023	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	116		70-130
4-Bromofluorobenzene	216	Q	70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-11 D
 Client ID: GPR798-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:26
 Analyst: JC
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	14.		mg/kg	0.43	0.14	5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	117		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	63	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-12
 Client ID: GPR798-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 21:30
 Analyst: JC
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	1.4		mg/kg	0.052	0.017	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	109		70-130
4-Bromofluorobenzene	249	Q	70-130
Dibromofluoromethane	76		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-13 D
 Client ID: GPR798-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 15:53
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2.2		mg/kg	0.13	0.043	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	146	Q	70-130
4-Bromofluorobenzene	128		70-130
Dibromofluoromethane	46	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-14 D
 Client ID: GPR798-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:40
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/19/22 22:23
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	7.8		mg/kg	0.10	0.035	2
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	128		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-15
 Client ID: FB-071822-01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:01
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-16
 Client ID: FB-071822-02
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:25
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	109		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-17 D
 Client ID: DUP-47
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 00:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 00:33
 Analyst: JC
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	5900		mg/kg	58	19.	1000
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 07/19/22 16:38
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,04-10,12,14,17 Batch: WG1665199-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	100		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:29
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 15-16 Batch: WG1665431-5					
Benzene	ND		ug/l	0.50	0.16

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:50
Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03,11,13 Batch: WG1665578-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	89		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	91		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,04-10,12,14,17 Batch: WG1665199-3 WG1665199-4								
Benzene	77		80		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	96		96		70-130
4-Bromofluorobenzene	98		97		70-130
Dibromofluoromethane	102		101		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 15-16 Batch: WG1665431-3 WG1665431-4								
Benzene	100		100		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	98		95		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03,11,13 Batch: WG1665578-3 WG1665578-4								
Benzene	88		84		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	76		75		70-130
Toluene-d8	102		101		70-130
4-Bromofluorobenzene	104		103		70-130
Dibromofluoromethane	78		77		70-130



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-01

Date Collected: 07/18/22 09:30

Client ID: GPR799-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.0		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-02
Client ID: GPR799-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:40
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.0		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-03
Client ID: GPR799-03-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 09:50
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.8		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-04

Date Collected: 07/18/22 10:00

Client ID: GPR799-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.3		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-05

Date Collected: 07/18/22 10:10

Client ID: GPR799-05-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.7		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-06
Client ID: GPR799-06-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:20
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-07

Date Collected: 07/18/22 10:30

Client ID: GPR799-07-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-08
Client ID: GPR798-01-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:40
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	93.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-09
Client ID: GPR798-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:50
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-10

Date Collected: 07/18/22 11:00

Client ID: GPR798-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	70.3		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-11
Client ID: GPR798-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:10
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	69.5		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-12

Date Collected: 07/18/22 11:20

Client ID: GPR798-05-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.4		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238159

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238159-13

Date Collected: 07/18/22 11:30

Client ID: GPR798-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.6		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-14

Date Collected: 07/18/22 11:40

Client ID: GPR798-07-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.1		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238159-17

Date Collected: 07/18/22 00:00

Client ID: DUP-47

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	07/19/22 09:58	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238159

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-14,17 QC Batch ID: WG1664527-1 QC Sample: L2238159-01 Client ID: GPR799-01-SS01						
Solids, Total	88.0	87.2	%	1		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-01A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-01B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-01C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-01D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-02A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-02B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-02C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-02D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-03A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-03B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-03C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-03D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-04A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-04B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-04C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-04D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-05A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-05B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-05C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-05D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-06A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-06B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-06C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-06D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-07A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-07B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-07C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-07D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-08A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-08B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-08C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-08D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-09A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-09B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-09C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-09D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-10A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-10B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-10C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-10D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-11A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-11B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-11C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-11D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-12A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-12B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-12C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-12D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-13A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238159**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238159-13B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-13C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-13D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-14A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-14B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-14C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-14D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)
L2238159-15A	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-15B	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-15C	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16A	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16B	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-16C	Vial HCl preserved	C	NA		3.4	Y	Absent		PA-8260(14)
L2238159-17A	Vial MeOH preserved	C	NA		3.4	Y	Absent		PA-8260HLW(14)
L2238159-17B	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-17C	Vial water preserved	C	NA		3.4	Y	Absent	19-JUL-22 03:02	PA-8260HLW(14)
L2238159-17D	Plastic 120ml unpreserved	C	NA		3.4	Y	Absent		TS(7)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238159
Report Date: 07/25/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

PADEP Short List Analytical Suites per Table III-5:

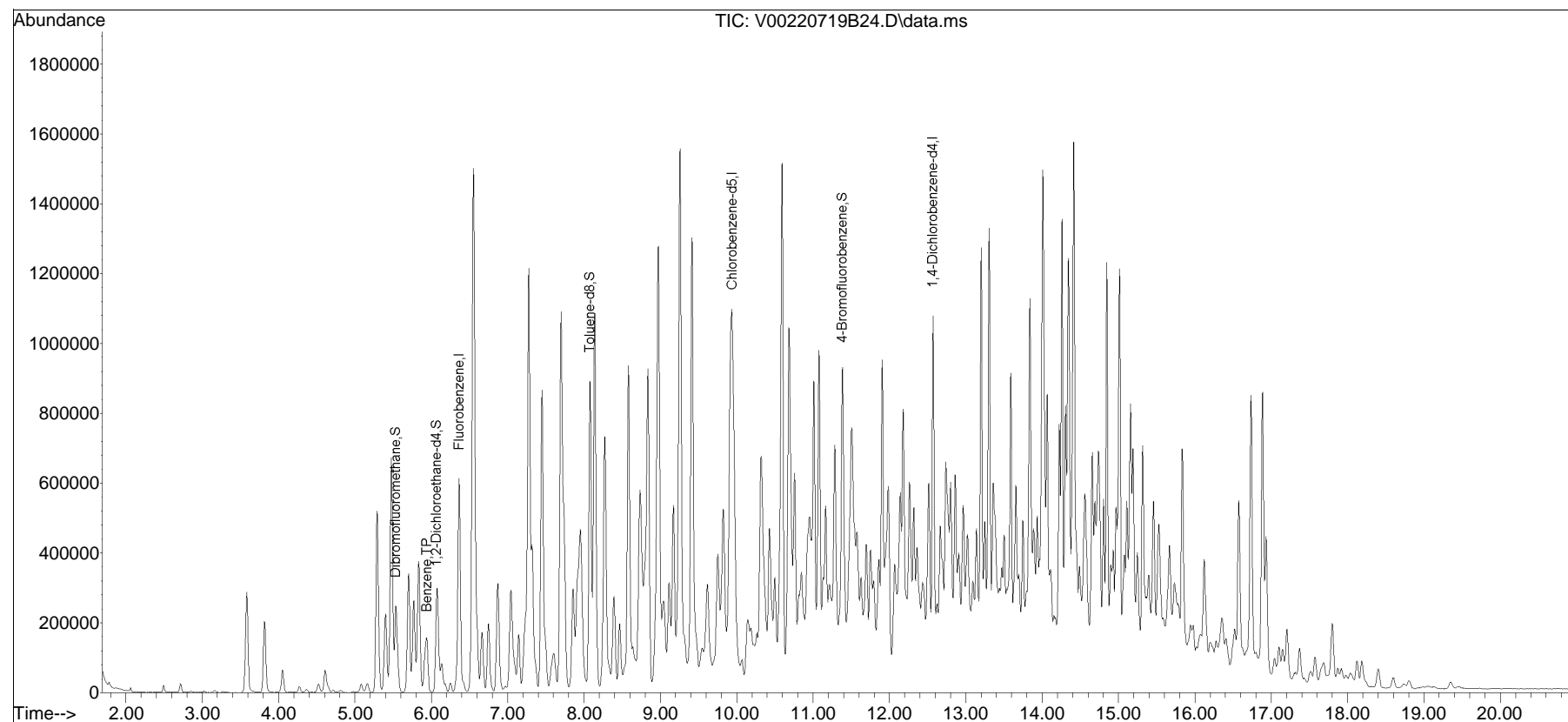
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B24.D
Acq On : 20 Jul 2022 12:07 am
Operator : VOA100:JC
Sample : 12238159-01d,31h,5.67,10,0.02,,a
Misc : WG1665199,ICAL19178
ALS Vial : 24 Sample Multiplier: 1

Quant Time: Jul 20 06:14:53 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

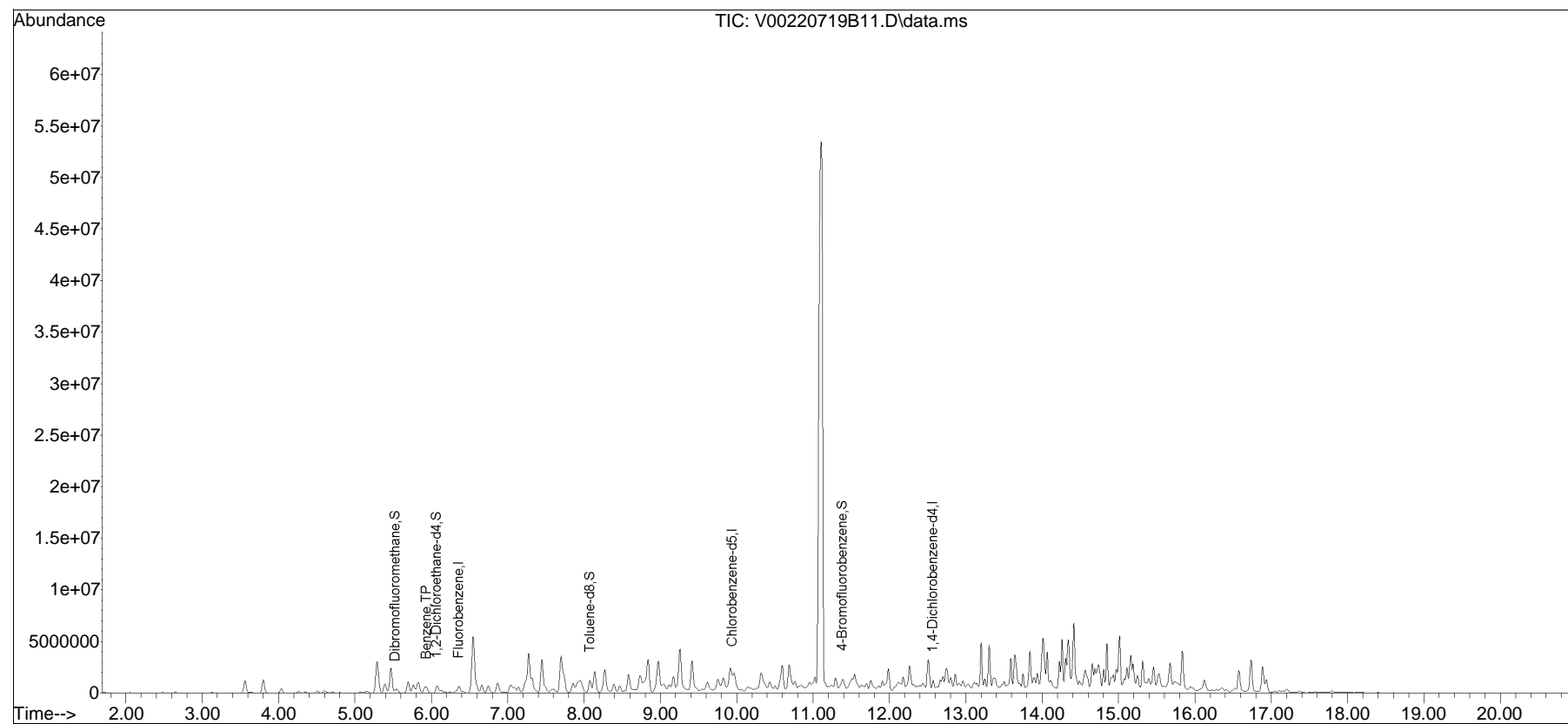


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B11.D
Acq On : 19 Jul 2022 6:24 pm
Operator : VOA100:JC
Sample : 12238159-02,31h,6.21,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Jul 20 06:14:01 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

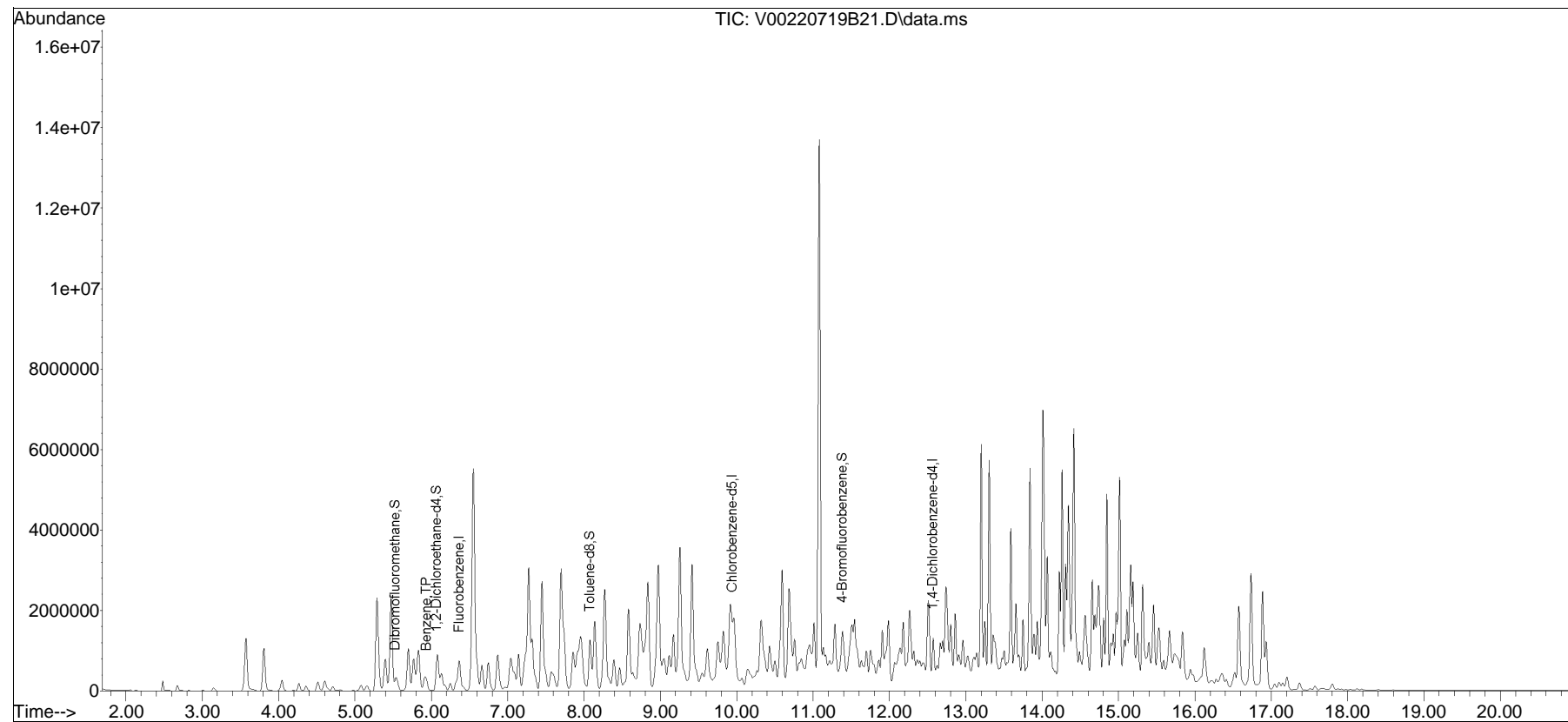


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B21.D
Acq On : 19 Jul 2022 10:49 pm
Operator : VOA100:JC
Sample : 12238159-07d,31h,6.23,10,0.05,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 20 06:14:41 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

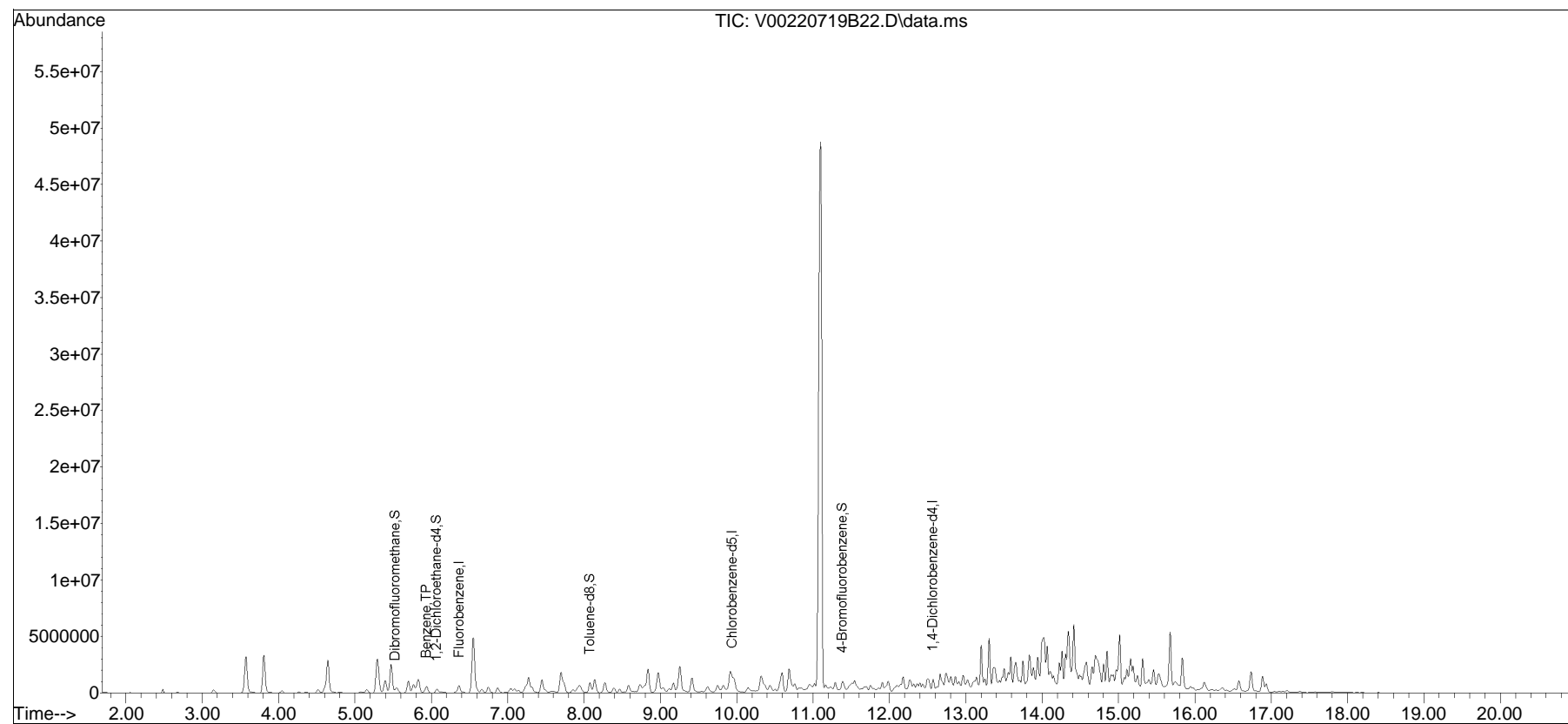


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B22.D
Acq On : 19 Jul 2022 11:15 pm
Operator : VOA100:JC
Sample : 12238159-08d,31h,5.93,10,0.05,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 22 Sample Multiplier: 1

Quant Time: Jul 20 06:14:45 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

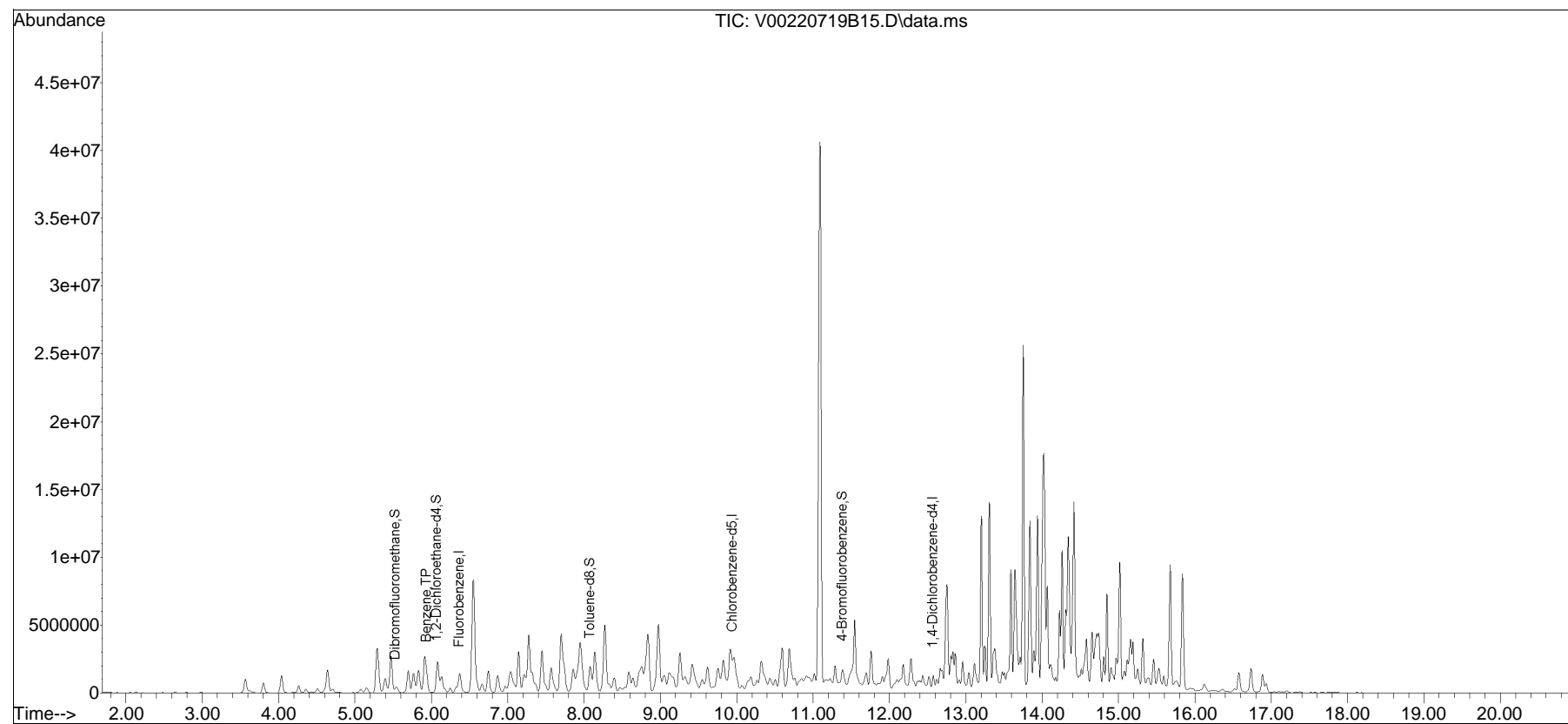


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B15.D
Acq On : 19 Jul 2022 8:11 pm
Operator : VOA100:JC
Sample : 12238159-09,31h,2.99,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 15 Sample Multiplier: 1

Quant Time: Jul 20 06:14:17 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

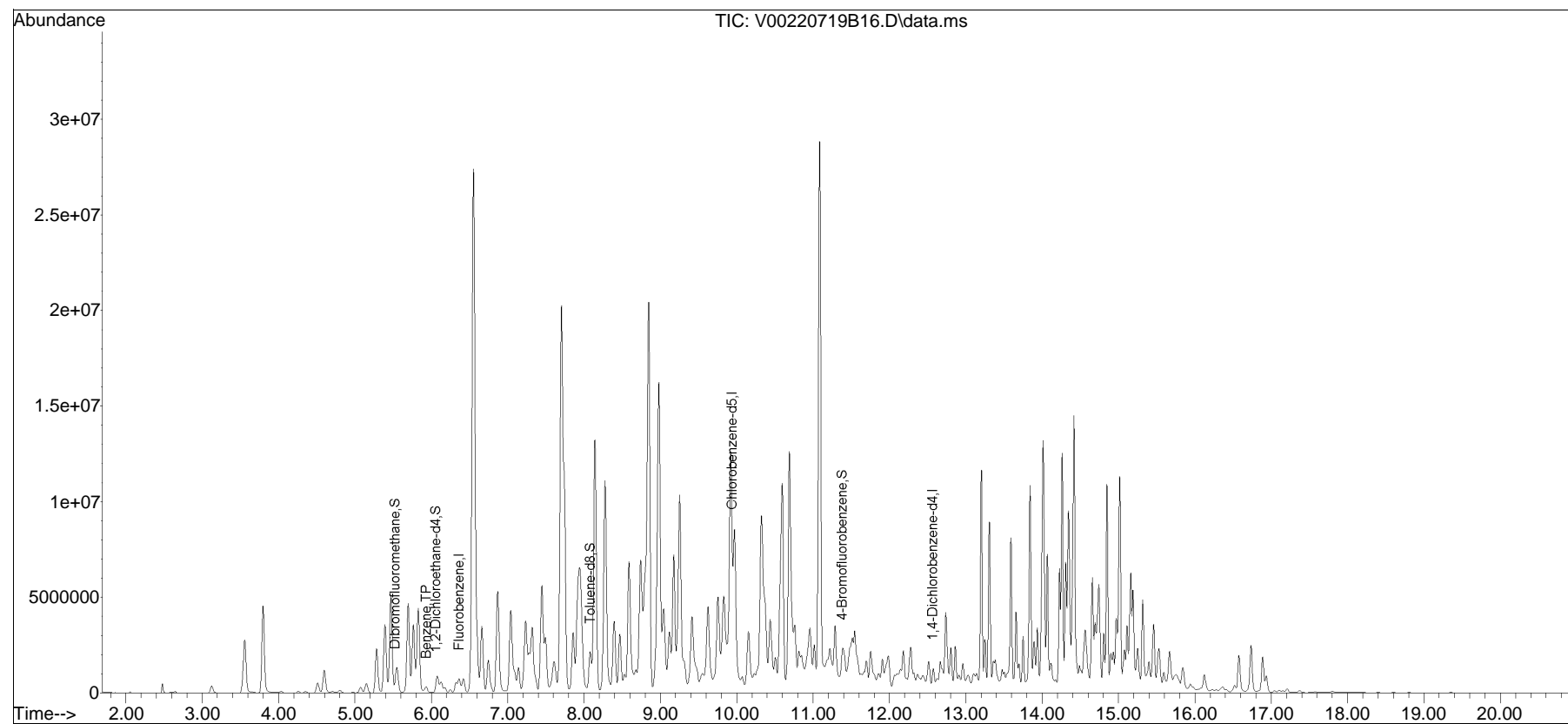


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B16.D
Acq On : 19 Jul 2022 8:37 pm
Operator : VOA100:JC
Sample : 12238159-10,31h,6.08,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 16 Sample Multiplier: 1

Quant Time: Jul 20 06:14:21 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

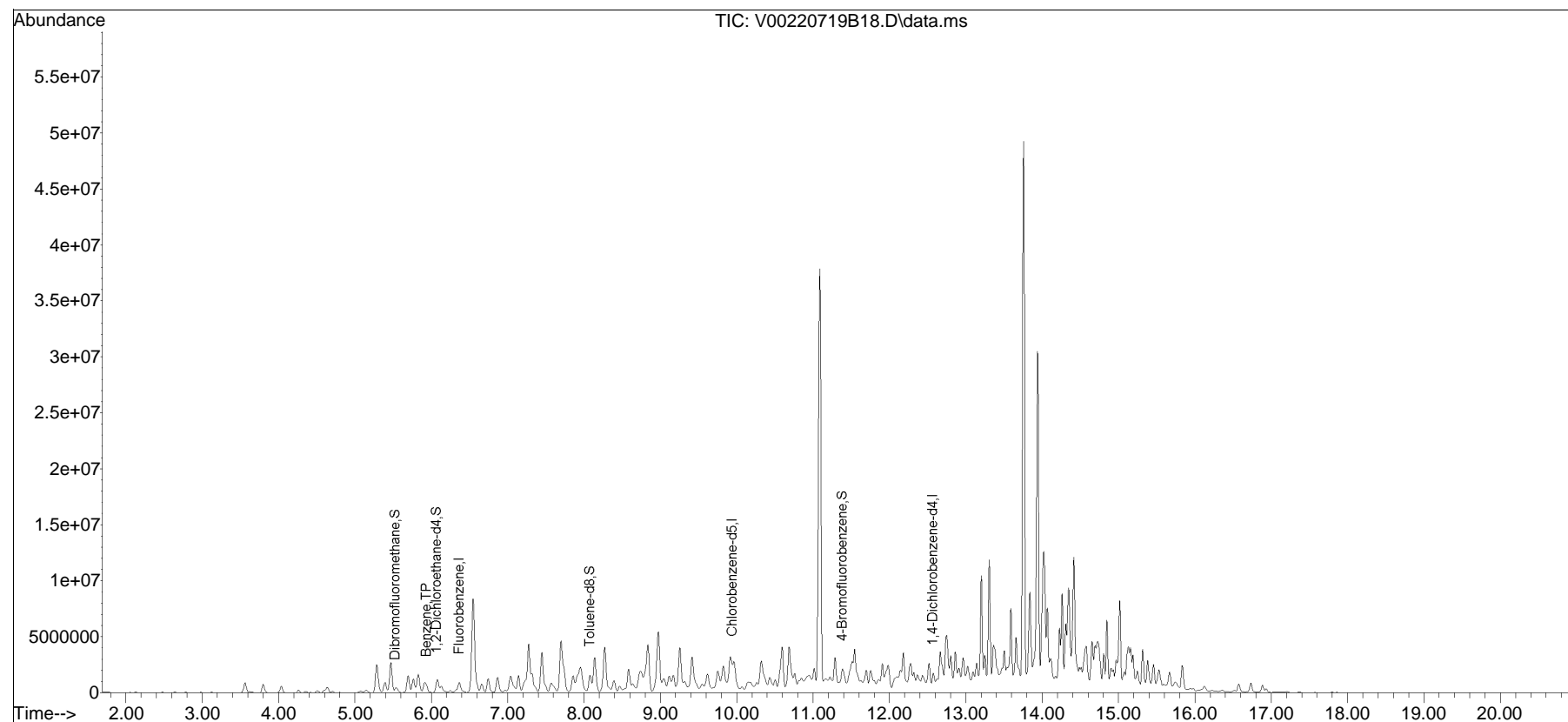


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA100\2022\220719B\
Data File : V00220719B18.D
Acq On : 19 Jul 2022 9:30 pm
Operator : VOA100:JC
Sample : 12238159-12,31h,6.50,10,0.100,,a,r2f
Misc : WG1665199,ICAL19178
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Jul 20 06:14:29 2022
Quant Method : I:\VOLATILES\VOA100\2022\220719B\V100_220714N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Fri Jul 15 08:34:11 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\220719B\V00220719B01.D•

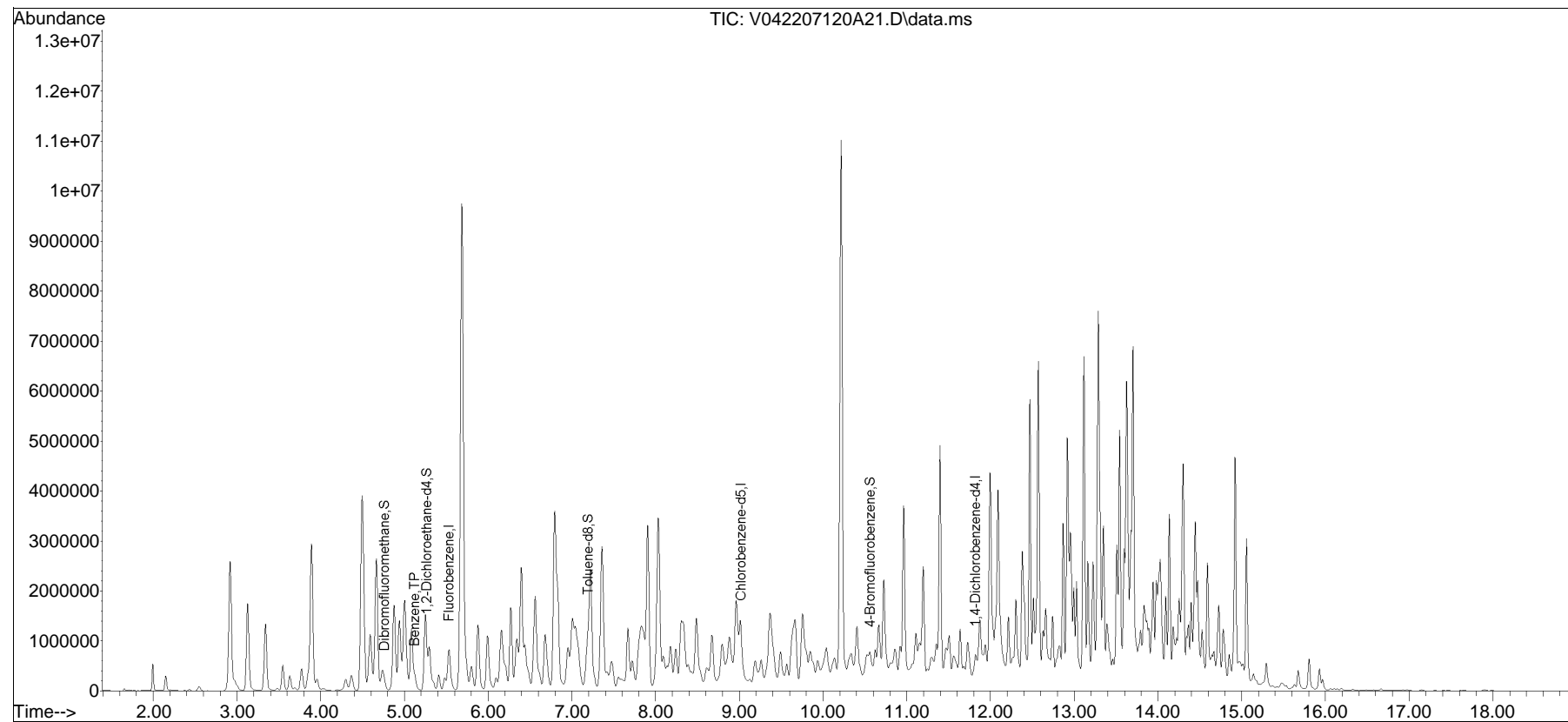


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA104\2022\2207120A\
Data File : V042207120A21.D
Acq On : 20 Jul 2022 3:53 pm
Operator : VOA104:JC
Sample : L2238159-13D,31H,5.73,10,0.050,,A
Misc : WG1665578,ICAL19119
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 21 06:56:55 2022
Quant Method : I:\VOLATILES\VOA104\2022\2207120A\V104_220621A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Wed Jun 22 06:56:43 2022
Response via : Initial Calibration

Sub List : 8260-Benzene - benzene only2\2207120A\V042207120A01.D•





ANALYTICAL REPORT

Lab Number:	L2238160
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	07/25/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2238160-01	GPR1117-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:00	07/18/22
L2238160-02	GPR1117-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 10:30	07/18/22
L2238160-03	GPR1117-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:00	07/18/22
L2238160-04	GPR1117-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:15	07/18/22
L2238160-05	GPR1117-05-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:30	07/18/22
L2238160-06	GPR1117-06-SS01	SOIL	PHILADELPHIA, PA	07/18/22 11:45	07/18/22
L2238160-07	GPR1117-07-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:00	07/18/22
L2238160-08	GPR1117-08-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:15	07/18/22
L2238160-09	GPR1116-01-SS01	SOIL	PHILADELPHIA, PA	07/18/22 12:30	07/18/22
L2238160-10	GPR1116-02-SS01	SOIL	PHILADELPHIA, PA	07/18/22 13:00	07/18/22
L2238160-11	GPR1116-03-SS01	SOIL	PHILADELPHIA, PA	07/18/22 13:30	07/18/22
L2238160-12	GPR1116-04-SS01	SOIL	PHILADELPHIA, PA	07/18/22 14:00	07/18/22
L2238160-13	FB-071822-3	WATER	PHILADELPHIA, PA	07/18/22 14:10	07/18/22
L2238160-14	FB-071822-4	WATER	PHILADELPHIA, PA	07/18/22 14:20	07/18/22
L2238160-15	TB-071822	WATER	PHILADELPHIA, PA	07/18/22 00:00	07/18/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2238160-15: A sample identified as "TB-071822" was listed on the Chain of Custody, but not received. This was verified by the client.

Volatile Organics

L2238160-04D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

L2238160-04D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (216%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-06: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (1300%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-09: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (194%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2238160-11: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (318%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

Total Metals

L2238160-01-03: The sample has an elevated detection limit for lead due to the dilution required by matrix interferences encountered during analysis.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 07/25/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01
 Client ID: GPR1117-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 02:08
 Analyst: JC
 Percent Solids: 59%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0035	0.00035	1
Benzene	ND		mg/kg	0.00087	0.00029	1
1,2-Dichloroethane	ND		mg/kg	0.0017	0.00045	1
Toluene	ND		mg/kg	0.0017	0.00094	1
1,2-Dibromoethane	ND		mg/kg	0.00087	0.00051	1
Ethylbenzene	ND		mg/kg	0.0017	0.00024	1
p/m-Xylene	ND		mg/kg	0.0035	0.00098	1
o-Xylene	0.0014	J	mg/kg	0.0017	0.00051	1
Xylenes, Total	0.0014	J	mg/kg	0.0017	0.00051	1
Isopropylbenzene	0.0055		mg/kg	0.0017	0.00019	1
1,3,5-Trimethylbenzene	0.0016	J	mg/kg	0.0035	0.00034	1
1,2,4-Trimethylbenzene	0.0023	J	mg/kg	0.0035	0.00058	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	121		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02
 Client ID: GPR1117-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 02:36
 Analyst: JC
 Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0033	0.00033	1
Benzene	ND		mg/kg	0.00083	0.00028	1
1,2-Dichloroethane	ND		mg/kg	0.0017	0.00043	1
Toluene	ND		mg/kg	0.0017	0.00090	1
1,2-Dibromoethane	ND		mg/kg	0.00083	0.00049	1
Ethylbenzene	ND		mg/kg	0.0017	0.00023	1
p/m-Xylene	ND		mg/kg	0.0033	0.00093	1
o-Xylene	0.00098	J	mg/kg	0.0017	0.00048	1
Xylenes, Total	0.00098	J	mg/kg	0.0017	0.00048	1
Isopropylbenzene	0.0010	J	mg/kg	0.0017	0.00018	1
1,3,5-Trimethylbenzene	0.0015	J	mg/kg	0.0033	0.00032	1
1,2,4-Trimethylbenzene	0.0017	J	mg/kg	0.0033	0.00055	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03
 Client ID: GPR1117-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 03:04
 Analyst: JC
 Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00029	1
Benzene	0.00024	J	mg/kg	0.00071	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00037	1
Toluene	ND		mg/kg	0.0014	0.00077	1
1,2-Dibromoethane	ND		mg/kg	0.00071	0.00042	1
Ethylbenzene	ND		mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00080	1
o-Xylene	0.00048	J	mg/kg	0.0014	0.00042	1
Xylenes, Total	0.00048	J	mg/kg	0.0014	0.00042	1
Isopropylbenzene	0.00049	J	mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00028	1
1,2,4-Trimethylbenzene	0.00085	J	mg/kg	0.0028	0.00048	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	119		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04 D
 Client ID: GPR1117-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 07:19
 Analyst: JC
 Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.1	0.11	2
Benzene	0.11	J	mg/kg	0.28	0.093	2
1,2-Dichloroethane	ND		mg/kg	0.56	0.14	2
Toluene	0.34	J	mg/kg	0.56	0.30	2
1,2-Dibromoethane	ND		mg/kg	0.28	0.16	2
Ethylbenzene	0.23	J	mg/kg	0.56	0.079	2
p/m-Xylene	0.92	J	mg/kg	1.1	0.31	2
o-Xylene	0.20	J	mg/kg	0.56	0.16	2
Xylenes, Total	1.1	J	mg/kg	0.56	0.16	2
Isopropylbenzene	3.7		mg/kg	0.56	0.061	2
1,3,5-Trimethylbenzene	0.41	J	mg/kg	1.1	0.11	2
1,2,4-Trimethylbenzene	1.3		mg/kg	1.1	0.19	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	108		70-130
4-Bromofluorobenzene	216	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
 Client ID: GPR1117-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 03:33
 Analyst: JC
 Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0044	0.00045	1
Benzene	0.0011		mg/kg	0.0011	0.00037	1
1,2-Dichloroethane	ND		mg/kg	0.0022	0.00057	1
Toluene	ND		mg/kg	0.0022	0.0012	1
1,2-Dibromoethane	ND		mg/kg	0.0011	0.00065	1
Ethylbenzene	ND		mg/kg	0.0022	0.00031	1
p/m-Xylene	ND		mg/kg	0.0044	0.0012	1
o-Xylene	ND		mg/kg	0.0022	0.00064	1
Xylenes, Total	ND		mg/kg	0.0022	0.00064	1
Isopropylbenzene	ND		mg/kg	0.0022	0.00024	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0044	0.00043	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0044	0.00074	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06
 Client ID: GPR1117-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:45
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:01
 Analyst: JC
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0038	0.00038	1
Benzene	0.0012		mg/kg	0.00094	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00048	1
Toluene	0.0020		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00094	0.00055	1
Ethylbenzene	ND		mg/kg	0.0019	0.00026	1
p/m-Xylene	0.0036	J	mg/kg	0.0038	0.0010	1
o-Xylene	0.0012	J	mg/kg	0.0019	0.00055	1
Xylenes, Total	0.0048	J	mg/kg	0.0019	0.00055	1
Isopropylbenzene	0.0012	J	mg/kg	0.0019	0.00020	1
1,3,5-Trimethylbenzene	0.0025	J	mg/kg	0.0038	0.00036	1
1,2,4-Trimethylbenzene	0.0090		mg/kg	0.0038	0.00063	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	111		70-130
4-Bromofluorobenzene	1300	Q	70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
 Client ID: GPR1117-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:29
 Analyst: JC
 Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0039	0.00039	1
Benzene	0.00049	J	mg/kg	0.00097	0.00032	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00050	1
Toluene	ND		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00097	0.00057	1
Ethylbenzene	ND		mg/kg	0.0019	0.00027	1
p/m-Xylene	ND		mg/kg	0.0039	0.0011	1
o-Xylene	ND		mg/kg	0.0019	0.00056	1
Xylenes, Total	ND		mg/kg	0.0019	0.00056	1
Isopropylbenzene	ND		mg/kg	0.0019	0.00021	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0039	0.00037	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0039	0.00064	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 04:57
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.0054		mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	ND		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	ND		mg/kg	0.0012	0.00017	1
p/m-Xylene	ND		mg/kg	0.0024	0.00066	1
o-Xylene	ND		mg/kg	0.0012	0.00034	1
Xylenes, Total	ND		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.00028	J	mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0024	0.00039	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 05:54
 Analyst: JC
 Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0029	0.00029	1
Benzene	ND		mg/kg	0.00073	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0015	0.00038	1
Toluene	0.00081	J	mg/kg	0.0015	0.00080	1
1,2-Dibromoethane	ND		mg/kg	0.00073	0.00043	1
Ethylbenzene	0.0012	J	mg/kg	0.0015	0.00021	1
p/m-Xylene	0.030		mg/kg	0.0029	0.00082	1
o-Xylene	0.012		mg/kg	0.0015	0.00043	1
Xylenes, Total	0.042		mg/kg	0.0015	0.00043	1
Isopropylbenzene	0.028		mg/kg	0.0015	0.00016	1
1,3,5-Trimethylbenzene	0.016		mg/kg	0.0029	0.00028	1
1,2,4-Trimethylbenzene	0.026		mg/kg	0.0029	0.00049	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	123		70-130
4-Bromofluorobenzene	194	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10
 Client ID: GPR1116-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 06:22
 Analyst: JC
 Percent Solids: 54%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.017		mg/kg	0.00092	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00048	1
Toluene	0.020		mg/kg	0.0018	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00092	0.00054	1
Ethylbenzene	0.0031		mg/kg	0.0018	0.00026	1
p/m-Xylene	0.016		mg/kg	0.0037	0.0010	1
o-Xylene	0.0055		mg/kg	0.0018	0.00054	1
Xylenes, Total	0.022		mg/kg	0.0018	0.00054	1
Isopropylbenzene	0.0091		mg/kg	0.0018	0.00020	1
1,3,5-Trimethylbenzene	0.00097	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.029		mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	121		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11
 Client ID: GPR1116-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 06:51
 Analyst: JC
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0029	0.00029	1
Benzene	0.0012		mg/kg	0.00072	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00037	1
Toluene	0.00080	J	mg/kg	0.0014	0.00078	1
1,2-Dibromoethane	ND		mg/kg	0.00072	0.00042	1
Ethylbenzene	0.00040	J	mg/kg	0.0014	0.00020	1
p/m-Xylene	0.00085	J	mg/kg	0.0029	0.00080	1
o-Xylene	0.0031		mg/kg	0.0014	0.00042	1
Xylenes, Total	0.0040	J	mg/kg	0.0014	0.00042	1
Isopropylbenzene	0.015		mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	0.00056	J	mg/kg	0.0029	0.00028	1
1,2,4-Trimethylbenzene	0.0095		mg/kg	0.0029	0.00048	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	121		70-130
4-Bromofluorobenzene	318	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
 Client ID: GPR1116-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 05:25
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0023	0.00024	1
Benzene	0.00056	J	mg/kg	0.00059	0.00019	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.0017		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00034	1
Ethylbenzene	0.0010	J	mg/kg	0.0012	0.00016	1
p/m-Xylene	0.0082		mg/kg	0.0023	0.00066	1
o-Xylene	0.0068		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.015		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.024		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0089		mg/kg	0.0023	0.00023	1
1,2,4-Trimethylbenzene	0.022		mg/kg	0.0023	0.00039	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:17
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 12:49
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	110		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:23
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 07/20/22 13:13
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	109		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-15
 Client ID: TB-071822
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 00:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 07/20/22 16:30
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 07/20/22 14:35
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 07/20/22 13:30

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 13-15 Batch: WG1664686-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 07/19/22 23:46
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03,05-12 Batch: WG1665206-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 07/19/22 23:46
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04 Batch: WG1665207-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/20/22 08:29
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 13-14 Batch: WG1665431-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	103		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 13-15 Batch: WG1664686-2									
1,2-Dibromoethane	93		-		80-120	-		20	A

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03,05-12 Batch: WG1665206-3 WG1665206-4								
Methyl tert butyl ether	116		115		66-130	1		30
Benzene	107		106		70-130	1		30
1,2-Dichloroethane	98		98		70-130	0		30
Toluene	105		105		70-130	0		30
1,2-Dibromoethane	104		104		70-130	0		30
Ethylbenzene	104		104		70-130	0		30
p/m-Xylene	105		105		70-130	0		30
o-Xylene	105		104		70-130	1		30
Isopropylbenzene	108		108		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		105		70-130	0		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	101		102		70-130
4-Bromofluorobenzene	106		105		70-130
Dibromofluoromethane	91		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04 Batch: WG1665207-3 WG1665207-4								
Methyl tert butyl ether	116		115		66-130	1		30
Benzene	107		106		70-130	1		30
1,2-Dichloroethane	98		98		70-130	0		30
Toluene	105		105		70-130	0		30
1,2-Dibromoethane	104		104		70-130	0		30
Ethylbenzene	104		104		70-130	0		30
p/m-Xylene	105		105		70-130	0		30
o-Xylene	105		104		70-130	1		30
Isopropylbenzene	108		108		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		105		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	101		102		70-130
4-Bromofluorobenzene	106		104		70-130
Dibromofluoromethane	91		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 13-14 Batch: WG1665431-3 WG1665431-4								
Methyl tert butyl ether	100		110		63-130	10		20
Benzene	100		100		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	100		100		70-130	0		20
Ethylbenzene	100		100		70-130	0		20
p/m-Xylene	105		100		70-130	5		20
o-Xylene	100		100		70-130	0		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	98		95		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01
 Client ID: GPR1117-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 06:49
 Analyst: SLR
 Percent Solids: 59%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.1		mg/kg	0.28	0.034	1
Fluorene	0.26	J	mg/kg	0.28	0.027	1
Phenanthrene	0.86		mg/kg	0.17	0.034	1
Anthracene	0.22		mg/kg	0.17	0.054	1
Pyrene	1.2		mg/kg	0.17	0.028	1
Benzo(a)anthracene	0.72		mg/kg	0.17	0.031	1
Chrysene	0.79		mg/kg	0.17	0.029	1
Benzo(b)fluoranthene	0.97		mg/kg	0.17	0.047	1
Benzo(a)pyrene	1.0		mg/kg	0.22	0.068	1
Benzo(ghi)perylene	0.50		mg/kg	0.22	0.033	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	39		30-120
4-Terphenyl-d14	33		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02
 Client ID: GPR1117-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 05:15
 Analyst: SLR
 Percent Solids: 67%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.24	0.030	1
Fluorene	0.27		mg/kg	0.24	0.024	1
Phenanthrene	0.80		mg/kg	0.14	0.029	1
Anthracene	0.29		mg/kg	0.14	0.047	1
Pyrene	1.5		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.76		mg/kg	0.14	0.027	1
Chrysene	0.88		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	1.0		mg/kg	0.14	0.041	1
Benzo(a)pyrene	1.1		mg/kg	0.19	0.059	1
Benzo(ghi)perylene	0.58		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	114		23-120
2-Fluorobiphenyl	60		30-120
4-Terphenyl-d14	59		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03
 Client ID: GPR1117-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 03:18
 Analyst: SLR
 Percent Solids: 68%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	6.3		mg/kg	0.24	0.029	1
Fluorene	2.7		mg/kg	0.24	0.023	1
Phenanthrene	8.9		mg/kg	0.14	0.029	1
Anthracene	1.4		mg/kg	0.14	0.046	1
Pyrene	3.2		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.88		mg/kg	0.14	0.027	1
Chrysene	1.0		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	0.79		mg/kg	0.14	0.040	1
Benzo(a)pyrene	0.84		mg/kg	0.19	0.058	1
Benzo(ghi)perylene	0.41		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	101		23-120
2-Fluorobiphenyl	54		30-120
4-Terphenyl-d14	53		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04
 Client ID: GPR1117-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 07:35
 Analyst: SLR
 Percent Solids: 79%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.20	0.025	1
Fluorene	1.0		mg/kg	0.20	0.020	1
Phenanthrene	3.5		mg/kg	0.12	0.025	1
Anthracene	0.96		mg/kg	0.12	0.040	1
Pyrene	4.8		mg/kg	0.12	0.020	1
Benzo(a)anthracene	2.9		mg/kg	0.12	0.023	1
Chrysene	2.8		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	3.4		mg/kg	0.12	0.035	1
Benzo(a)pyrene	3.1		mg/kg	0.16	0.050	1
Benzo(ghi)perylene	1.6		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	360	Q	23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	61		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
 Client ID: GPR1117-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:28
 Analyst: SLR
 Percent Solids: 44%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.32	J	mg/kg	0.37	0.045	1
Fluorene	0.19	J	mg/kg	0.37	0.036	1
Phenanthrene	1.2		mg/kg	0.22	0.045	1
Anthracene	0.54		mg/kg	0.22	0.072	1
Pyrene	1.1		mg/kg	0.22	0.037	1
Benzo(a)anthracene	0.67		mg/kg	0.22	0.042	1
Chrysene	0.66		mg/kg	0.22	0.039	1
Benzo(b)fluoranthene	0.75		mg/kg	0.22	0.062	1
Benzo(a)pyrene	0.64		mg/kg	0.30	0.091	1
Benzo(ghi)perylene	0.36		mg/kg	0.30	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	125	Q	23-120
2-Fluorobiphenyl	64		30-120
4-Terphenyl-d14	65		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06
 Client ID: GPR1117-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:45
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:52
 Analyst: SLR
 Percent Solids: 69%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.2		mg/kg	0.24	0.029	1
Fluorene	0.12	J	mg/kg	0.24	0.023	1
Phenanthrene	0.52		mg/kg	0.14	0.029	1
Anthracene	0.22		mg/kg	0.14	0.047	1
Pyrene	0.76		mg/kg	0.14	0.024	1
Benzo(a)anthracene	0.53		mg/kg	0.14	0.027	1
Chrysene	0.74		mg/kg	0.14	0.025	1
Benzo(b)fluoranthene	0.76		mg/kg	0.14	0.041	1
Benzo(a)pyrene	0.72		mg/kg	0.19	0.059	1
Benzo(ghi)perylene	0.49		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	102		23-120
2-Fluorobiphenyl	48		30-120
4-Terphenyl-d14	36		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
 Client ID: GPR1117-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 06:02
 Analyst: SLR
 Percent Solids: 60%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.45		mg/kg	0.28	0.034	1
Fluorene	0.11	J	mg/kg	0.28	0.027	1
Phenanthrene	0.39		mg/kg	0.17	0.034	1
Anthracene	0.098	J	mg/kg	0.17	0.054	1
Pyrene	0.39		mg/kg	0.17	0.028	1
Benzo(a)anthracene	0.26		mg/kg	0.17	0.031	1
Chrysene	0.27		mg/kg	0.17	0.029	1
Benzo(b)fluoranthene	0.36		mg/kg	0.17	0.047	1
Benzo(a)pyrene	0.30		mg/kg	0.22	0.068	1
Benzo(ghi)perylene	0.20	J	mg/kg	0.22	0.032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	30		30-120
4-Terphenyl-d14	27		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 08:23
 Analyst: SLR
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.14	J	mg/kg	0.21	0.026	1
Fluorene	0.12	J	mg/kg	0.21	0.021	1
Phenanthrene	1.1		mg/kg	0.13	0.026	1
Anthracene	0.30		mg/kg	0.13	0.042	1
Pyrene	1.0		mg/kg	0.13	0.021	1
Benzo(a)anthracene	0.59		mg/kg	0.13	0.024	1
Chrysene	0.58		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	0.61		mg/kg	0.13	0.036	1
Benzo(a)pyrene	0.54		mg/kg	0.17	0.052	1
Benzo(ghi)perylene	0.26		mg/kg	0.17	0.025	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	54		23-120
2-Fluorobiphenyl	31		30-120
4-Terphenyl-d14	31		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 03:41
 Analyst: SLR
 Percent Solids: 67%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.94		mg/kg	0.24	0.030	1
Fluorene	0.11	J	mg/kg	0.24	0.024	1
Phenanthrene	0.32		mg/kg	0.15	0.030	1
Anthracene	0.14	J	mg/kg	0.15	0.048	1
Pyrene	0.49		mg/kg	0.15	0.024	1
Benzo(a)anthracene	0.38		mg/kg	0.15	0.027	1
Chrysene	0.42		mg/kg	0.15	0.025	1
Benzo(b)fluoranthene	0.57		mg/kg	0.15	0.041	1
Benzo(a)pyrene	0.58		mg/kg	0.20	0.060	1
Benzo(ghi)perylene	0.33		mg/kg	0.20	0.029	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	56		23-120
2-Fluorobiphenyl	28	Q	30-120
4-Terphenyl-d14	27		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10
 Client ID: GPR1116-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 04:05
 Analyst: SLR
 Percent Solids: 54%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.0		mg/kg	0.30	0.037	1
Fluorene	0.35		mg/kg	0.30	0.030	1
Phenanthrene	0.94		mg/kg	0.18	0.037	1
Anthracene	0.34		mg/kg	0.18	0.059	1
Pyrene	1.2		mg/kg	0.18	0.030	1
Benzo(a)anthracene	0.81		mg/kg	0.18	0.034	1
Chrysene	0.92		mg/kg	0.18	0.032	1
Benzo(b)fluoranthene	1.1		mg/kg	0.18	0.051	1
Benzo(a)pyrene	1.2		mg/kg	0.24	0.074	1
Benzo(ghi)perylene	0.54		mg/kg	0.24	0.036	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	57		23-120
2-Fluorobiphenyl	29	Q	30-120
4-Terphenyl-d14	26		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11
 Client ID: GPR1116-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 10:21
 Analyst: SLR
 Percent Solids: 69%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.52		mg/kg	0.24	0.029	1
Fluorene	0.75		mg/kg	0.24	0.023	1
Phenanthrene	1.5		mg/kg	0.14	0.029	1
Anthracene	0.30		mg/kg	0.14	0.046	1
Pyrene	0.68		mg/kg	0.14	0.023	1
Benzo(a)anthracene	0.39		mg/kg	0.14	0.026	1
Chrysene	0.77		mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	0.49		mg/kg	0.14	0.040	1
Benzo(a)pyrene	0.42		mg/kg	0.19	0.058	1
Benzo(ghi)perylene	0.22		mg/kg	0.19	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	70		23-120
2-Fluorobiphenyl	29	Q	30-120
4-Terphenyl-d14	28		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
 Client ID: GPR1116-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 07/20/22 18:55
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.8		mg/kg	0.20	0.024	1
Fluorene	0.16	J	mg/kg	0.20	0.019	1
Phenanthrene	0.52		mg/kg	0.12	0.024	1
Anthracene	0.28		mg/kg	0.12	0.038	1
Pyrene	0.54		mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.49		mg/kg	0.12	0.022	1
Chrysene	0.52		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.67		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.66		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.52		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	34		23-120
2-Fluorobiphenyl	36		30-120
4-Terphenyl-d14	30		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13
 Client ID: FB-071822-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:10
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 07/21/22 11:19
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	36		23-120
2-Fluorobiphenyl	38		15-120
4-Terphenyl-d14	38	Q	41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14
 Client ID: FB-071822-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:20
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 07/21/22 11:35
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	38		23-120
2-Fluorobiphenyl	40		15-120
4-Terphenyl-d14	39	Q	41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 07/19/22 23:24
Analyst: SLR

Extraction Method: EPA 3546
Extraction Date: 07/19/22 13:32

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-12 Batch: WG1664828-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.099	0.020
Anthracene	ND		mg/kg	0.099	0.032
Pyrene	ND		mg/kg	0.099	0.016
Benzo(a)anthracene	ND		mg/kg	0.099	0.019
Chrysene	ND		mg/kg	0.099	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.099	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	112		23-120
2-Fluorobiphenyl	65		30-120
4-Terphenyl-d14	69		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8270D-SIM
 Analytical Date: 07/21/22 10:15
 Analyst: RP

Extraction Method: EPA 3510C
 Extraction Date: 07/20/22 05:15

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 13-14 Batch: WG1665023-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	33		23-120
2-Fluorobiphenyl	35		15-120
4-Terphenyl-d14	34	Q	41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-12 Batch: WG1664828-2 WG1664828-3								
Naphthalene	51		63		40-140	21		50
Fluorene	50		64		40-140	25		50
Phenanthrene	50		63		40-140	23		50
Anthracene	51		66		40-140	26		50
Pyrene	49		63		35-142	25		50
Benzo(a)anthracene	50		64		40-140	25		50
Chrysene	51		64		40-140	23		50
Benzo(b)fluoranthene	48		63		40-140	27		50
Benzo(a)pyrene	50		65		40-140	26		50
Benzo(ghi)perylene	46		60		40-140	26		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	80		102		23-120
2-Fluorobiphenyl	46		57		30-120
4-Terphenyl-d14	47		60		18-120

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 13-14 Batch: WG1665023-2 WG1665023-3								
Naphthalene	73		65		40-140	12		40
Fluorene	71		65		40-140	9		40
Phenanthrene	73		67		40-140	9		40
Anthracene	71		66		40-140	7		40
Pyrene	68		65		26-127	5		40
Benzo(a)anthracene	70		65		40-140	7		40
Chrysene	74		69		40-140	7		40
Benzo(b)fluoranthene	74		70		40-140	6		40
Benzo(a)pyrene	73		69		40-140	6		40
Benzo(ghi)perylene	82		82		40-140	0		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	36		32		23-120
2-Fluorobiphenyl	37		33		15-120
4-Terphenyl-d14	36	Q	35	Q	41-149



METALS



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-01
 Client ID: GPR1117-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 10:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 59%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	157		mg/kg	6.55	0.351	2	07/19/22 09:10	07/20/22 16:06	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-02

Date Collected: 07/18/22 10:30

Client ID: GPR1117-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	125		mg/kg	5.59	0.300	2	07/19/22 09:10	07/20/22 16:11	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-03

Date Collected: 07/18/22 11:00

Client ID: GPR1117-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 68%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	133		mg/kg	5.80	0.311	2	07/19/22 09:10	07/20/22 16:15	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04

Date Collected: 07/18/22 11:15

Client ID: GPR1117-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	66.9		mg/kg	2.44	0.130	1	07/19/22 09:10	07/20/22 14:04	EPA 3050B	1,6010D	SB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05

Date Collected: 07/18/22 11:30

Client ID: GPR1117-05-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	619		mg/kg	4.42	0.237	1	07/19/22 09:10	07/20/22 14:09	EPA 3050B	1,6010D	SB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-06
 Client ID: GPR1117-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:45
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	687		mg/kg	2.85	0.153	1	07/19/22 09:10	07/20/22 14:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
 Client ID: GPR1117-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	981		mg/kg	3.24	0.173	1	07/19/22 09:10	07/20/22 14:18	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	20.4		mg/kg	2.46	0.132	1	07/19/22 09:10	07/20/22 14:55	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 67%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	19.4		mg/kg	2.87	0.154	1	07/19/22 09:10	07/20/22 14:59	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10
 Client ID: GPR1116-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 13:00
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 54%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	97.8		mg/kg	3.52	0.189	1	07/19/22 09:10	07/20/22 15:04	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11

Date Collected: 07/18/22 13:30

Client ID: GPR1116-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 69%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	1360		mg/kg	2.83	0.152	1	07/19/22 09:10	07/20/22 15:09	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12

Date Collected: 07/18/22 14:00

Client ID: GPR1116-04-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	20.2		mg/kg	2.31	0.124	1	07/19/22 09:10	07/20/22 15:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-13

Date Collected: 07/18/22 14:10

Client ID: FB-071822-3

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 20:23	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-14

Date Collected: 07/18/22 14:20

Client ID: FB-071822-4

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 20:28	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-12 Batch: WG1664552-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	07/19/22 09:10	07/20/22 09:38	1,6010D	SB

Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 13-14 Batch: WG1664652-1									
Lead, Total	ND	ug/l	1.000	0.3430	1	07/19/22 10:34	07/19/22 19:15	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 Batch: WG1664552-2 SRM Lot Number: D113-540								
Lead, Total	90		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 13-14 Batch: WG1664652-2								
Lead, Total	96		-		80-120	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1664552-3 QC Sample: L2238152-01 Client ID: MS Sample												
Lead, Total	16.8	45.6	41.9	55	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1664652-3 WG1664652-4 QC Sample: L2238192-01 Client ID: MS Sample												
Lead, Total	10.88	530	549.9	102		505.6	93		75-125	8		20
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1664652-7 WG1664652-8 QC Sample: L2238192-03 Client ID: MS Sample												
Lead, Total	ND	530	506.0	95		507.2	96		75-125	0		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1664552-4 QC Sample: L2238152-01 Client ID: DUP Sample						
Lead, Total	16.8	12.3	mg/kg	31	Q	20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-01

Date Collected: 07/18/22 10:00

Client ID: GPR1117-01-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	58.7		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-02

Date Collected: 07/18/22 10:30

Client ID: GPR1117-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-03

Date Collected: 07/18/22 11:00

Client ID: GPR1117-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	68.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-04
Client ID: GPR1117-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:15
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	78.9		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-05
Client ID: GPR1117-05-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 11:30
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	43.5		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**SAMPLE RESULTS**

Lab ID: L2238160-06

Date Collected: 07/18/22 11:45

Client ID: GPR1117-06-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	68.5		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-07
Client ID: GPR1117-07-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:00
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	59.6		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-08
 Client ID: GPR1117-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:15
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.1		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-09
 Client ID: GPR1116-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 12:30
 Date Received: 07/18/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	67.4		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-10

Date Collected: 07/18/22 13:00

Client ID: GPR1116-02-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	53.9		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-11

Date Collected: 07/18/22 13:30

Client ID: GPR1116-03-SS01

Date Received: 07/18/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	69.3		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

SAMPLE RESULTS

Lab ID: L2238160-12
Client ID: GPR1116-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 07/18/22 14:00
Date Received: 07/18/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.2		%	0.100	NA	1	-	07/19/22 10:10	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2238160

Report Date: 07/25/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-12 QC Batch ID: WG1664529-1 QC Sample: L2238160-01 Client ID: GPR1117-01-SS01						
Solids, Total	58.7	62.1	%	6		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-01A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-01B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-01C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-01D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-01F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-02A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-02B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-02C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-02D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-02E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-02F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-03A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)
L2238160-03B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-03C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-03D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-03E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-03F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-04A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-04B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-04C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-04D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-04F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-05A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-05B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-05C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-05D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-05E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-05F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-06A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-06B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-06C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-06D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-06F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-07A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-07B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-07C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-07D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-07F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-08A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-08B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-08C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-08D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-08E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-08F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-09A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-09B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-09C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-09D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-09E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-09F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-10A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-10B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-10C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-10D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-10E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-10F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-11A	Vial MeOH preserved	B	NA		4.9	Y	Absent		PA-8260HLW(14)
L2238160-11B	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-11C	Vial water preserved	B	NA		4.9	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-11D	Plastic 120ml unpreserved	B	NA		4.9	Y	Absent		TS(7)
L2238160-11E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		4.9	Y	Absent		PB-TI(180)
L2238160-11F	Glass 120ml/4oz unpreserved	B	NA		4.9	Y	Absent		PA-PAH(14)
L2238160-12A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2238160-12B	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-12C	Vial water preserved	A	NA		3.5	Y	Absent	19-JUL-22 03:12	PA-8260HLW(14)
L2238160-12D	Plastic 120ml unpreserved	A	NA		3.5	Y	Absent		TS(7)
L2238160-12E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.5	Y	Absent		PB-TI(180)
L2238160-12F	Glass 120ml/4oz unpreserved	A	NA		3.5	Y	Absent		PA-PAH(14)
L2238160-13A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2238160-13D	Vial Na2S2O3 preserved	A	NA		3.5	Y	Absent		8011(14)
L2238160-13E	Vial Na2S2O3 preserved	A	NA		3.5	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2238160**Project Number:** 200.00135.006**Report Date:** 07/25/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2238160-13F	Plastic 250ml HNO3 preserved	A	<2	<2	3.5	Y	Absent		PB-6020T-PPB(180)
L2238160-13G	Amber 250ml unpreserved	A	7	7	3.5	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-13H	Amber 250ml unpreserved	A	7	7	3.5	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-14A	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14B	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14C	Vial HCl preserved	B	NA		4.9	Y	Absent		PA-8260(14)
L2238160-14D	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-14E	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-14F	Plastic 250ml HNO3 preserved	B	<2	<2	4.9	Y	Absent		PB-6020T-PPB(180)
L2238160-14G	Amber 250ml unpreserved	B	7	7	4.9	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-14H	Amber 250ml unpreserved	B	7	7	4.9	Y	Absent		PA-PAHSIM-LVI(7)
L2238160-15A	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)
L2238160-15B	Vial Na2S2O3 preserved	B	NA		4.9	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2238160
Report Date: 07/25/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2238160

Project Number: 200.00135.006

Report Date: 07/25/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Westborough, MA
 TEL: 508-898-9220
 FAX: 508-898-9193

Mansfield, MA
 TEL: 508-822-9300
 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC
 Address: 2127 Hamilton Avenue
 Trenton, NJ 08619
 Phone: 215-901-4974

Fax:
 Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
38160-01	CPR1117-01-SS01	7/18	1000	TS ↔ S	
02	CPR1117-02-SS01		1030		
03	CPR1117-03-SS01		1100		
04	CPR1117-04-SS01		1115		
05	CPR1117-05-SS01		1130		
06	CPR1117-06-SS01		1145		
07	CPR1117-07-SS01		1200		
08	CPR1117-08-SS01		1215		
09	CPR1116-01-SS01		1230		
10	CPR1116-02-SS01		1300		

Container Type: G
 Preservative:

Relinquished By: *[Signature]*
 Date/Time: 7/18/22 14:58
 Received By: *[Signature]*
 Date/Time: 7/18/22 14:58

Date Rec'd in Lab: 7/19/22
 ALPHA Job #: L2238160

Report Information
 FAX EMAIL
 ADEx Add'l Deliverables

Billing Information
 Same as Client info PO #: 3562

Regulatory Requirements/Report Limits
 State/Fed Program: Criteria:

ANALYSIS												SAMPLE HANDLING Filtration <input type="checkbox"/> Done <input checked="" type="checkbox"/> Not Needed <input type="checkbox"/> Lab to do Preservation <input type="checkbox"/> Lab to do (Please specify below)	TOTAL # BOTTLES
1	2	3	4	5	6	7	8	9	10	11	12		
5-1													
TS													
SHORTLIST													

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

CHAIN OF CUSTODY

PAGE 2 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: _____ Time: _____

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrafase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		

381160-11	GPR1116-03-5501	7/18	1330	S	TS
12	GPR1116-04-5501		1400	S	TS
13	FB-071822-3		1410	W	
14	FB-071822-4		1420	W	
15	FB-071822		-	W	

Date Rec'd in Lab: 7/19/22

ALPHA Job #: L2238160

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client Info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

ANALYTE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SHORTLIST 1-5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VOC PORTION of SL-5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EOB (8-11)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING

Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

Container Type - - G - - - - -

Preservative - - - - -

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	7/18 14:58	<i>[Signature]</i>	7/18/22 14:58
<i>[Signature]</i>	7/18/22 1:00	<i>[Signature]</i>	7/18/22 2:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

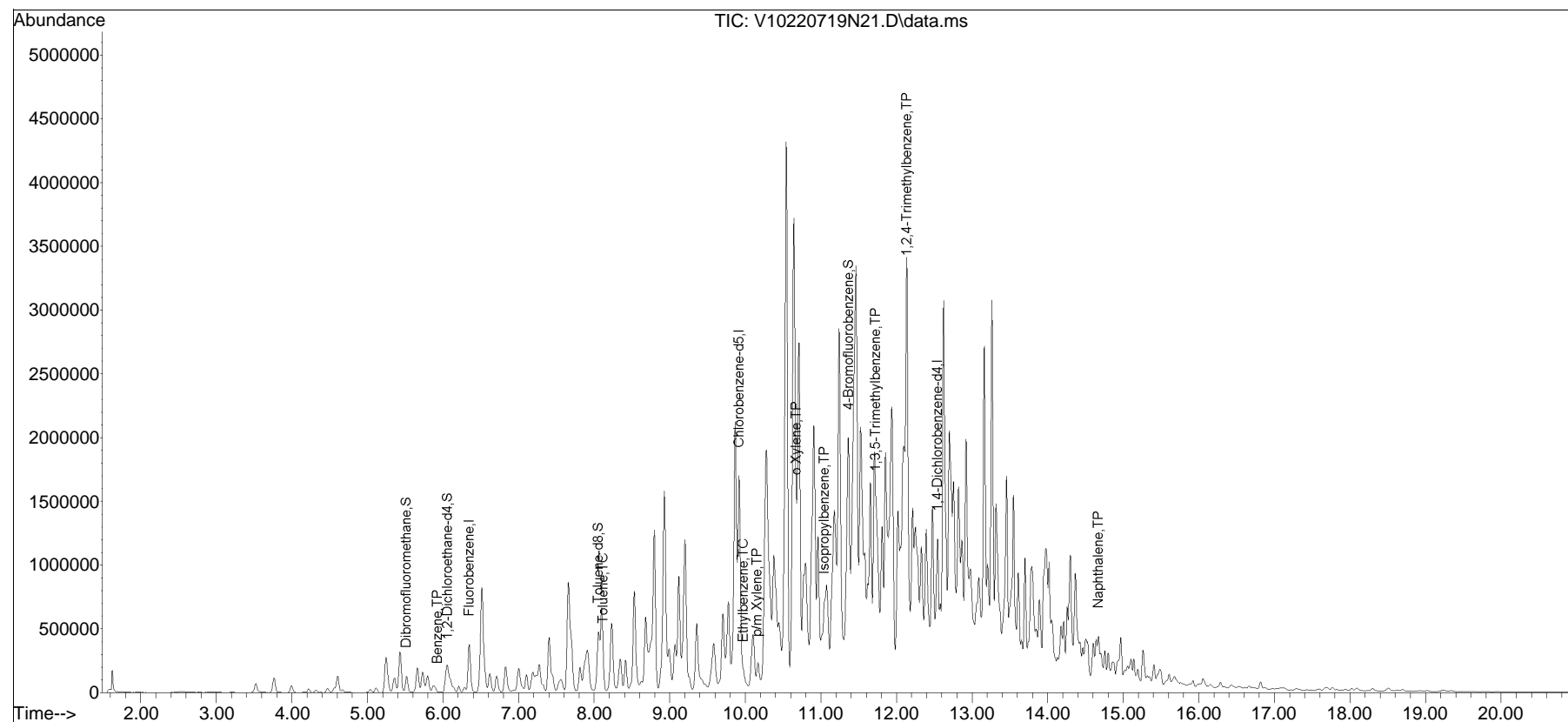
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N21.D
Acq On : 20 Jul 2022 7:19 am
Operator : VOA110:JC
Sample : 12238160-04d,31h,1.19,5,0.05,,a,r2f
Misc : WG1665207,ICAL18890
ALS Vial : 21 Sample Multiplier: 1

Quant Time: Jul 20 07:46:26 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N01.D•

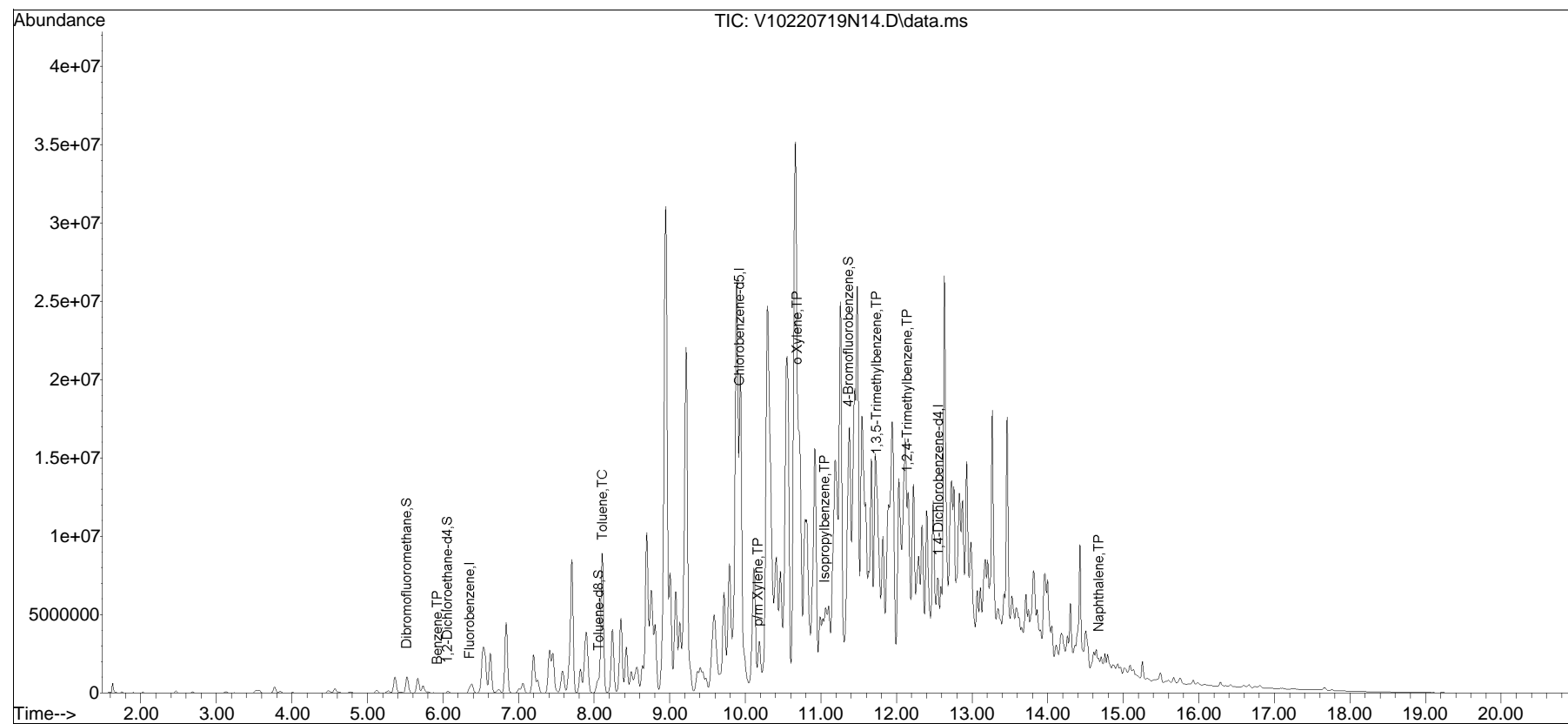


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N14.D
Acq On : 20 Jul 2022 4:01 am
Operator : VOA110:JC
Sample : 12238160-06,31,3.87,5,,b,r2f
Misc : WG1665206,ICAL18890
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Jul 20 07:26:44 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N02.D•

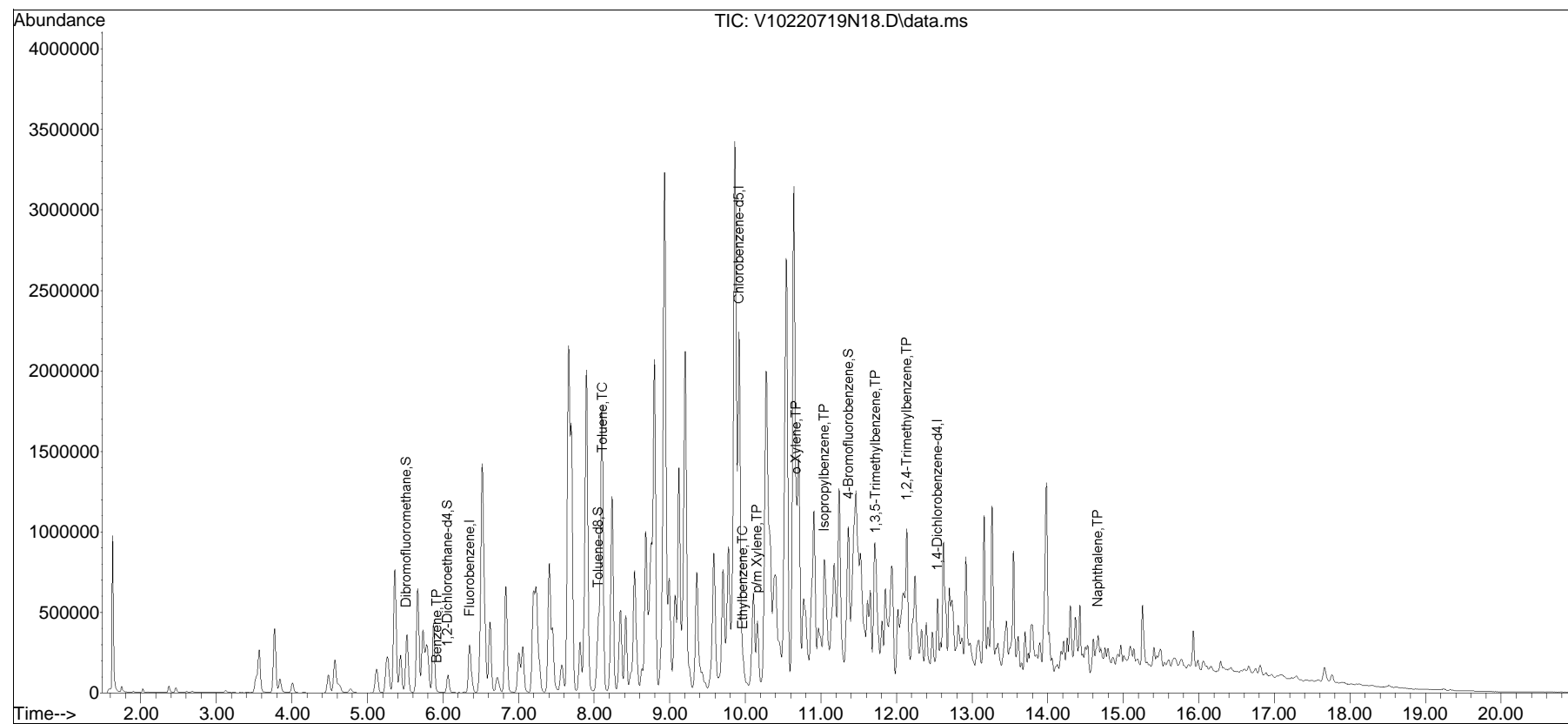


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
Data File : V10220719N18.D
Acq On : 20 Jul 2022 5:54 am
Operator : VOA110:JC
Sample : 12238160-09,31,5.06,5,,b,r2f
Misc : WG1665206,ICAL18890
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Jul 20 06:17:13 2022
Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Mon Apr 04 06:52:50 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N02.D•

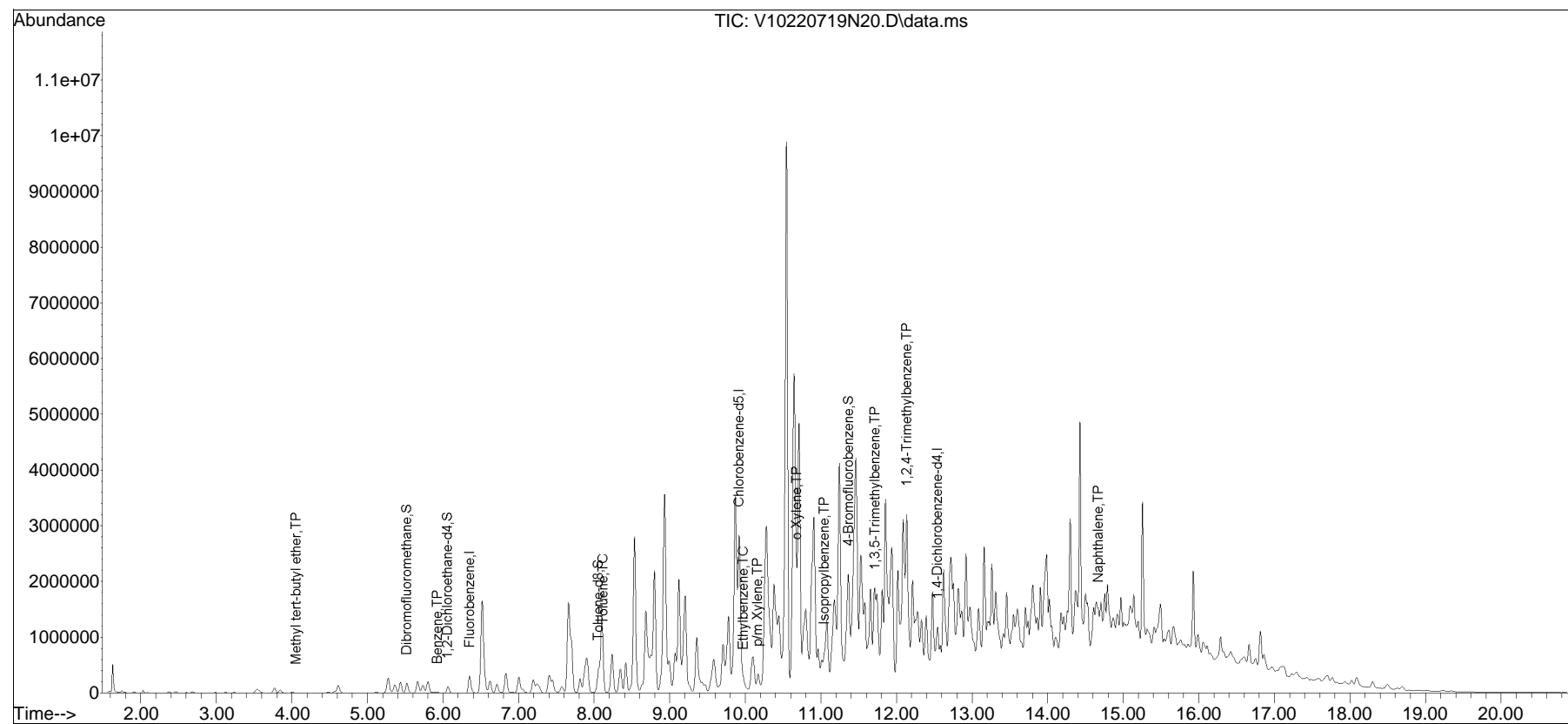


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2022\220719N\
 Data File : V10220719N20.D
 Acq On : 20 Jul 2022 6:51 am
 Operator : VOA110:JC
 Sample : 12238160-11,31,5.03,5,,b,r2f
 Misc : WG1665206,ICAL18890
 ALS Vial : 20 Sample Multiplier: 1

Quant Time: Jul 20 07:28:16 2022
 Quant Method : I:\VOLATILES\VOA110\2022\220719N\V110_220401N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Mon Apr 04 06:52:50 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list19N\V10220719N01.D•





ANALYTICAL REPORT

Lab Number:	L2241030
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/05/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241030-01	GPR790-01-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:00	08/01/22
L2241030-02	GPR790-02-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:10	08/01/22
L2241030-03	GPR790-03-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:20	08/01/22
L2241030-04	GPR790-04-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:30	08/01/22
L2241030-05	GPR790-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:40	08/01/22
L2241030-06	GPR790-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:50	08/01/22
L2241030-07	GPR790-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:00	08/01/22
L2241030-08	GPR791-01-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:00	08/01/22
L2241030-09	GPR791-02-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:10	08/01/22
L2241030-10	GPR791-03-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:20	08/01/22
L2241030-11	GPR791-04-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:30	08/01/22
L2241030-12	GPR791-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:40	08/01/22
L2241030-13	GPR791-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:50	08/01/22
L2241030-14	GPR791-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 14:00	08/01/22
L2241030-15	GPR791-08-SS01	SOIL	PHILADELPHIA, PA	08/01/22 14:10	08/01/22
L2241030-16	FB-080122-1	WATER	PHILADELPHIA, PA	08/01/22 14:30	08/01/22
L2241030-17	FB-080122-2	WATER	PHILADELPHIA, PA	08/01/22 14:40	08/01/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2241030-06: The collection date and time on the chain of custody was 01-AUG-22 11:50; however, the collection date/time on the container label was 01-AUG-22 17:50. At the client's request, the collection date/time is reported as 01-AUG-22 11:50.

L2241030-07: The collection date and time on the chain of custody was 01-AUG-22 12:00; however, the collection date/time on the container label was 01-AUG-22 12:30. At the client's request, the collection date/time is reported as 01-AUG-22 12:00.

L2241030-14: The collection date and time on the chain of custody was 01-AUG-22 14:00; however, the collection date/time on the container label was 01-AUG-22 14:50. At the client's request, the collection date/time is reported as 01-AUG-22 14:00.

Volatile Organics

L2241030-04D and -09D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 08/05/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-01 D
 Client ID: GPR790-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:07
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	520		mg/kg	3.4	1.1	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-02 D
 Client ID: GPR790-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:27
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	130		mg/kg	0.30	0.10	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-03 D
 Client ID: GPR790-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 09:46
 Analyst: NLK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2.8		mg/kg	0.26	0.086	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-04 D
 Client ID: GPR790-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:06
 Analyst: NLK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	0.20	J	mg/kg	0.59	0.20	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-05 D
 Client ID: GPR790-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:26
 Analyst: NLK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	3000		mg/kg	26	8.6	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-06 D
 Client ID: GPR790-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 10:45
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	4.6		mg/kg	0.42	0.14	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	92		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-07 D
 Client ID: GPR790-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:05
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	34.		mg/kg	6.5	2.2	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-08 D
 Client ID: GPR791-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:25
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	1200		mg/kg	2.4	0.81	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-09 D
 Client ID: GPR791-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:44
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	4.0	J	mg/kg	4.5	1.5	100
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-10 D
 Client ID: GPR791-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:04
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	160		mg/kg	0.49	0.16	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-11 D
 Client ID: GPR791-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:24
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	1300		mg/kg	5.0	1.6	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-12 D
 Client ID: GPR791-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:44
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	9.8		mg/kg	0.60	0.20	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-13 D
 Client ID: GPR791-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:04
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	380		mg/kg	1.8	0.61	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-14 D
 Client ID: GPR791-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:23
 Analyst: NLK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	13.		mg/kg	0.29	0.097	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-15 D
 Client ID: GPR791-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:43
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Benzene	7.1		mg/kg	0.36	0.12	10
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-16
 Client ID: FB-080122-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 11:39
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	85		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-17
 Client ID: FB-080122-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 12:03
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Benzene	ND		ug/l	0.50	0.16	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	113		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-15 Batch: WG1671226-5					
Benzene	ND		mg/kg	0.025	0.0083

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/02/22 08:32
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 16-17 Batch: WG1671475-5					
Benzene	ND		ug/l	0.50	0.16

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	97		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-15 Batch: WG1671226-3 WG1671226-4								
Benzene	82		87		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 16-17 Batch: WG1671475-3 WG1671475-4								
Benzene	92		95		70-130	3		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	80		82		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	121		117		70-130
Dibromofluoromethane	90		91		70-130

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-01

Date Collected: 08/01/22 11:00

Client ID: GPR790-01-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-02

Date Collected: 08/01/22 11:10

Client ID: GPR790-02-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.2		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-03

Date Collected: 08/01/22 11:20

Client ID: GPR790-03-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-04

Date Collected: 08/01/22 11:30

Client ID: GPR790-04-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-05

Date Collected: 08/01/22 11:40

Client ID: GPR790-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-06

Date Collected: 08/01/22 11:50

Client ID: GPR790-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.4		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-07
 Client ID: GPR790-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-08

Date Collected: 08/01/22 13:00

Client ID: GPR791-01-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.1		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-09

Date Collected: 08/01/22 13:10

Client ID: GPR791-02-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.3		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-10

Date Collected: 08/01/22 13:20

Client ID: GPR791-03-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-11

Date Collected: 08/01/22 13:30

Client ID: GPR791-04-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.8		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-12

Date Collected: 08/01/22 13:40

Client ID: GPR791-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.8		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-13

Date Collected: 08/01/22 13:50

Client ID: GPR791-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.6		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**SAMPLE RESULTS**

Lab ID: L2241030-14

Date Collected: 08/01/22 14:00

Client ID: GPR791-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	87.5		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

SAMPLE RESULTS

Lab ID: L2241030-15

Date Collected: 08/01/22 14:10

Client ID: GPR791-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	08/02/22 08:49	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241030

Report Date: 08/05/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-15 QC Batch ID: WG1670051-1 QC Sample: L2241030-01 Client ID: GPR790-01-SS01						
Solids, Total	77.6	76.5	%	1		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-01A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-01B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-01C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-01D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-02A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-02B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-02C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-02D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-03A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-03B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-03C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-03D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-04A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-04B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-04C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-04D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-05A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-05B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-05C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-05D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-06A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-06B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-06C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-06D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-07A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-07B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-07C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-07D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-08A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-08B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-08C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-08D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-09A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-09B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-09C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-09D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-10A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-10B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-10C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-10D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-11A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-11B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-11C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-11D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-12A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-12B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-12C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-12D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-13A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-13B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-13C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241030**Project Number:** 200.00135.006**Report Date:** 08/05/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241030-13D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-14A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-14B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-14C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-14D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-15A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2241030-15B	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-15C	Vial water preserved	B	NA		3.2	Y	Absent	02-AUG-22 06:20	PA-8260HLW(14)
L2241030-15D	Plastic 2oz unpreserved for TS	B	NA		3.2	Y	Absent		TS(7)
L2241030-16A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-16B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-16C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2241030-17C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241030
Report Date: 08/05/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241030

Project Number: 200.00135.006

Report Date: 08/05/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: _____ Time: _____

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41036 01	GPR-790-01-SS01	8/1/22	1100	S	an
02	GPR-790-02-SS01		1110		
03	GPR-790-03-SS01		1120		
04	GPR-790-04-SS01		1130		
05	GPR-790-05-SS01		1140		
06	GPR-790-06-SS01		1150		
07	GPR-790-07-SS01		1200		
08	GPR-791-01-SS01		1300		
09	GPR-791-02-SS01		1310		
10	GPR-791-03-SS01		1320		

Date Rec'd in Lab: 8/2/22 ALPHA Job #: L2241030

Report Information FAX EMAIL Add'l Deliverables
 ADEx Add'l Deliverables

Billing Information Same as Client info PO #: 3562

Regulatory Requirements/Report Limits
 State/Fed Program _____ Criteria _____

ANALYSIS

Benzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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SAMPLE HANDLING
 Filtration
 Done Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

Container Type: G Preservative: -

Relinquished By: <i>[Signature]</i>	Date/Time: 8/1/22 10:00	Received By: <i>[Signature]</i>	Date/Time: 8/1/22 14:48
<i>[Signature]</i>	8/1/22 2:00	<i>[Signature]</i>	8/1/22 5:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

CHAIN OF CUSTODY

PAGE 2 OF 2



Westborough, MA
 TEL: 508-898-9220
 FAX: 508-898-9193

Mansfield, MA
 TEL: 508-822-9300
 FAX: 508-822-3288

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: _____ Time: _____

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: _____

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/2/22

ALPHA Job #: L2241030

Report Information Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

Benzene	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Lab to do
 Preservation
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

4

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41030 U	GPR-791-04-5501	8/1/22	1330	S	W
12	GPR-791-05-5501		1340		
13	GPR-791-06-5501		1350		
14	GPR-791-07-5501		1400		
15	GPR-791-08-5501		1410		
16	FB-080122-1		1430	W	
17	FB-080122-2		1440		

Container Type	-	-	G	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/1/22	Sta AAL	8/22/22 14:08
<i>[Signature]</i>	8/1/22 10:00	<i>[Signature]</i>	8-1-2022
<i>[Signature]</i>	8-1-2022	<i>[Signature]</i>	8/1/22-2100
<i>[Signature]</i>	8/1/22	<i>[Signature]</i>	8/1/22 23:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



ANALYTICAL REPORT

Lab Number:	L2241031
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/08/22

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Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241031-01	GPR1116-05-SS01	SOIL	PHILADELPHIA, PA	08/01/22 08:45	08/01/22
L2241031-02	GPR1116-06-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:00	08/01/22
L2241031-03	GPR1116-07-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:10	08/01/22
L2241031-04	GPR1116-08-SS01	SOIL	PHILADELPHIA, PA	08/01/22 09:50	08/01/22
L2241031-05	GPR1116-09-SS01	SOIL	PHILADELPHIA, PA	08/01/22 10:10	08/01/22
L2241031-06	GPR1116-10-SS01	SOIL	PHILADELPHIA, PA	08/01/22 10:30	08/01/22
L2241031-07	GPR1116-11-SS01	SOIL	PHILADELPHIA, PA	08/01/22 11:00	08/01/22
L2241031-08	GPR1116-12-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:30	08/01/22
L2241031-09	GPR1116-13-SS01	SOIL	PHILADELPHIA, PA	08/01/22 12:45	08/01/22
L2241031-10	GPR1116-14-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:20	08/01/22
L2241031-11	GPR1116-15-SS01	SOIL	PHILADELPHIA, PA	08/01/22 13:35	08/01/22
L2241031-12	FB-080122-3	WATER	PHILADELPHIA, PA	08/01/22 14:35	08/01/22
L2241031-13	FB-080122-4	WATER	PHILADELPHIA, PA	08/01/22 14:40	08/01/22
L2241031-14	TB-080122	WATER	PHILADELPHIA, PA	08/01/22 00:00	08/01/22
L2241031-15	DUP-48	SOIL	PHILADELPHIA, PA	08/01/22 00:00	08/01/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241031-01: The sample was analyzed as a High Level Methanol based upon screen results. The sample was then analyzed as a Low Level in order to achieve lower reporting limits. The results of both analyses are reported. Differences were noted between the results of the analyses which have been attributed to vial discrepancies.

L2241031-01: The internal standard (IS) responses for chlorobenzene-d5 (44%) and 1,4-dichlorobenzene-d4 (27%) and the surrogate recoveries for toluene-d8 (146%) and 4-bromofluorobenzene (410%) were outside the acceptance criteria; however, re-analysis achieved the following result: 1,2-dichloroethane-d4 (148%). The results of both analyses are reported.

L2241031-02D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of non-target compounds in the sample.

The surrogate recovery for the following samples is outside the acceptance criteria for 4-bromofluorobenzene; however, the samples were not re-analyzed due to coelution with an obvious interference. Copies of the chromatograms are included as an attachment to this report:

L2241031-02D: 169%

L2241031-03: 217%

L2241031-08: 152%

L2241031-09: 142%

L2241031-10: 167%

L2241031-11: 192%

L2241031-07: The internal standard (IS) responses for 1,4-dichlorobenzene-d4 (48%) and the surrogate recovery for 4-bromofluorobenzene (581%) were outside the acceptance criteria due to obvious interferences.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Case Narrative (continued)

A copy of the chromatogram is included as an attachment to this report. A high-level analysis was performed, and those results are also reported.

L2241031-11: The analysis of Volatile Organics by EPA Method 5035/8260 Low Level could not be performed due to the elevated concentrations of non-target compounds in the sample.

Semivolatile Organics

L2241031-03D: The sample has elevated detection limits due to the limited sample volume utilized during extraction and the dilution required by the sample matrix.

L2241031-03D: The surrogate recoveries are below the acceptance criteria for nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%), and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

Total Metals

L2241031-04 and -15: The sample has an elevated detection limit for lead due to the dilution required by matrix interferences encountered during analysis.

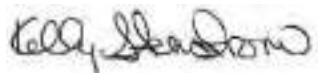
The WG1670165-3 MS recovery, performed on L2241031-01, is outside the acceptance criteria for lead (65%). A post digestion spike was performed and yielded an unacceptable recovery of 52%. The serial dilution recovery was not acceptable; therefore, this element fails the matrix test and the result reported in the native sample should be considered estimated.

The WG1670165-4 Laboratory Duplicate RPD for lead (35%), performed on L2241031-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1670165-6 serial dilution analysis, associated with L2241031-01, had a %D above the acceptance criteria for lead (47%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 08/08/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:03
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.19	0.019	1
Benzene	0.053		mg/kg	0.047	0.016	1
1,2-Dichloroethane	ND		mg/kg	0.094	0.024	1
Toluene	0.078	J	mg/kg	0.094	0.051	1
1,2-Dibromoethane	ND		mg/kg	0.047	0.028	1
Ethylbenzene	0.022	J	mg/kg	0.094	0.013	1
p/m-Xylene	0.063	J	mg/kg	0.19	0.053	1
o-Xylene	0.056	J	mg/kg	0.094	0.027	1
Xylenes, Total	0.12	J	mg/kg	0.094	0.027	1
Isopropylbenzene	0.80		mg/kg	0.094	0.010	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.19	0.018	1
1,2,4-Trimethylbenzene	0.78		mg/kg	0.19	0.031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 14:24
 Analyst: AJK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0036	0.00036	1
Benzene	0.0027		mg/kg	0.00089	0.00030	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00046	1
Toluene	0.0021		mg/kg	0.0018	0.00097	1
1,2-Dibromoethane	ND		mg/kg	0.00089	0.00052	1
Ethylbenzene	0.0016	J	mg/kg	0.0018	0.00025	1
p/m-Xylene	0.0041		mg/kg	0.0036	0.0010	1
o-Xylene	0.014		mg/kg	0.0018	0.00052	1
Xylenes, Total	0.018		mg/kg	0.0018	0.00052	1
Isopropylbenzene	0.046		mg/kg	0.0018	0.00019	1
1,3,5-Trimethylbenzene	0.0022	J	mg/kg	0.0036	0.00034	1
1,2,4-Trimethylbenzene	0.32		mg/kg	0.0036	0.00060	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	146	Q	70-130
4-Bromofluorobenzene	410	Q	70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01 R
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 00:27
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	0.00064	J	mg/kg	0.00071	0.00024	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00077	1
1,2-Dibromoethane	ND		mg/kg	0.00071	0.00042	1
Ethylbenzene	0.00024	J	mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00080	1
o-Xylene	0.00082	J	mg/kg	0.0014	0.00041	1
Xylenes, Total	0.00082	J	mg/kg	0.0014	0.00041	1
Isopropylbenzene	0.00069	J	mg/kg	0.0014	0.00016	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	0.0033		mg/kg	0.0028	0.00047	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	148	Q	70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	121		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02 D
 Client ID: GPR1116-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:23
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.5	0.15	10
Benzene	ND		mg/kg	0.38	0.13	10
1,2-Dichloroethane	ND		mg/kg	0.77	0.20	10
Toluene	ND		mg/kg	0.77	0.42	10
1,2-Dibromoethane	ND		mg/kg	0.38	0.22	10
Ethylbenzene	0.19	J	mg/kg	0.77	0.11	10
p/m-Xylene	0.92	J	mg/kg	1.5	0.43	10
o-Xylene	0.24	J	mg/kg	0.77	0.22	10
Xylenes, Total	1.2	J	mg/kg	0.77	0.22	10
Isopropylbenzene	18.		mg/kg	0.77	0.084	10
1,3,5-Trimethylbenzene	0.15	J	mg/kg	1.5	0.15	10
1,2,4-Trimethylbenzene	1.2	J	mg/kg	1.5	0.26	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	169	Q	70-130
Dibromofluoromethane	93		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03
 Client ID: GPR1116-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 14:43
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.18	0.019	1
Benzene	0.037	J	mg/kg	0.046	0.015	1
1,2-Dichloroethane	ND		mg/kg	0.093	0.024	1
Toluene	0.17		mg/kg	0.093	0.050	1
1,2-Dibromoethane	ND		mg/kg	0.046	0.027	1
Ethylbenzene	0.087	J	mg/kg	0.093	0.013	1
p/m-Xylene	0.30		mg/kg	0.18	0.052	1
o-Xylene	0.13		mg/kg	0.093	0.027	1
Xylenes, Total	0.43		mg/kg	0.093	0.027	1
Isopropylbenzene	8.4		mg/kg	0.093	0.010	1
1,3,5-Trimethylbenzene	0.12	J	mg/kg	0.18	0.018	1
1,2,4-Trimethylbenzene	2.7		mg/kg	0.18	0.031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	117		70-130
4-Bromofluorobenzene	217	Q	70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 14:02
 Analyst: AJK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.16	0.016	1
Benzene	35.	E	mg/kg	0.039	0.013	1
1,2-Dichloroethane	ND		mg/kg	0.078	0.020	1
Toluene	6.8		mg/kg	0.078	0.042	1
1,2-Dibromoethane	ND		mg/kg	0.039	0.023	1
Ethylbenzene	0.34		mg/kg	0.078	0.011	1
p/m-Xylene	1.0		mg/kg	0.16	0.043	1
o-Xylene	0.075	J	mg/kg	0.078	0.022	1
Xylenes, Total	1.1	J	mg/kg	0.078	0.022	1
Isopropylbenzene	0.022	J	mg/kg	0.078	0.0084	1
1,3,5-Trimethylbenzene	0.025	J	mg/kg	0.16	0.015	1
1,2,4-Trimethylbenzene	0.10	J	mg/kg	0.16	0.026	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04 D
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 15:03
 Analyst: NLK
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	28.		mg/kg	0.19	0.064	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05
 Client ID: GPR1116-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 15:23
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	ND		mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	ND		mg/kg	0.0010	0.00055	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	ND		mg/kg	0.0010	0.00014	1
p/m-Xylene	ND		mg/kg	0.0020	0.00057	1
o-Xylene	ND		mg/kg	0.0010	0.00030	1
Xylenes, Total	ND		mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.00064	J	mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
 Client ID: GPR1116-10-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:04
 Analyst: NLK
 Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	0.00030	J	mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	0.00084	J	mg/kg	0.0010	0.00055	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	0.00022	J	mg/kg	0.0010	0.00014	1
p/m-Xylene	0.0010	J	mg/kg	0.0020	0.00057	1
o-Xylene	0.00056	J	mg/kg	0.0010	0.00029	1
Xylenes, Total	0.0016	J	mg/kg	0.0010	0.00029	1
Isopropylbenzene	0.00054	J	mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	0.00025	J	mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	0.00072	J	mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 11:24
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.16	0.017	1
Benzene	ND		mg/kg	0.041	0.014	1
1,2-Dichloroethane	ND		mg/kg	0.083	0.021	1
Toluene	ND		mg/kg	0.083	0.045	1
1,2-Dibromoethane	ND		mg/kg	0.041	0.024	1
Ethylbenzene	0.015	J	mg/kg	0.083	0.012	1
p/m-Xylene	0.084	J	mg/kg	0.16	0.046	1
o-Xylene	0.026	J	mg/kg	0.083	0.024	1
Xylenes, Total	0.11	J	mg/kg	0.083	0.024	1
Isopropylbenzene	0.068	J	mg/kg	0.083	0.0090	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.16	0.016	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.16	0.028	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	117		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 01:08
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	ND		mg/kg	0.00060	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.00090	J	mg/kg	0.0012	0.00065	1
1,2-Dibromoethane	ND		mg/kg	0.00060	0.00035	1
Ethylbenzene	ND		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.0017	J	mg/kg	0.0024	0.00067	1
o-Xylene	0.0032		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.0049	J	mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.017		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0016	J	mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0037		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	113		70-130
4-Bromofluorobenzene	581	Q	70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08
 Client ID: GPR1116-12-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 03:56
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.13	0.013	1
Benzene	0.052		mg/kg	0.033	0.011	1
1,2-Dichloroethane	ND		mg/kg	0.066	0.017	1
Toluene	0.29		mg/kg	0.066	0.036	1
1,2-Dibromoethane	ND		mg/kg	0.033	0.019	1
Ethylbenzene	0.12		mg/kg	0.066	0.0093	1
p/m-Xylene	1.1		mg/kg	0.13	0.037	1
o-Xylene	0.16		mg/kg	0.066	0.019	1
Xylenes, Total	1.3		mg/kg	0.066	0.019	1
Isopropylbenzene	3.8		mg/kg	0.066	0.0072	1
1,3,5-Trimethylbenzene	3.8		mg/kg	0.13	0.013	1
1,2,4-Trimethylbenzene	16.		mg/kg	0.13	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	126		70-130
4-Bromofluorobenzene	152	Q	70-130
Dibromofluoromethane	78		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09
 Client ID: GPR1116-13-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:06
 Analyst: NLK
 Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0026	0.00026	1
Benzene	0.00064	J	mg/kg	0.00065	0.00022	1
1,2-Dichloroethane	ND		mg/kg	0.0013	0.00034	1
Toluene	0.0029		mg/kg	0.0013	0.00071	1
1,2-Dibromoethane	ND		mg/kg	0.00065	0.00038	1
Ethylbenzene	0.0011	J	mg/kg	0.0013	0.00018	1
p/m-Xylene	0.0086		mg/kg	0.0026	0.00073	1
o-Xylene	0.0056		mg/kg	0.0013	0.00038	1
Xylenes, Total	0.014		mg/kg	0.0013	0.00038	1
Isopropylbenzene	0.0034		mg/kg	0.0013	0.00014	1
1,3,5-Trimethylbenzene	0.0018	J	mg/kg	0.0026	0.00025	1
1,2,4-Trimethylbenzene	0.0048		mg/kg	0.0026	0.00044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	114		70-130
4-Bromofluorobenzene	142	Q	70-130
Dibromofluoromethane	89		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10
 Client ID: GPR1116-14-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:27
 Analyst: NLK
 Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.0012		mg/kg	0.00093	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0019	0.00048	1
Toluene	ND		mg/kg	0.0019	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00093	0.00054	1
Ethylbenzene	0.00041	J	mg/kg	0.0019	0.00026	1
p/m-Xylene	0.0012	J	mg/kg	0.0037	0.0010	1
o-Xylene	0.0013	J	mg/kg	0.0019	0.00054	1
Xylenes, Total	0.0025	J	mg/kg	0.0019	0.00054	1
Isopropylbenzene	0.020		mg/kg	0.0019	0.00020	1
1,3,5-Trimethylbenzene	0.0012	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.0014	J	mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	115		70-130
4-Bromofluorobenzene	167	Q	70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11
 Client ID: GPR1116-15-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 12:48
 Analyst: NLK
 Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.39	0.039	1
Benzene	0.050	J	mg/kg	0.097	0.032	1
1,2-Dichloroethane	ND		mg/kg	0.19	0.050	1
Toluene	0.35		mg/kg	0.19	0.10	1
1,2-Dibromoethane	ND		mg/kg	0.097	0.057	1
Ethylbenzene	0.27		mg/kg	0.19	0.027	1
p/m-Xylene	1.1		mg/kg	0.39	0.11	1
o-Xylene	0.27		mg/kg	0.19	0.056	1
Xylenes, Total	1.4		mg/kg	0.19	0.056	1
Isopropylbenzene	1.1		mg/kg	0.19	0.021	1
1,3,5-Trimethylbenzene	0.38	J	mg/kg	0.39	0.037	1
1,2,4-Trimethylbenzene	2.6		mg/kg	0.39	0.064	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	192	Q	70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:34
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 08:56
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	82		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	115		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:41
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 09:19
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-14
 Client ID: TB-080122
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/02/22 18:47
 Analyst: GT

Extraction Method: EPA 8011
 Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-14
 Client ID: TB-080122
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/02/22 09:42
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	82		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15
 Client ID: DUP-48
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/03/22 13:09
 Analyst: NLK
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0035	0.00035	1
Benzene	ND		mg/kg	0.00088	0.00029	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00045	1
Toluene	ND		mg/kg	0.0018	0.00095	1
1,2-Dibromoethane	ND		mg/kg	0.00088	0.00051	1
Ethylbenzene	ND		mg/kg	0.0018	0.00025	1
p/m-Xylene	0.0011	J	mg/kg	0.0035	0.00098	1
o-Xylene	0.0016	J	mg/kg	0.0018	0.00051	1
Xylenes, Total	0.0027	J	mg/kg	0.0018	0.00051	1
Isopropylbenzene	0.0040		mg/kg	0.0018	0.00019	1
1,3,5-Trimethylbenzene	0.0012	J	mg/kg	0.0035	0.00034	1
1,2,4-Trimethylbenzene	0.0038		mg/kg	0.0035	0.00058	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	129		70-130
Dibromofluoromethane	84		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/02/22 18:07
Analyst: GT

Extraction Method: EPA 8011
Extraction Date: 08/02/22 16:04

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 12-14 Batch: WG1670324-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-04 Batch: WG1671226-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:18
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 05 Batch: WG1671227-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06,09-10,15 Batch: WG1671352-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/03/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 07,11 Batch: WG1671356-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/02/22 08:32
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 12-14 Batch: WG1671475-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
1,2-Dibromoethane	ND		ug/l	2.0	0.19
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	83		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	97		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 04 Batch: WG1671502-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01 Batch: WG1671744-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/04/22 20:35
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,07 Batch: WG1671753-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/04/22 20:35
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1671755-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 12-14 Batch: WG1670324-2									
1,2-Dibromoethane	118		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-04 Batch: WG1671226-3 WG1671226-4								
Methyl tert butyl ether	83		90		66-130	8		30
Benzene	82		87		70-130	6		30
1,2-Dichloroethane	82		89		70-130	8		30
Toluene	77		80		70-130	4		30
1,2-Dibromoethane	80		87		70-130	8		30
Ethylbenzene	83		86		70-130	4		30
p/m-Xylene	83		87		70-130	5		30
o-Xylene	85		89		70-130	5		30
Isopropylbenzene	84		88		70-130	5		30
1,3,5-Trimethylbenzene	85		88		70-130	3		30
1,2,4-Trimethylbenzene	84		87		70-130	4		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 05 Batch: WG1671227-3 WG1671227-4								
Methyl tert butyl ether	83		90		66-130	8		30
Benzene	82		87		70-130	6		30
1,2-Dichloroethane	82		89		70-130	8		30
Toluene	77		80		70-130	4		30
1,2-Dibromoethane	80		87		70-130	8		30
Ethylbenzene	83		86		70-130	4		30
p/m-Xylene	83		87		70-130	5		30
o-Xylene	85		89		70-130	5		30
Isopropylbenzene	84		88		70-130	5		30
1,3,5-Trimethylbenzene	85		88		70-130	3		30
1,2,4-Trimethylbenzene	84		87		70-130	4		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	99		103		70-130
Toluene-d8	101		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06,09-10,15 Batch: WG1671352-3 WG1671352-4								
Methyl tert butyl ether	77		78		66-130	1		30
Benzene	85		84		70-130	1		30
1,2-Dichloroethane	84		84		70-130	0		30
Toluene	85		86		70-130	1		30
1,2-Dibromoethane	88		89		70-130	1		30
Ethylbenzene	91		90		70-130	1		30
p/m-Xylene	91		90		70-130	1		30
o-Xylene	90		90		70-130	0		30
Isopropylbenzene	91		90		70-130	1		30
1,3,5-Trimethylbenzene	92		92		70-130	0		30
1,2,4-Trimethylbenzene	94		92		70-130	2		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	95		94		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		93		70-130
Dibromofluoromethane	90		88		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 07,11 Batch: WG1671356-3 WG1671356-4								
Methyl tert butyl ether	77		78		66-130	1		30
Benzene	85		84		70-130	1		30
1,2-Dichloroethane	84		84		70-130	0		30
Toluene	85		86		70-130	1		30
1,2-Dibromoethane	88		89		70-130	1		30
Ethylbenzene	91		90		70-130	1		30
p/m-Xylene	91		90		70-130	1		30
o-Xylene	90		90		70-130	0		30
Isopropylbenzene	91		90		70-130	1		30
1,3,5-Trimethylbenzene	92		92		70-130	0		30
1,2,4-Trimethylbenzene	94		92		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	95		94		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		93		70-130
Dibromofluoromethane	90		88		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 12-14 Batch: WG1671475-3 WG1671475-4								
Methyl tert butyl ether	91		98		63-130	7		20
Benzene	92		95		70-130	3		20
1,2-Dichloroethane	83		87		70-130	5		20
Toluene	99		100		70-130	1		20
1,2-Dibromoethane	89		97		70-130	9		20
Ethylbenzene	99		100		70-130	1		20
p/m-Xylene	100		100		70-130	0		20
o-Xylene	100		100		70-130	0		20
Isopropylbenzene	120		120		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	80		82		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	121		117		70-130
Dibromofluoromethane	90		91		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 Batch: WG1671502-3 WG1671502-4								
Methyl tert butyl ether	75		74		66-130	1		30
Benzene	83		82		70-130	1		30
1,2-Dichloroethane	81		81		70-130	0		30
Toluene	83		82		70-130	1		30
1,2-Dibromoethane	85		84		70-130	1		30
Ethylbenzene	88		87		70-130	1		30
p/m-Xylene	88		88		70-130	0		30
o-Xylene	87		88		70-130	1		30
Isopropylbenzene	89		87		70-130	2		30
1,3,5-Trimethylbenzene	90		87		70-130	3		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		96		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	94		94		70-130
Dibromofluoromethane	92		90		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01 Batch: WG1671744-3 WG1671744-4								
Methyl tert butyl ether	75		74		66-130	1		30
Benzene	83		82		70-130	1		30
1,2-Dichloroethane	81		81		70-130	0		30
Toluene	83		82		70-130	1		30
1,2-Dibromoethane	85		84		70-130	1		30
Ethylbenzene	88		87		70-130	1		30
p/m-Xylene	88		88		70-130	0		30
o-Xylene	87		88		70-130	1		30
Isopropylbenzene	89		87		70-130	2		30
1,3,5-Trimethylbenzene	90		87		70-130	3		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		96		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	93		94		70-130
Dibromofluoromethane	92		90		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery		RPD	
	%Recovery	Qual	%Recovery	Qual	Limits	RPD	Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,07 Batch: WG1671753-3 WG1671753-4								
Methyl tert butyl ether	110		90		66-130	20		30
Benzene	102		102		70-130	0		30
1,2-Dichloroethane	96		98		70-130	2		30
Toluene	98		101		70-130	3		30
1,2-Dibromoethane	96		100		70-130	4		30
Ethylbenzene	102		104		70-130	2		30
p/m-Xylene	102		104		70-130	2		30
o-Xylene	99		102		70-130	3		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		104		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		92		70-130
Dibromofluoromethane	90		92		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1671755-3 WG1671755-4								
Methyl tert butyl ether	110		90		66-130	20		30
Benzene	102		102		70-130	0		30
1,2-Dichloroethane	96		98		70-130	2		30
Toluene	98		101		70-130	3		30
1,2-Dibromoethane	96		100		70-130	4		30
Ethylbenzene	102		104		70-130	2		30
p/m-Xylene	102		104		70-130	2		30
o-Xylene	99		102		70-130	3		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	104		104		70-130	0		30
1,2,4-Trimethylbenzene	105		104		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	100		101		70-130
4-Bromofluorobenzene	95		92		70-130
Dibromofluoromethane	90		92		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01
 Client ID: GPR1116-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 08:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 13:03
 Analyst: CMM
 Percent Solids: 76%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.35		mg/kg	0.22	0.026	1
Fluorene	0.056	J	mg/kg	0.22	0.021	1
Phenanthrene	0.15		mg/kg	0.13	0.026	1
Anthracene	0.055	J	mg/kg	0.13	0.042	1
Pyrene	0.21		mg/kg	0.13	0.021	1
Benzo(a)anthracene	0.24		mg/kg	0.13	0.024	1
Chrysene	0.27		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	0.42		mg/kg	0.13	0.036	1
Benzo(a)pyrene	0.40		mg/kg	0.17	0.052	1
Benzo(ghi)perylene	0.26		mg/kg	0.17	0.025	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	55		30-120
4-Terphenyl-d14	55		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02
 Client ID: GPR1116-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 13:27
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.1		mg/kg	0.20	0.024	1
Fluorene	0.22		mg/kg	0.20	0.019	1
Phenanthrene	0.67		mg/kg	0.12	0.024	1
Anthracene	0.18		mg/kg	0.12	0.038	1
Pyrene	0.55		mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.27		mg/kg	0.12	0.022	1
Chrysene	0.30		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.44		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.41		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.31		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	52		30-120
4-Terphenyl-d14	44		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03 D
 Client ID: GPR1116-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/08/22 12:10
 Analyst: SZ
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	11	1.3	20
Fluorene	1.4	J	mg/kg	11	1.1	20
Phenanthrene	2.8	J	mg/kg	6.6	1.3	20
Anthracene	ND		mg/kg	6.6	2.2	20
Pyrene	ND		mg/kg	6.6	1.1	20
Benzo(a)anthracene	ND		mg/kg	6.6	1.2	20
Chrysene	ND		mg/kg	6.6	1.2	20
Benzo(b)fluoranthene	ND		mg/kg	6.6	1.9	20
Benzo(a)pyrene	ND		mg/kg	8.8	2.7	20
Benzo(ghi)perylene	ND		mg/kg	8.8	1.3	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04
 Client ID: GPR1116-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:50
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 14:14
 Analyst: CMM
 Percent Solids: 78%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.21	0.025	1
Fluorene	0.024	J	mg/kg	0.21	0.020	1
Phenanthrene	0.062	J	mg/kg	0.12	0.025	1
Anthracene	ND		mg/kg	0.12	0.041	1
Pyrene	0.041	J	mg/kg	0.12	0.021	1
Benzo(a)anthracene	0.029	J	mg/kg	0.12	0.024	1
Chrysene	0.030	J	mg/kg	0.12	0.022	1
Benzo(b)fluoranthene	0.035	J	mg/kg	0.12	0.035	1
Benzo(a)pyrene	ND		mg/kg	0.17	0.051	1
Benzo(ghi)perylene	ND		mg/kg	0.17	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	88		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	60		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05
 Client ID: GPR1116-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:10
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:01
 Analyst: CMM
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.20	0.024	1
Fluorene	ND		mg/kg	0.20	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	ND		mg/kg	0.12	0.020	1
Benzo(a)anthracene	ND		mg/kg	0.12	0.022	1
Chrysene	ND		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.033	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	47		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
 Client ID: GPR1116-10-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:25
 Analyst: CMM
 Percent Solids: 76%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.2		mg/kg	0.22	0.026	1
Fluorene	0.14	J	mg/kg	0.22	0.021	1
Phenanthrene	0.34		mg/kg	0.13	0.026	1
Anthracene	0.22		mg/kg	0.13	0.042	1
Pyrene	0.38		mg/kg	0.13	0.022	1
Benzo(a)anthracene	0.40		mg/kg	0.13	0.024	1
Chrysene	0.52		mg/kg	0.13	0.022	1
Benzo(b)fluoranthene	1.2		mg/kg	0.13	0.036	1
Benzo(a)pyrene	1.4		mg/kg	0.17	0.053	1
Benzo(ghi)perylene	0.94		mg/kg	0.17	0.026	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	64		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07
 Client ID: GPR1116-11-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 11:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 15:48
 Analyst: CMM
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.16	J	mg/kg	0.20	0.024	1
Fluorene	0.036	J	mg/kg	0.20	0.019	1
Phenanthrene	0.083	J	mg/kg	0.12	0.024	1
Anthracene	0.039	J	mg/kg	0.12	0.038	1
Pyrene	0.16		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.13		mg/kg	0.12	0.022	1
Chrysene	0.16		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.18		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.17		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.092	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	48		30-120
4-Terphenyl-d14	33		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08
 Client ID: GPR1116-12-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:30
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:12
 Analyst: CMM
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.32		mg/kg	0.19	0.023	1
Fluorene	1.2		mg/kg	0.19	0.018	1
Phenanthrene	1.6		mg/kg	0.11	0.023	1
Anthracene	0.45		mg/kg	0.11	0.036	1
Pyrene	0.62		mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.34		mg/kg	0.11	0.021	1
Chrysene	0.92		mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	0.68		mg/kg	0.11	0.031	1
Benzo(a)pyrene	0.62		mg/kg	0.15	0.046	1
Benzo(ghi)perylene	0.31		mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	157	Q	23-120
2-Fluorobiphenyl	34		30-120
4-Terphenyl-d14	23		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09
 Client ID: GPR1116-13-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 12:45
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:35
 Analyst: CMM
 Percent Solids: 80%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.3		mg/kg	0.21	0.025	1
Fluorene	0.53		mg/kg	0.21	0.020	1
Phenanthrene	1.5		mg/kg	0.12	0.025	1
Anthracene	0.48		mg/kg	0.12	0.040	1
Pyrene	1.5		mg/kg	0.12	0.021	1
Benzo(a)anthracene	0.85		mg/kg	0.12	0.023	1
Chrysene	0.86		mg/kg	0.12	0.022	1
Benzo(b)fluoranthene	0.92		mg/kg	0.12	0.035	1
Benzo(a)pyrene	0.97		mg/kg	0.16	0.050	1
Benzo(ghi)perylene	0.45		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	76		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	47		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10
 Client ID: GPR1116-14-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:20
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 16:59
 Analyst: CMM
 Percent Solids: 60%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.37		mg/kg	0.27	0.033	1
Fluorene	0.74		mg/kg	0.27	0.027	1
Phenanthrene	1.5		mg/kg	0.16	0.033	1
Anthracene	0.18		mg/kg	0.16	0.054	1
Pyrene	0.62		mg/kg	0.16	0.027	1
Benzo(a)anthracene	0.42		mg/kg	0.16	0.031	1
Chrysene	0.36		mg/kg	0.16	0.028	1
Benzo(b)fluoranthene	0.44		mg/kg	0.16	0.046	1
Benzo(a)pyrene	0.43		mg/kg	0.22	0.067	1
Benzo(ghi)perylene	0.19	J	mg/kg	0.22	0.032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	64		23-120
2-Fluorobiphenyl	54		30-120
4-Terphenyl-d14	38		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11
 Client ID: GPR1116-15-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 13:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 17:46
 Analyst: CMM
 Percent Solids: 70%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.9		mg/kg	0.23	0.028	1
Fluorene	0.52		mg/kg	0.23	0.022	1
Phenanthrene	2.8		mg/kg	0.14	0.028	1
Anthracene	1.3		mg/kg	0.14	0.045	1
Pyrene	4.3		mg/kg	0.14	0.023	1
Benzo(a)anthracene	3.7		mg/kg	0.14	0.026	1
Chrysene	3.7		mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	5.1		mg/kg	0.14	0.039	1
Benzo(a)pyrene	5.2		mg/kg	0.18	0.056	1
Benzo(ghi)perylene	3.8		mg/kg	0.18	0.027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	51		30-120
4-Terphenyl-d14	45		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12
 Client ID: FB-080122-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:35
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:23
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	0.05	J	ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	0.03	J	ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.01	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	74		15-120
4-Terphenyl-d14	83		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13
 Client ID: FB-080122-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 14:40
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:39
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	75		15-120
4-Terphenyl-d14	84		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15
 Client ID: DUP-48
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 00:00
 Date Received: 08/01/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/03/22 18:10
 Analyst: CMM
 Percent Solids: 71%

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 19:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.16	J	mg/kg	0.23	0.028	1
Fluorene	0.087	J	mg/kg	0.23	0.022	1
Phenanthrene	0.19		mg/kg	0.14	0.028	1
Anthracene	ND		mg/kg	0.14	0.044	1
Pyrene	0.10	J	mg/kg	0.14	0.023	1
Benzo(a)anthracene	0.040	J	mg/kg	0.14	0.026	1
Chrysene	0.044	J	mg/kg	0.14	0.024	1
Benzo(b)fluoranthene	0.042	J	mg/kg	0.14	0.038	1
Benzo(a)pyrene	ND		mg/kg	0.18	0.056	1
Benzo(ghi)perylene	0.028	J	mg/kg	0.18	0.027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		23-120
2-Fluorobiphenyl	79		30-120
4-Terphenyl-d14	76		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8270D
 Analytical Date: 08/02/22 16:42
 Analyst: SZ

Extraction Method: EPA 3546
 Extraction Date: 08/02/22 06:01

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-11,15 Batch: WG1670007-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.097	0.020
Anthracene	ND		mg/kg	0.097	0.032
Pyrene	ND		mg/kg	0.097	0.016
Benzo(a)anthracene	ND		mg/kg	0.097	0.018
Chrysene	ND		mg/kg	0.097	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.097	0.027
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	77		30-120
4-Terphenyl-d14	95		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
 Analytical Date: 08/03/22 11:07
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/02/22 19:34

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 12-13 Batch: WG1670368-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	50		23-120
2-Fluorobiphenyl	48		15-120
4-Terphenyl-d14	76		41-149



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-11,15 Batch: WG1670007-2 WG1670007-3								
Naphthalene	72		72		40-140	0		50
Fluorene	77		77		40-140	0		50
Phenanthrene	71		71		40-140	0		50
Anthracene	75		75		40-140	0		50
Pyrene	71		70		35-142	1		50
Benzo(a)anthracene	82		78		40-140	5		50
Chrysene	78		74		40-140	5		50
Benzo(b)fluoranthene	94		93		40-140	1		50
Benzo(a)pyrene	94		92		40-140	2		50
Benzo(ghi)perylene	77		73		40-140	5		50

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	82		83		23-120
2-Fluorobiphenyl	77		76		30-120
4-Terphenyl-d14	86		84		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 12-13 Batch: WG1670368-2 WG1670368-3								
Naphthalene	77		83		40-140	8		40
Fluorene	82		88		40-140	7		40
Phenanthrene	86		92		40-140	7		40
Anthracene	87		92		40-140	6		40
Pyrene	97		97		26-127	0		40
Benzo(a)anthracene	104		100		40-140	4		40
Chrysene	102		98		40-140	4		40
Benzo(b)fluoranthene	105		103		40-140	2		40
Benzo(a)pyrene	95		92		40-140	3		40
Benzo(ghi)perylene	111		108		40-140	3		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	79		87		23-120
2-Fluorobiphenyl	72		78		15-120
4-Terphenyl-d14	88		86		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-01

Date Collected: 08/01/22 08:45

Client ID: GPR1116-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	67.9		mg/kg	2.49	0.134	1	08/02/22 15:27	08/06/22 19:03	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02

Date Collected: 08/01/22 09:00

Client ID: GPR1116-06-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	104		mg/kg	2.25	0.121	1	08/02/22 15:27	08/06/22 19:59	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-03

Date Collected: 08/01/22 09:10

Client ID: GPR1116-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	119		mg/kg	2.25	0.121	1	08/02/22 15:27	08/06/22 20:04	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-04

Date Collected: 08/01/22 09:50

Client ID: GPR1116-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	85.3		mg/kg	12.2	0.652	5	08/02/22 15:27	08/08/22 20:03	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05

Date Collected: 08/01/22 10:10

Client ID: GPR1116-09-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	40.8		mg/kg	2.31	0.124	1	08/02/22 15:27	08/06/22 20:13	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06

Date Collected: 08/01/22 10:30

Client ID: GPR1116-10-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 76%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	13.9		mg/kg	2.48	0.133	1	08/02/22 15:27	08/06/22 20:18	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07

Date Collected: 08/01/22 11:00

Client ID: GPR1116-11-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	193		mg/kg	2.30	0.123	1	08/02/22 15:27	08/06/22 20:32	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-08

Date Collected: 08/01/22 12:30

Client ID: GPR1116-12-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	97.5		mg/kg	2.15	0.115	1	08/02/22 15:27	08/06/22 20:37	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09

Date Collected: 08/01/22 12:45

Client ID: GPR1116-13-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 80%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	375		mg/kg	2.37	0.127	1	08/02/22 15:27	08/06/22 20:41	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-10

Date Collected: 08/01/22 13:20

Client ID: GPR1116-14-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 60%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	60.2		mg/kg	3.22	0.172	1	08/02/22 15:27	08/06/22 20:46	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-11

Date Collected: 08/01/22 13:35

Client ID: GPR1116-15-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 70%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	189		mg/kg	2.68	0.143	1	08/02/22 15:27	08/06/22 20:50	EPA 3050B	1,6010D	MC



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-12

Date Collected: 08/01/22 14:35

Client ID: FB-080122-3

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 21:18	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-13

Date Collected: 08/01/22 14:40

Client ID: FB-080122-4

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 21:23	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15

Date Collected: 08/01/22 00:00

Client ID: DUP-48

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	206		mg/kg	13.4	0.716	5	08/02/22 15:27	08/08/22 20:08	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 12-13 Batch: WG1670146-1									
Lead, Total	ND	ug/l	1.000	0.3430	1	08/02/22 11:07	08/02/22 20:05	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-11,15 Batch: WG1670165-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/02/22 15:27	08/06/22 18:40	1,6010D	MC

Prep Information

Digestion Method: EPA 3050B



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 12-13 Batch: WG1670146-2								
Lead, Total	95		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 Batch: WG1670165-2 SRM Lot Number: D113-540								
Lead, Total	93		-		72-128	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 12-13 QC Batch ID: WG1670146-3 QC Sample: L2241079-01 Client ID: MS Sample												
Lead, Total	3.328	530	527.1	99		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-3 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01												
Lead, Total	67.9	52.7	102	65	Q	-	-		75-125	-		20



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-4 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Lead, Total	67.9	96.4	mg/kg	35	Q	20

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

**Lab Serial Dilution
Analysis
Batch Quality Control**

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11,15 QC Batch ID: WG1670165-6 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Lead, Total	67.9	99.7	mg/kg	47	Q	20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-01

Date Collected: 08/01/22 08:45

Client ID: GPR1116-05-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.1		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-02
Client ID: GPR1116-06-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 09:00
Date Received: 08/01/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.4		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-03

Date Collected: 08/01/22 09:10

Client ID: GPR1116-07-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.5		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-04

Date Collected: 08/01/22 09:50

Client ID: GPR1116-08-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	78.4		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-05

Date Collected: 08/01/22 10:10

Client ID: GPR1116-09-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.6		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-06
Client ID: GPR1116-10-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/01/22 10:30
Date Received: 08/01/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.1		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-07

Date Collected: 08/01/22 11:00

Client ID: GPR1116-11-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.3		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-08

Date Collected: 08/01/22 12:30

Client ID: GPR1116-12-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.2		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-09

Date Collected: 08/01/22 12:45

Client ID: GPR1116-13-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.7		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-10

Date Collected: 08/01/22 13:20

Client ID: GPR1116-14-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	59.6		%	0.100	NA	1	-	08/02/22 10:14	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241031-11

Date Collected: 08/01/22 13:35

Client ID: GPR1116-15-SS01

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	70.4		%	0.100	NA	1	-	08/02/22 09:28	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241031

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241031-15

Date Collected: 08/01/22 00:00

Client ID: DUP-48

Date Received: 08/01/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	71.0		%	0.100	NA	1	-	08/02/22 09:28	121,2540G	RI



Lab Duplicate Analysis *Batch Quality Control*

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241031

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 11,15 QC Batch ID: WG1670059-1 QC Sample: L2241056-01 Client ID: DUP Sample						
Solids, Total	82.3	82.1	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-10 QC Batch ID: WG1670085-1 QC Sample: L2241031-01 Client ID: GPR1116-05-SS01						
Solids, Total	76.1	76.7	%	1		20



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-01A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241031-01B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-01C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-01D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-01F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-02A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-02B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-02C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-02D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-02E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-02F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-03A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-03B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-03C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-03D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-03E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-03F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-04A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-04B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-04C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-04D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-04F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-05A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-05B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-05C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-05D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-05E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-05F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-06A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-06B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-06C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-06D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-06F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-07A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241031-07B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-07C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260H(14),PA-8260HLW(14)
L2241031-07D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-07F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-08A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)
L2241031-08B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-08C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-08D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-08E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-08F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-09A	Vial MeOH preserved	C	NA		3.9	Y	Absent		PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-09B	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-09C	Vial water preserved	C	NA		3.9	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-09D	Plastic 2oz unpreserved for TS	C	NA		3.9	Y	Absent		TS(7)
L2241031-09E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.9	Y	Absent		PB-TI(180)
L2241031-09F	Glass 250ml/8oz unpreserved	C	NA		3.9	Y	Absent		PA-PAH(14)
L2241031-10A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-10B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-10C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 06:54	PA-8260HLW(14)
L2241031-10D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-10E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-10F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-11A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-11B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-11C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-11D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-11E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-11F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)
L2241031-12A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12C	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-12D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-12E	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-12F	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-12G	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-12H	Plastic 250ml HNO3 preserved	C	<2	<2	3.9	Y	Absent		PB-6020T-PPB(180)
L2241031-13A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-13B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-13C	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241031**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241031-13D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-13E	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-13F	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-13G	Amber 250ml unpreserved	C	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2241031-13H	Plastic 250ml HNO3 preserved	C	<2	<2	3.9	Y	Absent		PB-6020T-PPB(180)
L2241031-14A	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-14B	Vial HCl preserved	C	NA		3.9	Y	Absent		PA-8260(14)
L2241031-14C	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-14D	Vial Na2S2O3 preserved	C	NA		3.9	Y	Absent		8011(14)
L2241031-15A	Vial MeOH preserved	A	NA		3.3	Y	Absent		PA-8260HLW(14)
L2241031-15B	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-15C	Vial water preserved	A	NA		3.3	Y	Absent	02-AUG-22 07:11	PA-8260HLW(14)
L2241031-15D	Plastic 2oz unpreserved for TS	A	NA		3.3	Y	Absent		TS(7)
L2241031-15E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		3.3	Y	Absent		PB-TI(180)
L2241031-15F	Glass 250ml/8oz unpreserved	A	NA		3.3	Y	Absent		PA-PAH(14)

Project Name: PHILADELPHIA REFINERY
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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241031
Report Date: 08/08/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

*5 DAY**

Due Date: Time:

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3268

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: *8/2/22* ALPHA Job #: *L224/031*

Report Information Data Deliverables Billing Information

FAX EMAIL
 ADEx Add'l Deliverables

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ANALYSIS

<i>SHORT LIST 1-5</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41031	01 C-PR1116-05-SS01	8/1	0845	S	TS
	02 C-PR1116-06-SS01		0900		
	03 C-PR1116-07-SS01		0910		
	04 C-PR1116-08-SS01		0950		
	05 C-PR1116-09-SS01		1010		
	06 C-PR1116-10-SS01		1030		
	07 C-PR1116-11-SS01		1100		
	08 C-PR1116-12-SS01		1230		
	09 C-PR1116-13-SS01		1245		
	10 C-PR1116-14-SS01		1320		

Container Type	-	-	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	<i>8/1/22</i>	<i>ST- AAC</i>	<i>8/1/22 14:40</i>
<i>[Signature]</i>	<i>8/1/22</i>	<i>[Signature]</i>	<i>8/1/22</i>
<i>[Signature]</i>	<i>8/1/22</i>	<i>[Signature]</i>	<i>8/1/22</i>

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3288

Project Name: Philadelphia Refinery

Client Information

Client: Ransom Consulting, LLC
 Address: 2127 Hamilton Avenue

Project Location: Philadelphia, PA

Trenton, NJ 08619

Project #: 200.00135.006

Phone: 215-901-4974

Project Manager: William Schmidt

Fax: _____

Turn-Around Time

Email: William.Schmidt@ransomenv.com

Standard Rush (ONLY IF PRE-APPROVED)

These samples have been Previously analyzed by Alpha

Due Date: 5-DAY Time: _____

Other Project Specific Requirements/Comments/Detection Limits:
 Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/2/22 ALPHA Job #: 2241031

Report Information **Data Deliverables** **Billing Information**
 FAX EMAIL Same as Client info PO #: 3562
 ADEX Add'l Deliverables

Regulatory Requirements/Report Limits
 State/Fed Program _____ Criteria _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41031	11 C.PRH16-15-5501	8/1	1335	S	TS
	12 FB-080122-3		1435	W	TS
	13 FB-080122-1		1440	W	TS
	14 TB-080122		-	W	TS
	15 Dup-48		-	S	TS

ANALYSIS													SAMPLE HANDLING Filtration <input type="checkbox"/> Done <input checked="" type="checkbox"/> Not Needed <input type="checkbox"/> Lab to do Preservation <input type="checkbox"/> Lab to do (Please specify below)	TOTAL # BOTTLES							
1	2	3	4	5	6	7	8	9	10	11	12	13									
Shortlist 1-5	VOG portion of SLS	EDB (soil)																			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Relinquished By	Date/Time	Received By	Date/Time
<i>[Signature]</i>	8/1/22	STP AAL	8/1/22 14:48
<i>[Signature]</i>	8/1/22 18:01	<i>[Signature]</i>	8-1/18:01
<i>[Signature]</i>	8/1/22	<i>[Signature]</i>	8/1/22 23:28

Container Type: - - G - - - - -
 Preservative: - - - - -
 Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene

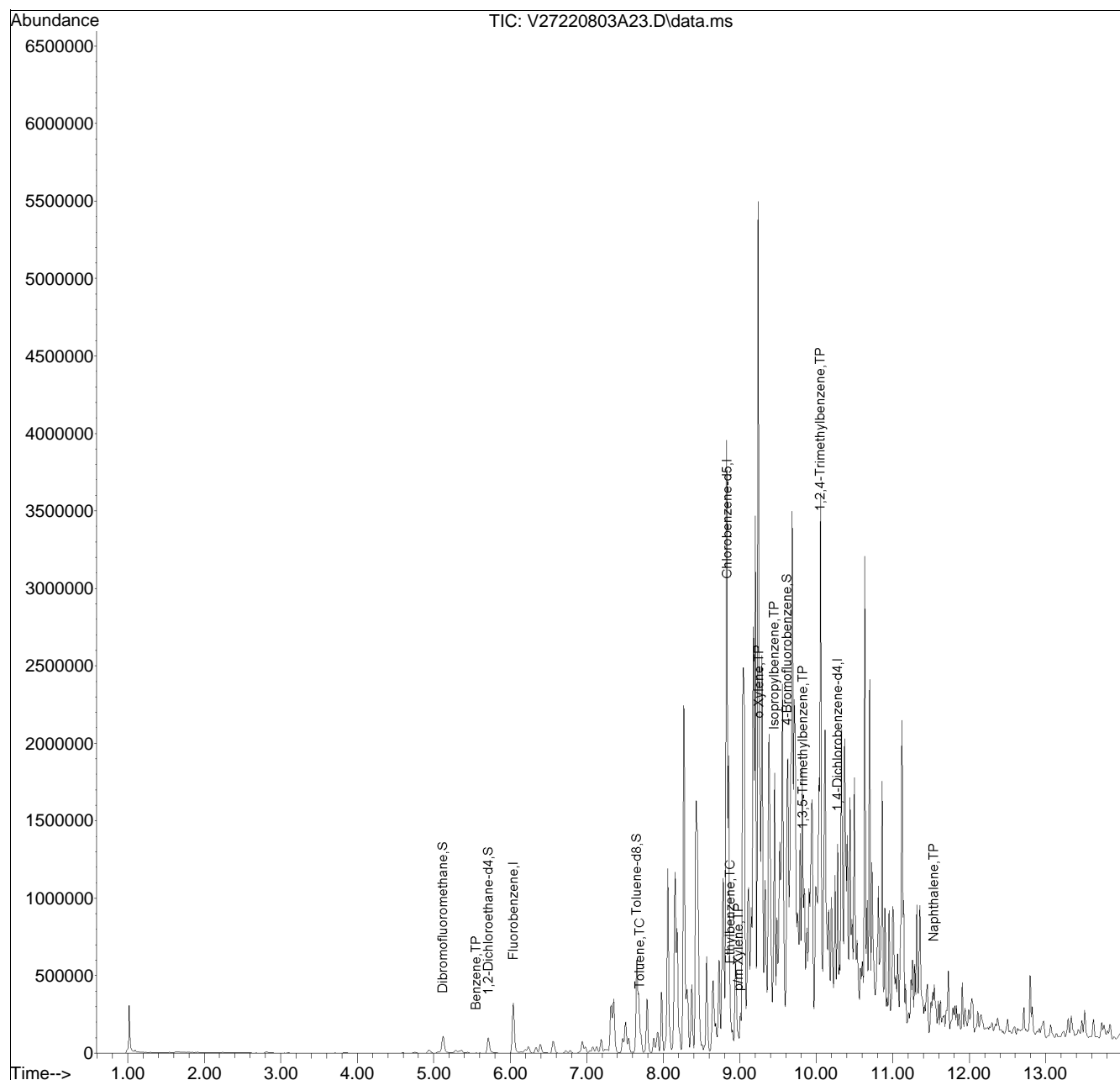
- ~~3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene~~
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2022\220803A\
 Data File : V27220803A23.D
 Acq On : 03 Aug 2022 02:23 pm
 Operator : VOA127:NLK
 Sample : L2241031-02D,31H,4.39,5,0.010,,A
 Misc : WG1671226,ICAL19153
 ALS Vial : 23 Sample Multiplier: 1

Quant Time: Aug 04 09:48:00 2022
 Quant Method : I:\VOLATILES\VOA127\2022\220803A\V127_220706A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 07 06:48:30 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V27220803A01.D•

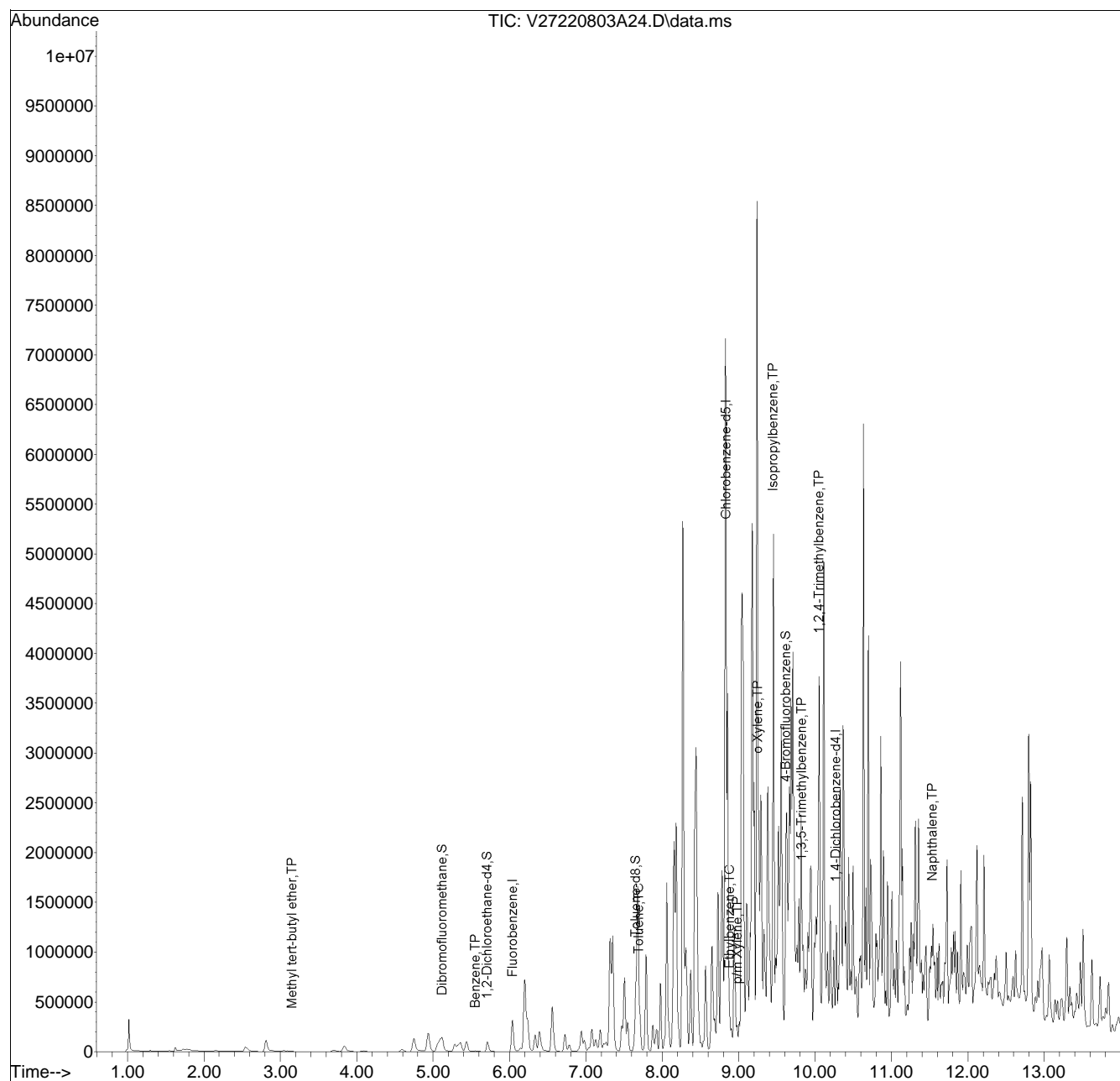


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2022\220803A\
 Data File : V27220803A24.D
 Acq On : 03 Aug 2022 02:43 pm
 Operator : VOA127:NLK
 Sample : L2241031-03,31H,3.61,5,0.100,,A
 Misc : WG1671226,ICAL19153
 ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 04 09:54:45 2022
 Quant Method : I:\VOLATILES\VOA127\2022\220803A\V127_220706A_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 07 06:48:30 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V27220803A01.D•

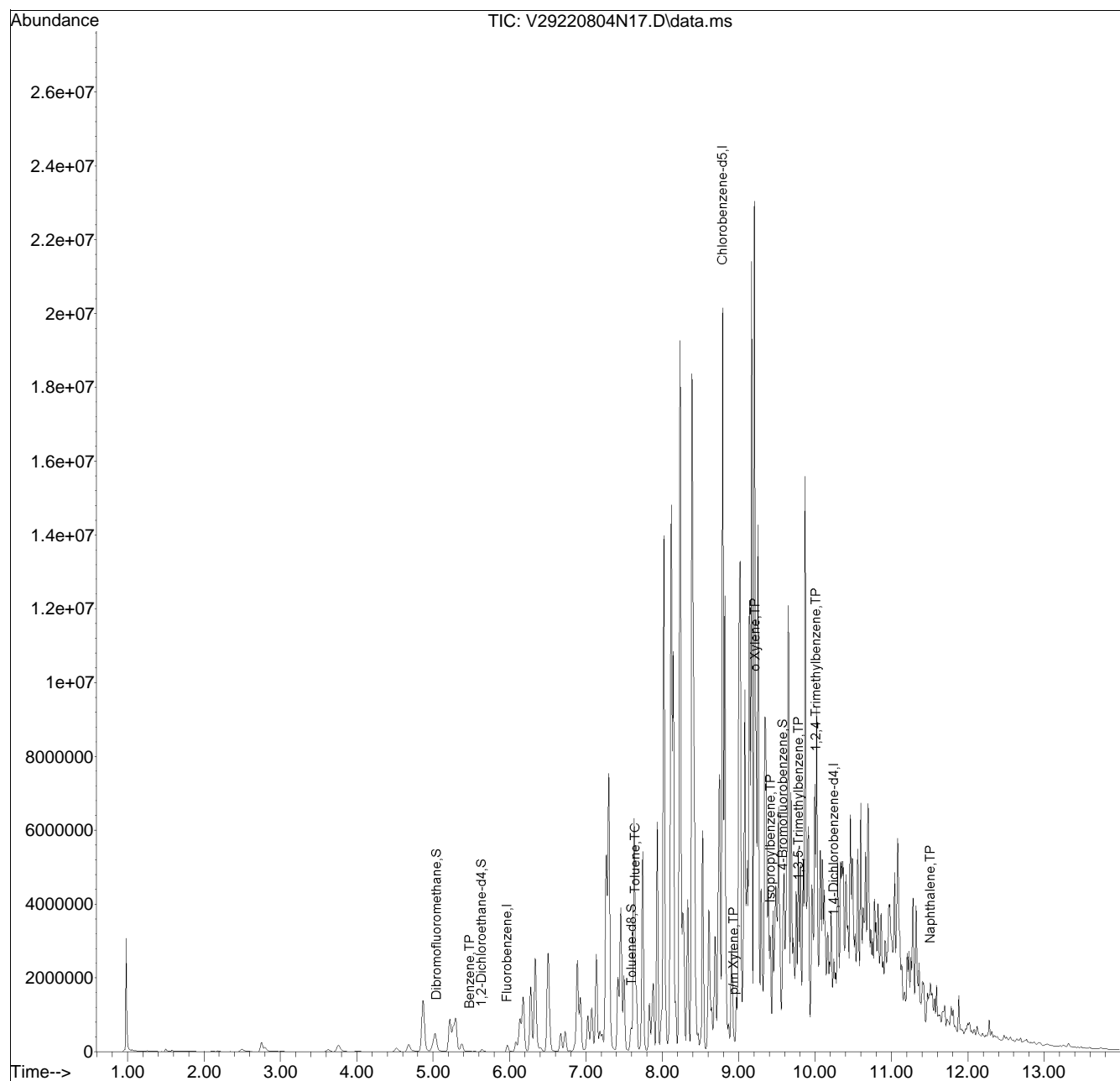


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220804N\
Data File : V29220804N17.D
Acq On : 05 Aug 2022 01:08 am
Operator : VOA129:NLK
Sample : 12241031-07,31,5.09,5,,b
Misc : WG1671753,ICAL19173
ALS Vial : 17 Sample Multiplier: 1

Quant Time: Aug 05 12:24:36 2022
Quant Method : I:\VOLATILES\VOA129\2022\220804N\V129_220712N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jul 14 08:00:36 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list04N\V29220804N01.D•

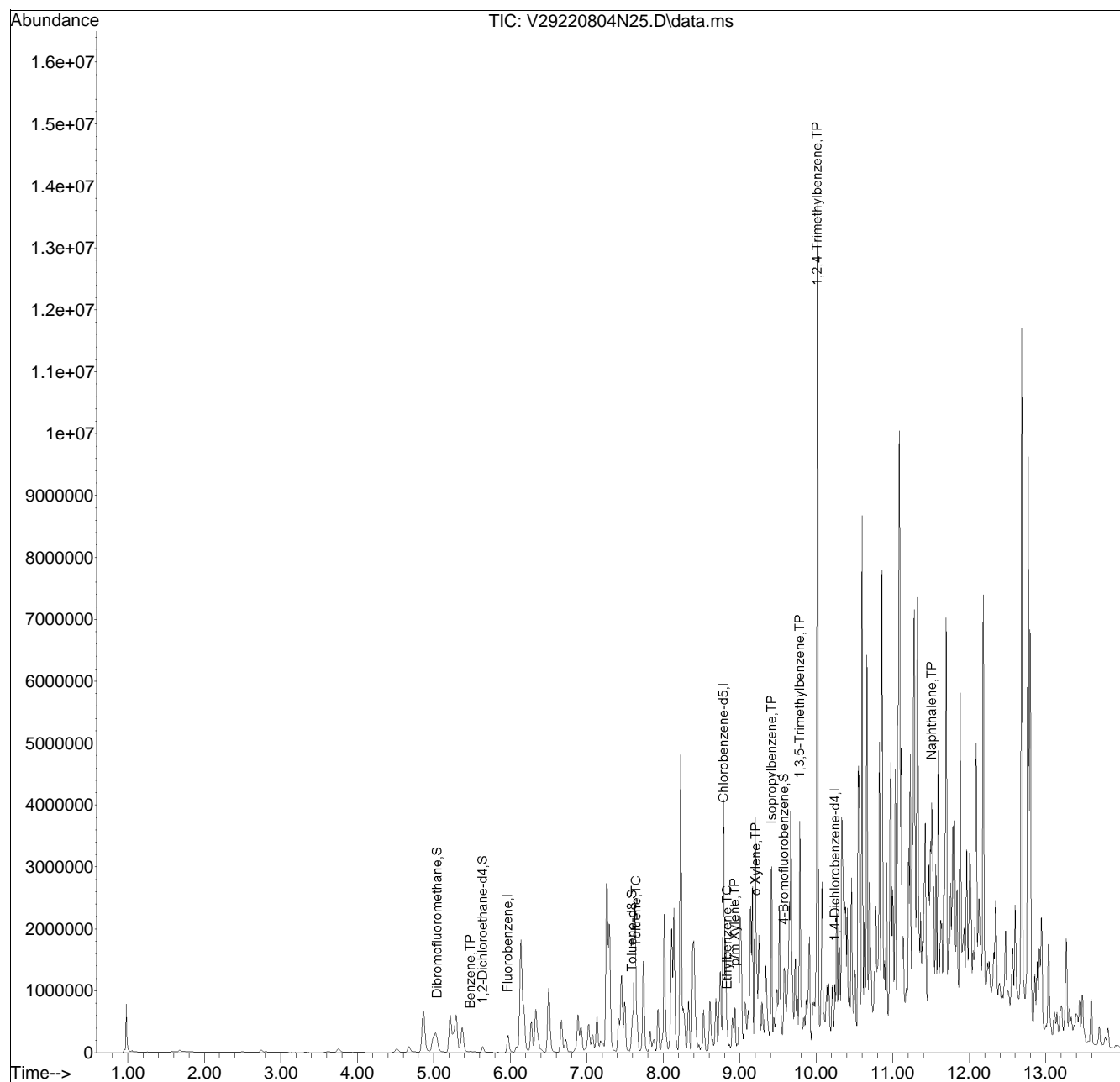


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220804N\
 Data File : V29220804N25.D
 Acq On : 05 Aug 2022 03:56 am
 Operator : VOA129:NLK
 Sample : 12241031-08,31h,4.68,5,0.100,,a
 Misc : WG1671755,ICAL19173
 ALS Vial : 25 Sample Multiplier: 1

Quant Time: Aug 05 07:51:26 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220804N\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list04N\V29220804N01.D•

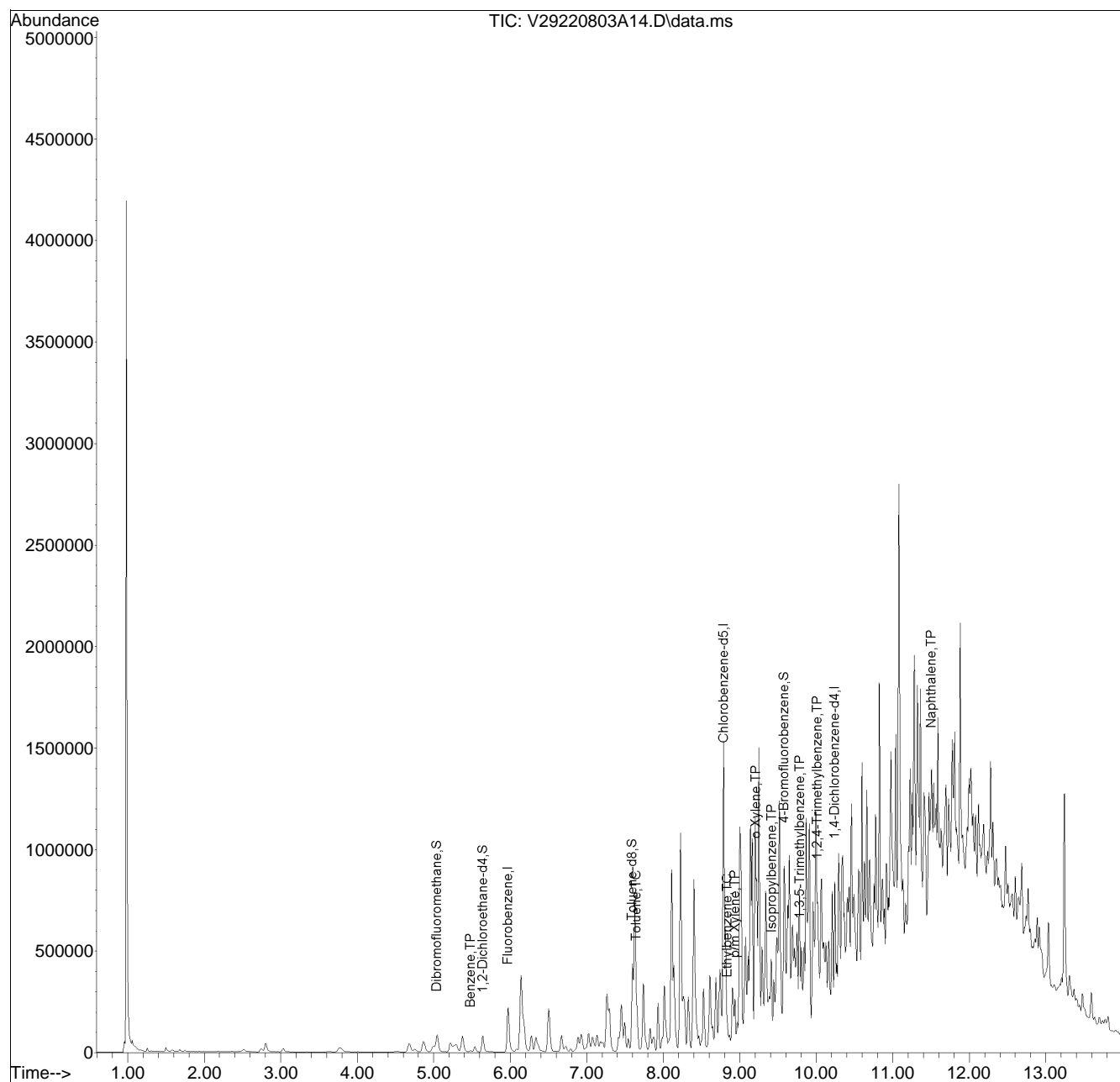


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220803A\
 Data File : V29220803A14.D
 Acq On : 03 Aug 2022 12:06 pm
 Operator : VOA129:NLK
 Sample : 12241031-09,31,4.79,5,,c
 Misc : WG1671352,ICAL19173
 ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 04 12:45:30 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•

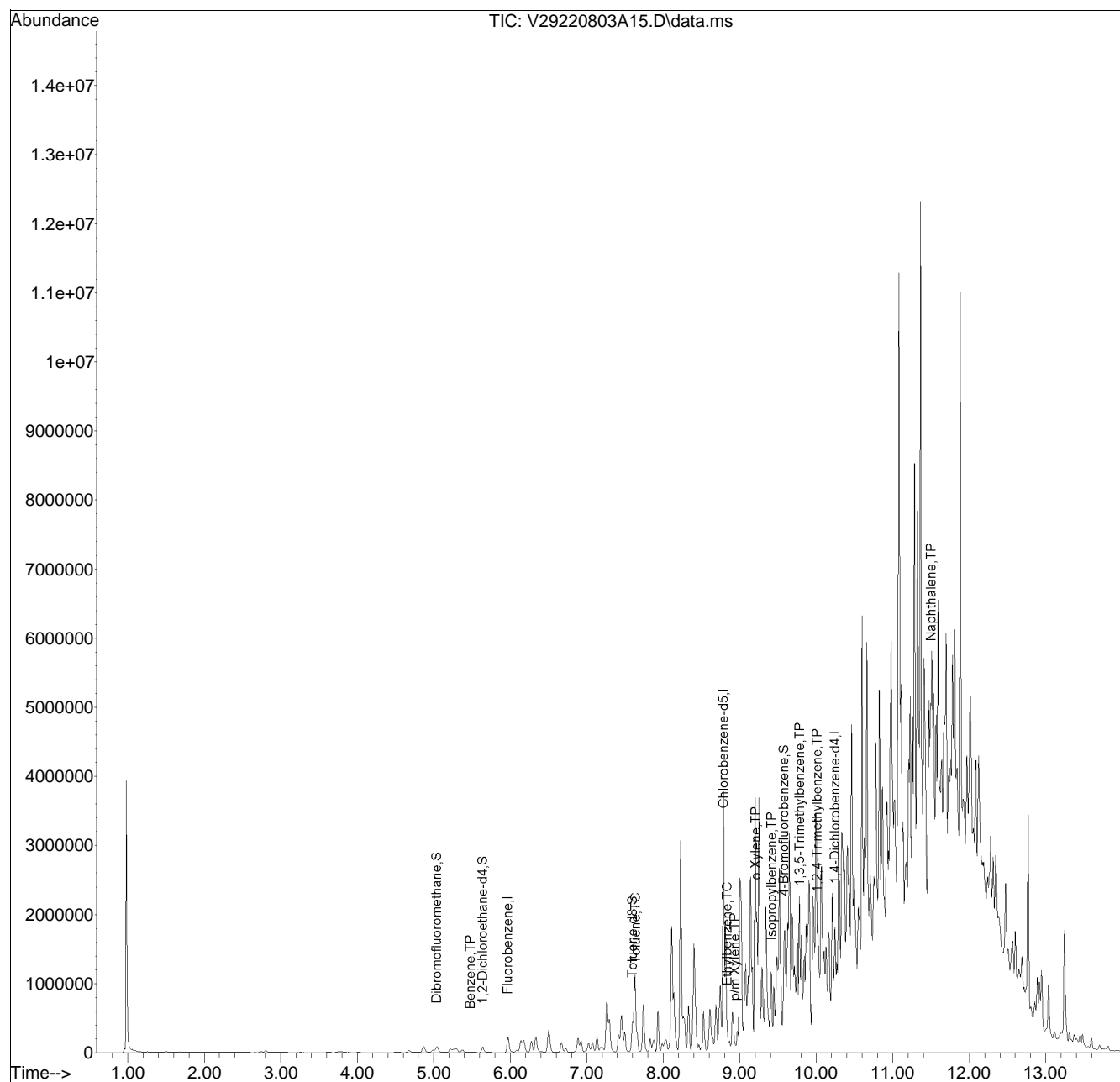


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220803A\
 Data File : V29220803A15.D
 Acq On : 03 Aug 2022 12:27 pm
 Operator : VOA129:NLK
 Sample : 12241031-10,31,4.51,5,,b
 Misc : WG1671352,ICAL19173
 ALS Vial : 15 Sample Multiplier: 1

Quant Time: Aug 04 13:23:30 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•

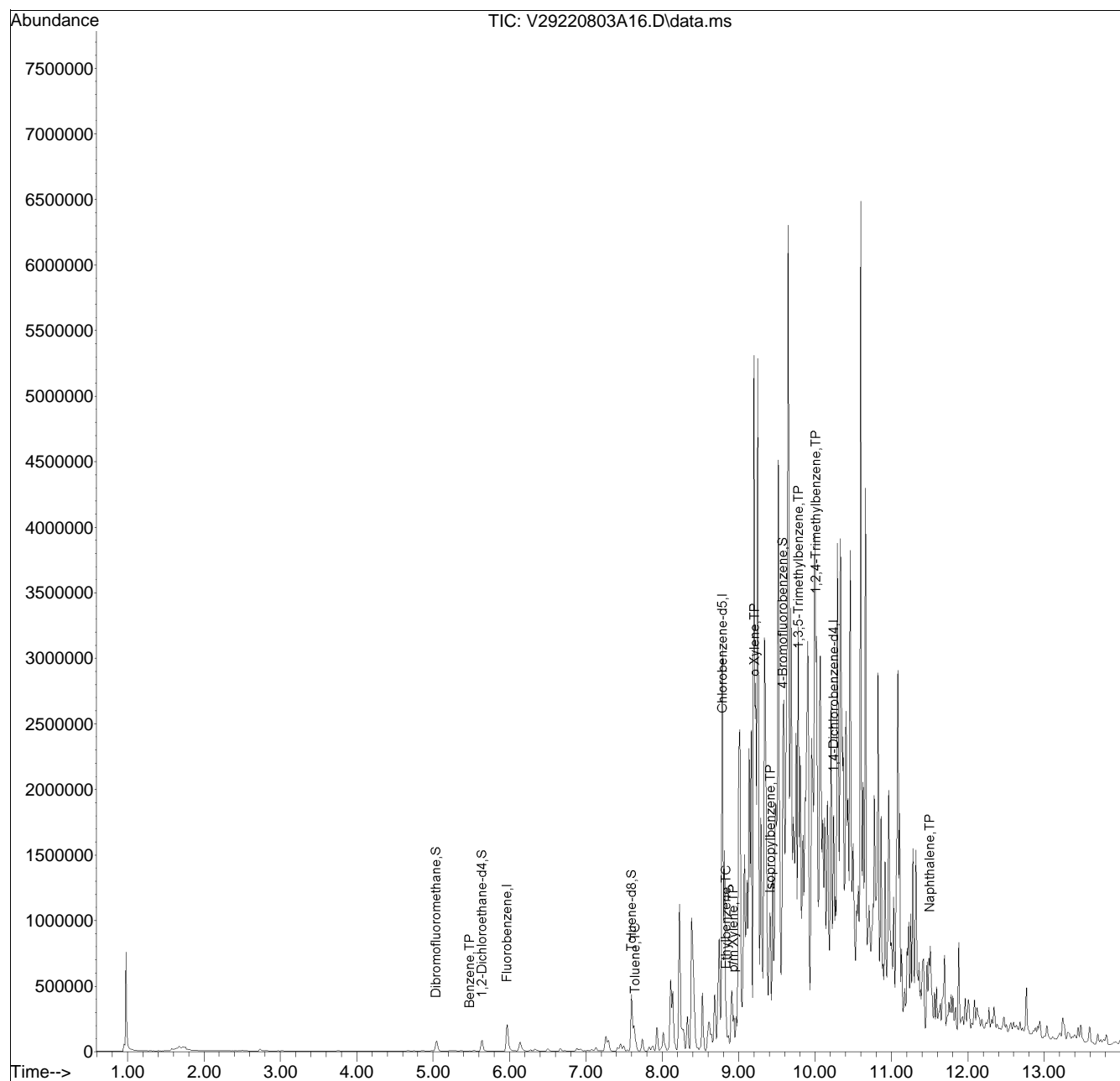


Quantitation Report (QT Reviewed)

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 Data File : V29220803A16.D
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 Operator : VOA129:NLK
 Sample : 12241031-11,31h,2.06,5,0.100,,a
 Misc : WG1671356,ICAL19173
 ALS Vial : 16 Sample Multiplier: 1

Quant Time: Aug 04 12:45:38 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220803A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list03A\V29220803A01.D•





ANALYTICAL REPORT

Lab Number:	L2241290
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/08/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241290

Report Date: 08/08/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241290-01	GPR792-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:00	08/02/22
L2241290-02	GPR792-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:10	08/02/22
L2241290-03	GPR792-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:20	08/02/22
L2241290-04	GPR792-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:30	08/02/22
L2241290-05	GPR792-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:40	08/02/22
L2241290-06	GPR792-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:50	08/02/22
L2241290-07	GPR792-07-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:00	08/02/22
L2241290-08	GPR793-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:10	08/02/22
L2241290-09	GPR793-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:20	08/02/22
L2241290-10	GPR793-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:30	08/02/22
L2241290-11	GPR793-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:40	08/02/22
L2241290-12	GPR793-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:50	08/02/22
L2241290-13	GPR793-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 12:00	08/02/22
L2241290-14	DUP-49	SOIL	PHILADELPHIA, PA	08/02/22 00:00	08/02/22
L2241290-15	FB-080222-1	WATER	PHILADELPHIA, PA	08/02/22 13:00	08/02/22
L2241290-16	FB-080222-2	WATER	PHILADELPHIA, PA	08/02/22 13:10	08/02/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

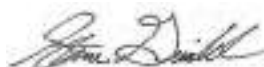
Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Steven Gniadek

Title: Technical Director/Representative

Date: 08/08/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-01 D
 Client ID: GPR792-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:48
 Analyst: JC
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	2400		mg/kg	15	1.6	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-02 D
 Client ID: GPR792-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:23
 Analyst: JC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4700		mg/kg	49	5.3	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	89		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-03 D
 Client ID: GPR792-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:47
 Analyst: JC
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	12000		mg/kg	88	9.6	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-04 D
 Client ID: GPR792-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:11
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Isopropylbenzene	5000		mg/kg	54	5.9	500
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	90		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-05 D
 Client ID: GPR792-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:35
 Analyst: JC
 Percent Solids: 73%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	8900		mg/kg	65	7.1	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	91		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-06 D
 Client ID: GPR792-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:50
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:59
 Analyst: JC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4600		mg/kg	70	7.7	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	90		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-07 D
 Client ID: GPR792-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 14:23
 Analyst: JC
 Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1400		mg/kg	12	1.3	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	85		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	89		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-08 D
 Client ID: GPR793-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/06/22 02:38
 Analyst: AJK
 Percent Solids: 95%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	5500		mg/kg	92	10.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-09 D
 Client ID: GPR793-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 14:47
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Isopropylbenzene	11000		mg/kg	100	11.	1000
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	95		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-10 D
 Client ID: GPR793-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:11
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Isopropylbenzene	15000		mg/kg	120	14.	1000
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-11 D
 Client ID: GPR793-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:35
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	14000		mg/kg	110	12.	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	90		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-12 D
 Client ID: GPR793-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:50
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:35
 Analyst: JC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1900		mg/kg	9.2	1.0	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-13 D
 Client ID: GPR793-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 12:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:59
 Analyst: JC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1800		mg/kg	11	1.2	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-14 D
 Client ID: DUP-49
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 15:59
 Analyst: NLK
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	4700		mg/kg	59	6.4	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-15
 Client ID: FB-080222-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 12:42
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-16
 Client ID: FB-080222-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 13:05
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:47
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 15-16 Batch: WG1671600-5					
Isopropylbenzene	ND		ug/l	0.50	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-07,09-14 Batch: WG1672612-5					
Isopropylbenzene	ND		mg/kg	0.050	0.0054

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	94		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/05/22 18:45
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08 Batch: WG1672622-5					
Isopropylbenzene	ND		mg/kg	0.050	0.0054

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	93		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 15-16 Batch: WG1671600-3 WG1671600-4								
Isopropylbenzene	94		96		70-130	2		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	109		112		70-130
Toluene-d8	99		97		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	104		104		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-07,09-14 Batch: WG1672612-3 WG1672612-4								
Isopropylbenzene	102		99		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	83		83		70-130
Toluene-d8	100		95		70-130
4-Bromofluorobenzene	100		99		70-130
Dibromofluoromethane	89		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08 Batch: WG1672622-3 WG1672622-4								
Isopropylbenzene	115		102		70-130	12		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	89		89		70-130
Toluene-d8	97		97		70-130
4-Bromofluorobenzene	106		101		70-130
Dibromofluoromethane	94		89		70-130



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-01

Date Collected: 08/02/22 10:00

Client ID: GPR792-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-02

Date Collected: 08/02/22 10:10

Client ID: GPR792-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-03

Date Collected: 08/02/22 10:20

Client ID: GPR792-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.0		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-04

Date Collected: 08/02/22 10:30

Client ID: GPR792-04-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-05

Date Collected: 08/02/22 10:40

Client ID: GPR792-05-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	73.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-06

Date Collected: 08/02/22 10:50

Client ID: GPR792-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.1		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-07

Date Collected: 08/02/22 11:00

Client ID: GPR792-07-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	79.0		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-08

Date Collected: 08/02/22 11:10

Client ID: GPR793-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.7		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-09

Date Collected: 08/02/22 11:20

Client ID: GPR793-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.8		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-10

Date Collected: 08/02/22 11:30

Client ID: GPR793-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.6		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-11

Date Collected: 08/02/22 11:40

Client ID: GPR793-04-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.5		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-12
 Client ID: GPR793-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:50
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.7		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

SAMPLE RESULTS

Lab ID: L2241290-13

Date Collected: 08/02/22 12:00

Client ID: GPR793-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.8		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**SAMPLE RESULTS**

Lab ID: L2241290-14

Date Collected: 08/02/22 00:00

Client ID: DUP-49

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.5		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241290

Report Date: 08/08/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-14 QC Batch ID: WG1670716-1 QC Sample: L2241290-01 Client ID: GPR792-01-SS01						
Solids, Total	85.2	85.1	%	0		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-01A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-01B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-01C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-01D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-02A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-02B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-02C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-02D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-03A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-03B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-03C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-03D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-04A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-04B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-04C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-04D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-05A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-05B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-05C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-05D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-06A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-06B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-06C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-06D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-07A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-07B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-07C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-07D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-08A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-08B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-08C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-08D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-09A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-09B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-09C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-09D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-10A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-10B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-10C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-10D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-11A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-11B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-11C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-11D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-12A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-12B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-12C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-12D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-13A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-13B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-13C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241290**Project Number:** 200.00135.006**Report Date:** 08/08/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241290-13D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-14A	Vial MeOH preserved	A	NA		3.5	Y	Absent		PA-8260HLW(14)
L2241290-14B	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-14C	Vial water preserved	A	NA		3.5	Y	Absent	03-AUG-22 12:21	PA-8260HLW(14)
L2241290-14D	Plastic 2oz unpreserved for TS	A	NA		3.5	Y	Absent		TS(7)
L2241290-15A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-15B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-15C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16A	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16B	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)
L2241290-16C	Vial HCl preserved	A	NA		3.5	Y	Absent		PA-8260(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241290
Report Date: 08/08/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241290

Project Number: 200.00135.006

Report Date: 08/08/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 2



Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: 2224129D

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

Cumene																SAMPLE HANDLING	
																Filtration	
																<input type="checkbox"/> Done	
																<input checked="" type="checkbox"/> Not Needed	
																<input type="checkbox"/> Lab to do	
																Preservation	
																<input type="checkbox"/> Lab to do	
																(Please specify below)	
																Sample Specific Comments	

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41290-01	GPR-792-01-SS01	8/2/22	1000	S	an
-02	GPR-792-02-SS01		1010		
-03	GPR-792-03-SS01		1020		
-04	GPR-792-04-SS01		1030		
-05	GPR-792-05-SS01		1040		
-06	GPR-792-06-SS01		1050		
-07	GPR-792-07-SS01		1100		
-08	GPR-793-01-SS01		1110		
-09	GPR-793-02-SS01		1120		
-10	GPR-793-03-SS01		1130		

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-622-9300
 FAX: 508-898-9193 FAX: 508-622-3288

Client Information

Client: Ransom Consulting, LLC
 Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax:

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terrafase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: L2241290

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

ANALYSIS

CUMENE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41290-11	GPR-793-04-5501	8/2/22	1140	S	an
-12	GPR-793-05-5501		1150		
-13	GPR-793-06-5501		1200		
-14	DUP-49				
-15	FB-080222-1		1300	W	
-16	FB-080222-2		1310		

Container Type	-	-	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/2/22	STJ AAL	8/2/22 14:52
<i>[Signature]</i>	8/2/22	<i>[Signature]</i>	8/2/22 9:40
<i>[Signature]</i>	8/2/22	<i>[Signature]</i>	8/2/22 23:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



ANALYTICAL REPORT

Lab Number:	L2241291
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/10/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241291-01	GPR494-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 08:45	08/02/22
L2241291-02	GPR494-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 09:10	08/02/22
L2241291-03	GPR494-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 09:30	08/02/22
L2241291-04	GPR494-04-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:00	08/02/22
L2241291-05	GPR494-05-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:20	08/02/22
L2241291-06	GPR494-06-SS01	SOIL	PHILADELPHIA, PA	08/02/22 10:40	08/02/22
L2241291-07	GPR494-07-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:00	08/02/22
L2241291-08	GPR494-08-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:20	08/02/22
L2241291-09	GPR494-09-SS01	SOIL	PHILADELPHIA, PA	08/02/22 11:30	08/02/22
L2241291-10	GPR1088-01-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:00	08/02/22
L2241291-11	GPR1088-02-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:15	08/02/22
L2241291-12	GPR1088-03-SS01	SOIL	PHILADELPHIA, PA	08/02/22 13:30	08/02/22
L2241291-13	DUP-50	SOIL	PHILADELPHIA, PA	08/02/22 00:00	08/02/22
L2241291-14	FB-080222-3	WATER	PHILADELPHIA, PA	08/02/22 13:35	08/02/22
L2241291-15	FB-080222-4	WATER	PHILADELPHIA, PA	08/02/22 13:40	08/02/22
L2241291-16	TB-080222	WATER	PHILADELPHIA, PA	08/02/22 00:00	08/02/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241291-01: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (48%) and the surrogate recovery for 4-bromofluorobenzene (153%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis; however, since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. The results of both analyses are reported.

L2241291-02: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (47%) and the surrogate recovery for 4-bromofluorobenzene (207%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. Since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. A high-level analysis was performed, and those results are also reported.

L2241291-03: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (201%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-04: The internal standard (IS) response for 1,4-dichlorobenzene-d4 (33%) and the surrogate recoveries for toluene-d8 (133%) and 4-bromofluorobenzene (254%) were outside the acceptance criteria; however, re-analysis achieved the following results: 1,4-dichlorobenzene-d4 (44%) and 4-bromofluorobenzene (171%). The results of both analyses are reported; however, since the IS response was below method criteria, all associated compounds and surrogate recoveries are considered to have a potentially high bias.

L2241291-05D: The sample has elevated detection limits due to the dilution required by the elevated

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Case Narrative (continued)

concentrations of non-target compounds in the sample.

L2241291-05D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (220%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-06: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (149%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-07: The surrogate recoveries are outside the acceptance criteria for toluene-d8 (144%) and 4-bromofluorobenzene (834%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2241291-08: The surrogate recovery for 4-bromofluorobenzene (137%) was outside the acceptance criteria; however, re-analysis achieved the following results: 1,4-dichlorobenzene-d4 (36%) and 4-bromofluorobenzene (134%). The results of both analyses are reported; however, since the IS response was below method criteria, all associated compounds and surrogate recoveries are considered to have a potentially high bias.

Semivolatile Organics

L2241291-01D and -03D through -06D: The sample has elevated detection limits due to the dilution required by the sample matrix.

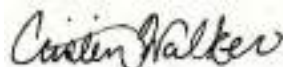
L2241291-08D: The surrogate recoveries are below the acceptance criteria for nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%) and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

Total Metals

The WG1670927-3 MS recovery for lead (486%), performed on L2241291-01, does not apply because the sample concentration is greater than four times the spike amount added.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Cristin Walker

Title: Technical Director/Representative

Date: 08/10/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:13
 Analyst: JC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.0040		mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.033		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	0.036		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.21		mg/kg	0.0024	0.00066	1
o-Xylene	0.095		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.30		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.054		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.16		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.63	E	mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	153	Q	70-130
Dibromofluoromethane	76		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 22:38
 Analyst: AJK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.099	0.0099	1
Benzene	ND		mg/kg	0.025	0.0082	1
1,2-Dichloroethane	ND		mg/kg	0.049	0.013	1
Toluene	ND		mg/kg	0.049	0.027	1
1,2-Dibromoethane	ND		mg/kg	0.025	0.014	1
Ethylbenzene	0.022	J	mg/kg	0.049	0.0070	1
p/m-Xylene	0.078	J	mg/kg	0.099	0.028	1
o-Xylene	0.038	J	mg/kg	0.049	0.014	1
Xylenes, Total	0.12	J	mg/kg	0.049	0.014	1
Isopropylbenzene	ND		mg/kg	0.049	0.0054	1
1,3,5-Trimethylbenzene	0.060	J	mg/kg	0.099	0.0095	1
1,2,4-Trimethylbenzene	0.22		mg/kg	0.099	0.016	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 10:40
 Analyst: JC
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.14	0.014	1
Benzene	0.037		mg/kg	0.036	0.012	1
1,2-Dichloroethane	ND		mg/kg	0.072	0.018	1
Toluene	0.047	J	mg/kg	0.072	0.039	1
1,2-Dibromoethane	ND		mg/kg	0.036	0.021	1
Ethylbenzene	0.064	J	mg/kg	0.072	0.010	1
p/m-Xylene	0.078	J	mg/kg	0.14	0.040	1
o-Xylene	0.14		mg/kg	0.072	0.021	1
Xylenes, Total	0.22	J	mg/kg	0.072	0.021	1
Isopropylbenzene	0.63		mg/kg	0.072	0.0078	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.14	0.014	1
1,2,4-Trimethylbenzene	0.061	J	mg/kg	0.14	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	98		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 22:58
 Analyst: AJK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0037	0.00037	1
Benzene	0.0041		mg/kg	0.00092	0.00031	1
1,2-Dichloroethane	ND		mg/kg	0.0018	0.00048	1
Toluene	0.0086		mg/kg	0.0018	0.0010	1
1,2-Dibromoethane	ND		mg/kg	0.00092	0.00054	1
Ethylbenzene	0.0074		mg/kg	0.0018	0.00026	1
p/m-Xylene	0.0054		mg/kg	0.0037	0.0010	1
o-Xylene	0.025		mg/kg	0.0018	0.00054	1
Xylenes, Total	0.030		mg/kg	0.0018	0.00054	1
Isopropylbenzene	0.072		mg/kg	0.0018	0.00020	1
1,3,5-Trimethylbenzene	0.00036	J	mg/kg	0.0037	0.00036	1
1,2,4-Trimethylbenzene	0.0053		mg/kg	0.0037	0.00062	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	127		70-130
4-Bromofluorobenzene	207	Q	70-130
Dibromofluoromethane	79		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03
 Client ID: GPR494-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 23:40
 Analyst: AJK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	0.00040	J	mg/kg	0.00048	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00096	0.00025	1
Toluene	0.00082	J	mg/kg	0.00096	0.00052	1
1,2-Dibromoethane	ND		mg/kg	0.00048	0.00028	1
Ethylbenzene	0.0012		mg/kg	0.00096	0.00014	1
p/m-Xylene	0.0064		mg/kg	0.0019	0.00054	1
o-Xylene	0.0068		mg/kg	0.00096	0.00028	1
Xylenes, Total	0.013		mg/kg	0.00096	0.00028	1
Isopropylbenzene	0.034		mg/kg	0.00096	0.00010	1
1,3,5-Trimethylbenzene	0.00040	J	mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	0.0017	J	mg/kg	0.0019	0.00032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	125		70-130
4-Bromofluorobenzene	201	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 11:33
 Analyst: JC
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00021	1
Benzene	0.0018		mg/kg	0.00051	0.00017	1
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026	1
Toluene	0.0050		mg/kg	0.0010	0.00056	1
1,2-Dibromoethane	ND		mg/kg	0.00051	0.00030	1
Ethylbenzene	0.0042		mg/kg	0.0010	0.00014	1
p/m-Xylene	0.0096		mg/kg	0.0020	0.00057	1
o-Xylene	0.019		mg/kg	0.0010	0.00030	1
Xylenes, Total	0.029		mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.013		mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	0.0010	J	mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	0.0057		mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	128		70-130
Toluene-d8	133	Q	70-130
4-Bromofluorobenzene	254	Q	70-130
Dibromofluoromethane	116		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04 R
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 23:19
 Analyst: AJK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.00036	J	mg/kg	0.00061	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.0011	J	mg/kg	0.0012	0.00066	1
1,2-Dibromoethane	ND		mg/kg	0.00061	0.00036	1
Ethylbenzene	0.0010	J	mg/kg	0.0012	0.00017	1
p/m-Xylene	0.0027		mg/kg	0.0024	0.00068	1
o-Xylene	0.0041		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.0068		mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.0072		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0074		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0010	J	mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	171	Q	70-130
Dibromofluoromethane	87		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05 D
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:00
 Analyst: JC
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.27	0.027	2
Benzene	ND		mg/kg	0.068	0.022	2
1,2-Dichloroethane	ND		mg/kg	0.14	0.035	2
Toluene	0.089	J	mg/kg	0.14	0.074	2
1,2-Dibromoethane	ND		mg/kg	0.068	0.040	2
Ethylbenzene	0.046	J	mg/kg	0.14	0.019	2
p/m-Xylene	0.16	J	mg/kg	0.27	0.076	2
o-Xylene	0.086	J	mg/kg	0.14	0.040	2
Xylenes, Total	0.25	J	mg/kg	0.14	0.040	2
Isopropylbenzene	2.1		mg/kg	0.14	0.015	2
1,3,5-Trimethylbenzene	ND		mg/kg	0.27	0.026	2
1,2,4-Trimethylbenzene	0.15	J	mg/kg	0.27	0.045	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	220	Q	70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-06
 Client ID: GPR494-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 15:30
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0022	0.00022	1
Benzene	0.00059		mg/kg	0.00056	0.00018	1
1,2-Dichloroethane	ND		mg/kg	0.0011	0.00029	1
Toluene	0.0012		mg/kg	0.0011	0.00061	1
1,2-Dibromoethane	ND		mg/kg	0.00056	0.00033	1
Ethylbenzene	0.00067	J	mg/kg	0.0011	0.00016	1
p/m-Xylene	0.0032		mg/kg	0.0022	0.00062	1
o-Xylene	0.0052		mg/kg	0.0011	0.00032	1
Xylenes, Total	0.0084		mg/kg	0.0011	0.00032	1
Isopropylbenzene	0.0091		mg/kg	0.0011	0.00012	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0022	0.00022	1
1,2,4-Trimethylbenzene	0.0020	J	mg/kg	0.0022	0.00037	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	149	Q	70-130
Dibromofluoromethane	85		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 12:53
 Analyst: JC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.00050	J	mg/kg	0.00059	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00030	1
Toluene	0.0043		mg/kg	0.0012	0.00064	1
1,2-Dibromoethane	ND		mg/kg	0.00059	0.00035	1
Ethylbenzene	0.0028		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.041		mg/kg	0.0024	0.00066	1
o-Xylene	0.020		mg/kg	0.0012	0.00034	1
Xylenes, Total	0.061		mg/kg	0.0012	0.00034	1
Isopropylbenzene	0.14		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0025		mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.018		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	130		70-130
Toluene-d8	144	Q	70-130
4-Bromofluorobenzene	834	Q	70-130
Dibromofluoromethane	106		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/05/22 13:20
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	0.0052		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	0.0044		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00040	1
Ethylbenzene	0.0030		mg/kg	0.0014	0.00020	1
p/m-Xylene	0.012		mg/kg	0.0028	0.00078	1
o-Xylene	0.0075		mg/kg	0.0014	0.00040	1
Xylenes, Total	0.020		mg/kg	0.0014	0.00040	1
Isopropylbenzene	0.0029		mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	0.0039		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	0.012		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	121		70-130
4-Bromofluorobenzene	137	Q	70-130
Dibromofluoromethane	108		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08 R
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 21:34
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0024	0.00024	1
Benzene	0.016		mg/kg	0.00060	0.00020	1
1,2-Dichloroethane	ND		mg/kg	0.0012	0.00031	1
Toluene	0.0057		mg/kg	0.0012	0.00066	1
1,2-Dibromoethane	ND		mg/kg	0.00060	0.00035	1
Ethylbenzene	0.0036		mg/kg	0.0012	0.00017	1
p/m-Xylene	0.012		mg/kg	0.0024	0.00068	1
o-Xylene	0.0083		mg/kg	0.0012	0.00035	1
Xylenes, Total	0.020		mg/kg	0.0012	0.00035	1
Isopropylbenzene	0.0019		mg/kg	0.0012	0.00013	1
1,3,5-Trimethylbenzene	0.0022	J	mg/kg	0.0024	0.00023	1
1,2,4-Trimethylbenzene	0.0063		mg/kg	0.0024	0.00040	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	113		70-130
4-Bromofluorobenzene	134	Q	70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
 Client ID: GPR494-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 21:54
 Analyst: NLK
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	ND		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00041	1
Ethylbenzene	ND		mg/kg	0.0014	0.00020	1
p/m-Xylene	ND		mg/kg	0.0028	0.00078	1
o-Xylene	ND		mg/kg	0.0014	0.00040	1
Xylenes, Total	ND		mg/kg	0.0014	0.00040	1
Isopropylbenzene	ND		mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 18:57
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 10:28
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:04
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 10:52
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-16
 Client ID: TB-080222
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:11
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-16
 Client ID: TB-080222
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 00:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 11:17
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/04/22 08:49
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 14-16 Batch: WG1671346-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	103		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/08/22 17:23
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 14-16 Batch: WG1672421-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 16:59
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG1672584-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 16:59
Analyst: TMS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 02-04 Batch: WG1672587-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 02,05 Batch: WG1672595-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01,04,07 Batch: WG1672597-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/08/22 08:37
 Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 06 Batch: WG1672815-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/08/22 18:52
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 08-09 Batch: WG1672860-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	96		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/05/22 08:48
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 08 Batch: WG1672867-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 14-16 Batch: WG1671346-3 WG1671346-4								
Methyl tert butyl ether	87		89		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	100		110		70-130	10		20
Ethylbenzene	100		110		70-130	10		20
p/m-Xylene	105		105		70-130	0		20
o-Xylene	100		105		70-130	5		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	100		110		64-130	10		20
1,2,4-Trimethylbenzene	100		110		70-130	10		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	93		92		70-130
Toluene-d8	102		100		70-130
4-Bromofluorobenzene	99		99		70-130
Dibromofluoromethane	103		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 14-16 Batch: WG1672421-2									
1,2-Dibromoethane	92		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG1672584-3 WG1672584-4								
Methyl tert butyl ether	91		90		66-130	1		30
Benzene	98		95		70-130	3		30
1,2-Dichloroethane	94		93		70-130	1		30
Toluene	96		94		70-130	2		30
1,2-Dibromoethane	99		98		70-130	1		30
Ethylbenzene	101		98		70-130	3		30
p/m-Xylene	100		97		70-130	3		30
o-Xylene	99		97		70-130	2		30
Isopropylbenzene	100		98		70-130	2		30
1,3,5-Trimethylbenzene	100		99		70-130	1		30
1,2,4-Trimethylbenzene	101		99		70-130	2		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		99		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	89		91		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 02-04 Batch: WG1672587-3 WG1672587-4								
Methyl tert butyl ether	91		90		66-130	1		30
Benzene	98		95		70-130	3		30
1,2-Dichloroethane	94		93		70-130	1		30
Toluene	96		94		70-130	2		30
1,2-Dibromoethane	99		98		70-130	1		30
Ethylbenzene	101		98		70-130	3		30
p/m-Xylene	100		97		70-130	3		30
o-Xylene	99		97		70-130	2		30
Isopropylbenzene	100		98		70-130	2		30
1,3,5-Trimethylbenzene	100		99		70-130	1		30
1,2,4-Trimethylbenzene	101		99		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		99		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	95		94		70-130
Dibromofluoromethane	89		91		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 02,05 Batch: WG1672595-3 WG1672595-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01,04,07 Batch: WG1672597-3 WG1672597-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 06 Batch: WG1672815-3 WG1672815-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 08-09 Batch: WG1672860-3 WG1672860-4								
Methyl tert butyl ether	93		93		66-130	0		30
Benzene	91		90		70-130	1		30
1,2-Dichloroethane	90		90		70-130	0		30
Toluene	84		83		70-130	1		30
1,2-Dibromoethane	90		89		70-130	1		30
Ethylbenzene	90		88		70-130	2		30
p/m-Xylene	90		88		70-130	2		30
o-Xylene	91		89		70-130	2		30
Isopropylbenzene	92		92		70-130	0		30
1,3,5-Trimethylbenzene	91		92		70-130	1		30
1,2,4-Trimethylbenzene	90		90		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	103		104		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	99		101		70-130
Dibromofluoromethane	99		97		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 08 Batch: WG1672867-3 WG1672867-4								
Methyl tert butyl ether	91		91		66-130	0		30
Benzene	97		94		70-130	3		30
1,2-Dichloroethane	106		104		70-130	2		30
Toluene	100		96		70-130	4		30
1,2-Dibromoethane	99		97		70-130	2		30
Ethylbenzene	101		97		70-130	4		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	103		99		70-130	4		30
1,3,5-Trimethylbenzene	103		99		70-130	4		30
1,2,4-Trimethylbenzene	102		97		70-130	5		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	100		102		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01 D
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 13:44
 Analyst: JG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.3	J	mg/kg	1.8	0.22	10
Fluorene	5.2		mg/kg	1.8	0.18	10
Phenanthrene	30.		mg/kg	1.1	0.22	10
Anthracene	4.8		mg/kg	1.1	0.35	10
Pyrene	11.		mg/kg	1.1	0.18	10
Benzo(a)anthracene	9.7		mg/kg	1.1	0.20	10
Chrysene	13.		mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	3.7		mg/kg	1.1	0.30	10
Benzo(a)pyrene	7.7		mg/kg	1.4	0.44	10
Benzo(ghi)perylene	2.5		mg/kg	1.4	0.21	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	77		30-120
4-Terphenyl-d14	69		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02 D
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 14:32
 Analyst: JG
 Percent Solids: 88%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.4	J	mg/kg	1.9	0.23	10
Fluorene	9.0		mg/kg	1.9	0.18	10
Phenanthrene	71.		mg/kg	1.1	0.23	10
Anthracene	7.1		mg/kg	1.1	0.36	10
Pyrene	39.		mg/kg	1.1	0.19	10
Benzo(a)anthracene	20.		mg/kg	1.1	0.21	10
Chrysene	34.		mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	8.4		mg/kg	1.1	0.32	10
Benzo(a)pyrene	18.		mg/kg	1.5	0.46	10
Benzo(ghi)perylene	7.0		mg/kg	1.5	0.22	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	42		23-120
2-Fluorobiphenyl	58		30-120
4-Terphenyl-d14	61		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03 D
 Client ID: GPR494-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 01:40
 Analyst: CMM
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.91	0.11	5
Fluorene	4.8		mg/kg	0.91	0.088	5
Phenanthrene	29.		mg/kg	0.54	0.11	5
Anthracene	4.0		mg/kg	0.54	0.18	5
Pyrene	20.		mg/kg	0.54	0.090	5
Benzo(a)anthracene	7.8		mg/kg	0.54	0.10	5
Chrysene	14.		mg/kg	0.54	0.094	5
Benzo(b)fluoranthene	3.6		mg/kg	0.54	0.15	5
Benzo(a)pyrene	7.4		mg/kg	0.72	0.22	5
Benzo(ghi)perylene	2.4		mg/kg	0.72	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	48		23-120
2-Fluorobiphenyl	64		30-120
4-Terphenyl-d14	60		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04 D
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 02:03
 Analyst: CMM
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.36	J	mg/kg	0.93	0.11	5
Fluorene	0.57	J	mg/kg	0.93	0.091	5
Phenanthrene	1.1		mg/kg	0.56	0.11	5
Anthracene	0.59		mg/kg	0.56	0.18	5
Pyrene	8.6		mg/kg	0.56	0.093	5
Benzo(a)anthracene	3.9		mg/kg	0.56	0.10	5
Chrysene	9.7		mg/kg	0.56	0.097	5
Benzo(b)fluoranthene	4.6		mg/kg	0.56	0.16	5
Benzo(a)pyrene	7.4		mg/kg	0.75	0.23	5
Benzo(ghi)perylene	3.5		mg/kg	0.75	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	54		23-120
2-Fluorobiphenyl	63		30-120
4-Terphenyl-d14	67		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05 D
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 14:55
 Analyst: JG
 Percent Solids: 81%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.94	J	mg/kg	2.0	0.24	10
Fluorene	8.1		mg/kg	2.0	0.20	10
Phenanthrene	36.		mg/kg	1.2	0.24	10
Anthracene	4.7		mg/kg	1.2	0.39	10
Pyrene	15.		mg/kg	1.2	0.20	10
Benzo(a)anthracene	11.		mg/kg	1.2	0.23	10
Chrysene	16.		mg/kg	1.2	0.21	10
Benzo(b)fluoranthene	3.9		mg/kg	1.2	0.34	10
Benzo(a)pyrene	8.7		mg/kg	1.6	0.49	10
Benzo(ghi)perylene	2.7		mg/kg	1.6	0.24	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	60		23-120
2-Fluorobiphenyl	80		30-120
4-Terphenyl-d14	74		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-06 D
 Client ID: GPR494-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 15:18
 Analyst: JG
 Percent Solids: 92%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.42	J	mg/kg	1.8	0.22	10
Fluorene	1.4	J	mg/kg	1.8	0.17	10
Phenanthrene	7.6		mg/kg	1.1	0.22	10
Anthracene	1.8		mg/kg	1.1	0.35	10
Pyrene	2.3		mg/kg	1.1	0.18	10
Benzo(a)anthracene	2.8		mg/kg	1.1	0.20	10
Chrysene	3.1		mg/kg	1.1	0.18	10
Benzo(b)fluoranthene	1.2		mg/kg	1.1	0.30	10
Benzo(a)pyrene	2.1		mg/kg	1.4	0.43	10
Benzo(ghi)perylene	0.75	J	mg/kg	1.4	0.21	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	85		23-120
2-Fluorobiphenyl	81		30-120
4-Terphenyl-d14	72		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07 D
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:11
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.98	0.12	5
Fluorene	6.6		mg/kg	0.98	0.095	5
Phenanthrene	30.		mg/kg	0.58	0.12	5
Anthracene	2.8		mg/kg	0.58	0.19	5
Pyrene	7.8		mg/kg	0.58	0.097	5
Benzo(a)anthracene	3.5		mg/kg	0.58	0.11	5
Chrysene	7.0		mg/kg	0.58	0.10	5
Benzo(b)fluoranthene	1.1		mg/kg	0.58	0.16	5
Benzo(a)pyrene	2.7		mg/kg	0.78	0.24	5
Benzo(ghi)perylene	0.70	J	mg/kg	0.78	0.11	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	57		30-120
4-Terphenyl-d14	54		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08 D
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:33
 Analyst: JG
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	4.8	J	mg/kg	6.7	0.81	35
Fluorene	11.		mg/kg	6.7	0.65	35
Phenanthrene	110		mg/kg	4.0	0.81	35
Anthracene	23.		mg/kg	4.0	1.3	35
Pyrene	130		mg/kg	4.0	0.66	35
Benzo(a)anthracene	71.		mg/kg	4.0	0.75	35
Chrysene	170		mg/kg	4.0	0.70	35
Benzo(b)fluoranthene	28.		mg/kg	4.0	1.1	35
Benzo(a)pyrene	54.		mg/kg	5.4	1.6	35
Benzo(ghi)perylene	18.		mg/kg	5.4	0.79	35

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
 Client ID: GPR494-09-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/09/22 03:56
 Analyst: CMM
 Percent Solids: 81%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.059	J	mg/kg	0.20	0.024	1
Fluorene	0.030	J	mg/kg	0.20	0.019	1
Phenanthrene	0.45		mg/kg	0.12	0.024	1
Anthracene	0.13		mg/kg	0.12	0.039	1
Pyrene	0.84		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.73		mg/kg	0.12	0.022	1
Chrysene	0.70		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	1.2		mg/kg	0.12	0.033	1
Benzo(a)pyrene	1.1		mg/kg	0.16	0.048	1
Benzo(ghi)perylene	0.51		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	69		30-120
4-Terphenyl-d14	65		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14
 Client ID: FB-080222-3
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:35
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/08/22 12:33
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	71		23-120
2-Fluorobiphenyl	64		15-120
4-Terphenyl-d14	49		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/08/22 12:49
 Analyst: AH

Extraction Method: EPA 3510C
 Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	68		15-120
4-Terphenyl-d14	52		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/08/22 23:47
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-09 Batch: WG1671002-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	84		30-120
4-Terphenyl-d14	103		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 08/08/22 12:17
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 08/06/22 11:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 14-15 Batch: WG1672057-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	66		15-120
4-Terphenyl-d14	53		41-149

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-09 Batch: WG1671002-2 WG1671002-3								
Naphthalene	83		77		40-140	8		50
Fluorene	91		84		40-140	8		50
Phenanthrene	81		76		40-140	6		50
Anthracene	87		80		40-140	8		50
Pyrene	83		76		35-142	9		50
Benzo(a)anthracene	93		87		40-140	7		50
Chrysene	88		84		40-140	5		50
Benzo(b)fluoranthene	113		103		40-140	9		50
Benzo(a)pyrene	114		108		40-140	5		50
Benzo(ghi)perylene	92		87		40-140	6		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	94		84		23-120
2-Fluorobiphenyl	83		77		30-120
4-Terphenyl-d14	99		90		18-120



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 14-15 Batch: WG1672057-2 WG1672057-3								
Naphthalene	76		73		40-140	4		40
Fluorene	76		73		40-140	4		40
Phenanthrene	76		71		40-140	7		40
Anthracene	74		70		40-140	6		40
Pyrene	67		63		26-127	6		40
Benzo(a)anthracene	79		73		40-140	8		40
Chrysene	85		80		40-140	6		40
Benzo(b)fluoranthene	88		78		40-140	12		40
Benzo(a)pyrene	76		68		40-140	11		40
Benzo(ghi)perylene	82		79		40-140	4		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	80		76		23-120
2-Fluorobiphenyl	72		67		15-120
4-Terphenyl-d14	58		54		41-149

METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01

Date Collected: 08/02/22 08:45

Client ID: GPR494-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	517		mg/kg	2.11	0.113	1	08/03/22 23:50	08/09/22 19:10	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
 Client ID: GPR494-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	90.3		mg/kg	2.21	0.118	1	08/03/22 23:50	08/09/22 18:56	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-03

Date Collected: 08/02/22 09:30

Client ID: GPR494-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	12.9		mg/kg	2.12	0.114	1	08/03/22 23:50	08/09/22 19:01	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
 Client ID: GPR494-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	238		mg/kg	2.14	0.115	1	08/03/22 23:50	08/09/22 19:06	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05
 Client ID: GPR494-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	32.0		mg/kg	2.37	0.127	1	08/03/22 23:50	08/09/22 19:43	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-06

Date Collected: 08/02/22 10:40

Client ID: GPR494-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	78.1		mg/kg	2.06	0.111	1	08/03/22 23:50	08/09/22 19:48	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07
 Client ID: GPR494-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:00
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	19.3		mg/kg	2.28	0.122	1	08/03/22 23:50	08/09/22 19:53	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
 Client ID: GPR494-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	114		mg/kg	2.26	0.121	1	08/03/22 23:50	08/09/22 19:57	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09

Date Collected: 08/02/22 11:30

Client ID: GPR494-09-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	70.9		mg/kg	2.36	0.127	1	08/03/22 23:50	08/09/22 20:02	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-14

Date Collected: 08/02/22 13:35

Client ID: FB-080222-3

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:45	EPA 3005A	1,6010D	EW



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-15
 Client ID: FB-080222-4
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 13:40
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:50	EPA 3005A	1,6010D	EW



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1670927-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/03/22 23:50	08/09/22 18:47	1,6010D	NB

Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 14-15 Batch: WG1670990-1									
Lead, Total	ND	mg/l	0.010	0.003	1	08/04/22 02:44	08/08/22 14:27	1,6010D	EW

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1670927-2 SRM Lot Number: D113-540								
Lead, Total	81		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 14-15 Batch: WG1670990-2								
Lead, Total	100		-		80-120	-		

Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1670927-3 QC Sample: L2241291-01 Client ID: GPR494-01-SS01												
Lead, Total	517	45.2	737	486	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 14-15 QC Batch ID: WG1670990-3 QC Sample: L2241354-01 Client ID: MS Sample												
Lead, Total	0.004J	0.53	0.507	96		-	-		75-125	-		20



Lab Duplicate Analysis
Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1670927-4 QC Sample: L2241291-01 Client ID: GPR494-01-SS01						
Lead, Total	517	569	mg/kg	10		20



INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-01
 Client ID: GPR494-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 08:45
 Date Received: 08/02/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.5		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-02
Client ID: GPR494-02-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 09:10
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	87.8		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-03

Date Collected: 08/02/22 09:30

Client ID: GPR494-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.5		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-04
Client ID: GPR494-04-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 10:00
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.7		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-05

Date Collected: 08/02/22 10:20

Client ID: GPR494-05-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.1		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-06

Date Collected: 08/02/22 10:40

Client ID: GPR494-06-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.9		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-07

Date Collected: 08/02/22 11:00

Client ID: GPR494-07-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.0		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-08
Client ID: GPR494-08-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:20
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/03/22 11:54	121,2540G	RI



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-09
Client ID: GPR494-09-SS01
Sample Location: PHILADELPHIA, PA

Date Collected: 08/02/22 11:30
Date Received: 08/02/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.2		%	0.100	NA	1	-	08/03/22 12:12	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-10

Date Collected: 08/02/22 13:00

Client ID: GPR1088-01-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.5		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-11

Date Collected: 08/02/22 13:15

Client ID: GPR1088-02-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-12

Date Collected: 08/02/22 13:30

Client ID: GPR1088-03-SS01

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-13

Date Collected: 08/02/22 00:00

Client ID: DUP-50

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.0		SU	-	NA	1	-	08/05/22 10:34	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241291

Project Number: 200.00135.006

Report Date: 08/10/22

SAMPLE RESULTS

Lab ID: L2241291-14

Date Collected: 08/02/22 13:35

Client ID: FB-080222-3

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	7.0		SU	-	NA	1	-	08/03/22 20:36	1,9040C	AS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**SAMPLE RESULTS**

Lab ID: L2241291-15

Date Collected: 08/02/22 13:40

Client ID: FB-080222-4

Date Received: 08/02/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.8		SU	-	NA	1	-	08/03/22 20:36	1,9040C	AS



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 14-15 Batch: WG1670909-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 10-13 Batch: WG1671686-1								
pH	100		-		99-101	-		

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241291

Report Date: 08/10/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-08 QC Batch ID: WG1670713-1 QC Sample: L2241331-01 Client ID: DUP Sample						
Solids, Total	84.5	85.1	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 09 QC Batch ID: WG1670716-1 QC Sample: L2241290-01 Client ID: DUP Sample						
Solids, Total	85.2	85.1	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 14-15 QC Batch ID: WG1670909-2 QC Sample: L2240789-01 Client ID: DUP Sample						
pH	6.7	6.6	SU	2		5
General Chemistry - Westborough Lab Associated sample(s): 10-13 QC Batch ID: WG1671686-2 QC Sample: L2241901-01 Client ID: DUP Sample						
pH	3.8	3.7	SU	3		5

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-01A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241291-01B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-01C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-01D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-01E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-01F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-02A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241291-02B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-02C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260H(14),PA-8260HLW(14)
L2241291-02D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-02E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-02F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-03A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-03B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-03C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-03D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-03E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-03F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-04A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-04B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-04C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-04D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-04E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-04F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-05A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-05B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-05C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-05D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-05E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-05F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-06A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-06B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-06C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-06D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-06E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-06F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-07A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-07B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-07C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-07D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-07E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-07F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-08A	Vial MeOH preserved	C	NA		3.6	Y	Absent		PA-8260HLW(14)
L2241291-08B	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-08C	Vial water preserved	C	NA		3.6	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-08D	Plastic 2oz unpreserved for TS	C	NA		3.6	Y	Absent		TS(7)
L2241291-08E	Metals Only-Glass 60mL/2oz unpreserved	C	NA		3.6	Y	Absent		PB-TI(180)
L2241291-08F	Glass 120ml/4oz unpreserved	C	NA		3.6	Y	Absent		PA-PAH(14)
L2241291-09A	Vial MeOH preserved	B	NA		3.0	Y	Absent		PA-8260HLW(14)
L2241291-09B	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241291**Project Number:** 200.00135.006**Report Date:** 08/10/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-09C	Vial water preserved	B	NA		3.0	Y	Absent	03-AUG-22 12:19	PA-8260HLW(14)
L2241291-09D	Plastic 2oz unpreserved for TS	B	NA		3.0	Y	Absent		TS(7)
L2241291-09E	Metals Only-Glass 60mL/2oz unpreserved	B	NA		3.0	Y	Absent		PB-TI(180)
L2241291-09F	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PA-PAH(14)
L2241291-10A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-11A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-12A	Glass 120ml/4oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-13A	Glass 250ml/8oz unpreserved	B	NA		3.0	Y	Absent		PH-9045(1)
L2241291-14A	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14B	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14C	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-14D	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-14E	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-14F	Plastic 60ml unpreserved	C	7	7	3.6	Y	Absent		PH-9040(1)
L2241291-14G	Plastic 250ml HNO3 preserved	C	<2	<2	3.6	Y	Absent		PB-TI(180)
L2241291-14H	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-14I	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-15A	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15B	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15C	Vial HCl preserved	C	NA		3.6	Y	Absent		PA-8260(14)
L2241291-15D	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-15E	Vial Na2S2O3 preserved	C	NA		3.6	Y	Absent		8011(14)
L2241291-15F	Plastic 60ml unpreserved	C	7	7	3.6	Y	Absent		PH-9040(1)
L2241291-15G	Plastic 250ml HNO3 preserved	C	<2	<2	3.6	Y	Absent		PB-TI(180)
L2241291-15H	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-15I	Amber 250ml unpreserved	C	7	7	3.6	Y	Absent		PA-PAHSIM-LVI(7)
L2241291-16A	Vial HCl preserved	B	NA		3.0	Y	Absent		PA-8260(14)
L2241291-16B	Vial HCl preserved	B	NA		3.0	Y	Absent		PA-8260(14)

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Project Number: 200.00135.006

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241291-16C	Vial Na2S2O3 preserved	B	NA		3.0	Y	Absent		8011(14)
L2241291-16D	Vial Na2S2O3 preserved	B	NA		3.0	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241291
Report Date: 08/10/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

PAGE 1 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Westborough, MA Mansfield, MA
TEL: 508-898-9220 TEL: 508-822-9300
FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: Standard Rush (ONLY IF PRE-APPROVED)

Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/3/22

ALPHA Job #: L2241291

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials			
		Date	Time					
41291-01	CPR494-01-SS01	8/2	0845	BS	TS			
-02	CPR494-02-SS01	↓	0910	↑	↓			
-03	CPR494-03-SS01		0930					
-04	CPR494-04-SS01		1000					
-05	CPR494-05-SS01		1020					
-06	CPR494-06-SS01		1040					
-07	CPR494-07-SS01		1100					
-08	CPR494-08-SS01		1120					
-09	CPR494-09-SS01		1130					
-10	CPR1088-01-SS01		↓			1300	↓	↓

ANALYSIS

SHORTLIST 1-5 PH	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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SAMPLE HANDLING

Filtration
 Done
 Not Needed

Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

Container Type: G
Preservative:

Relinquished By:	Date/Time	Received By:	Date/Time
	8/2/22	ST-AAA	8/2/22 4:52
	8/2/22 1:00	AMU	8/2/22 1:00
	8/2/22		8/2/22 2:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC
Address: 2127 Hamilton Avenue
Trenton, NJ 08619
Phone: 215-901-4974
Fax: _____
Email: William.Schmidt@ransomenv.com

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: _____ Time: _____

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/13/22

ALPHA Job #: L2241291

Report Information Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program _____ Criteria _____

ANALYSIS

Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PH	VOC	EDB	Other Analytes
41291-11	8/2	1316	S	TS				
-12		1330	S	TS				
-13		-	S	TS				
-14		1335	w	TS				
-15		1340	w	TS				
-16		-	w	TS				

SHEET LIST 1-5
PH
VOC PORTION OF 5L
EDB (8011)

SAMPLE HANDLING
Filtration
 Done
 Not Needed
 Lab to do
Preservation
 Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41291-11	GPR 1088-02-5501	8/2	1316	S	TS
-12	GPR 1088-03-5501		1330	S	TS
-13	DUP-50		-	S	TS
-14	FB-080222-3		1335	w	TS
-15	FB-080222-4		1340	w	TS
-16	TB-080222		-	w	TS

Container Type	-	-	G	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	8/12/22	ST-AL	8/12/22 14:52
<i>[Signature]</i>	8/12/22	<i>[Signature]</i>	8/21/22
<i>[Signature]</i>	8/2/22	<i>[Signature]</i>	8/2/22 23:15

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene

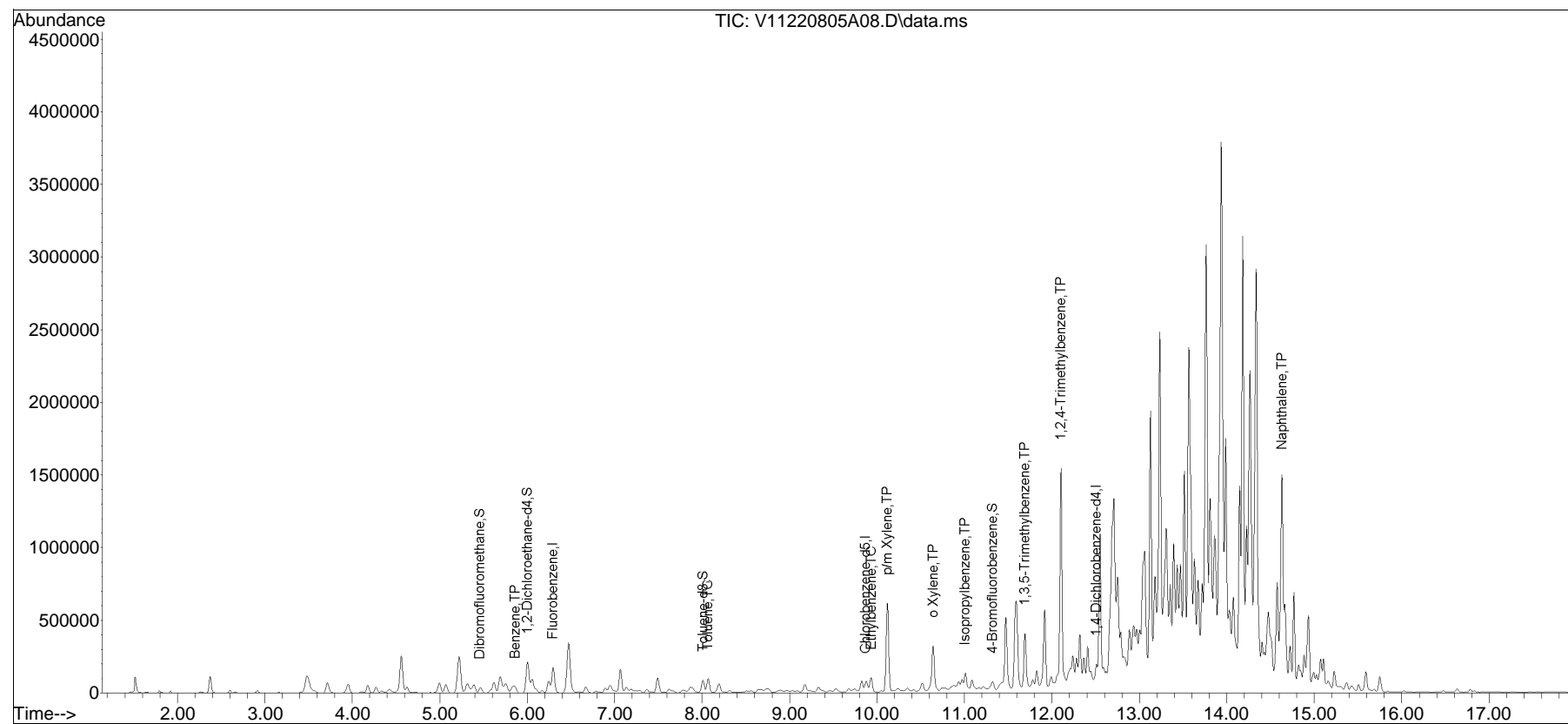
- ~~3. Kerosene Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene~~
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
Data File : V11220805A08.D
Acq On : 05 Aug 2022 10:13 am
Operator : VOA111:JC
Sample : L2241291-01,31,4.67,5,,B
Misc : WG1672597,ICAL19072
ALS Vial : 8 Sample Multiplier: 1

Quant Time: Aug 05 13:21:07 2022
Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jun 09 10:30:20 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•

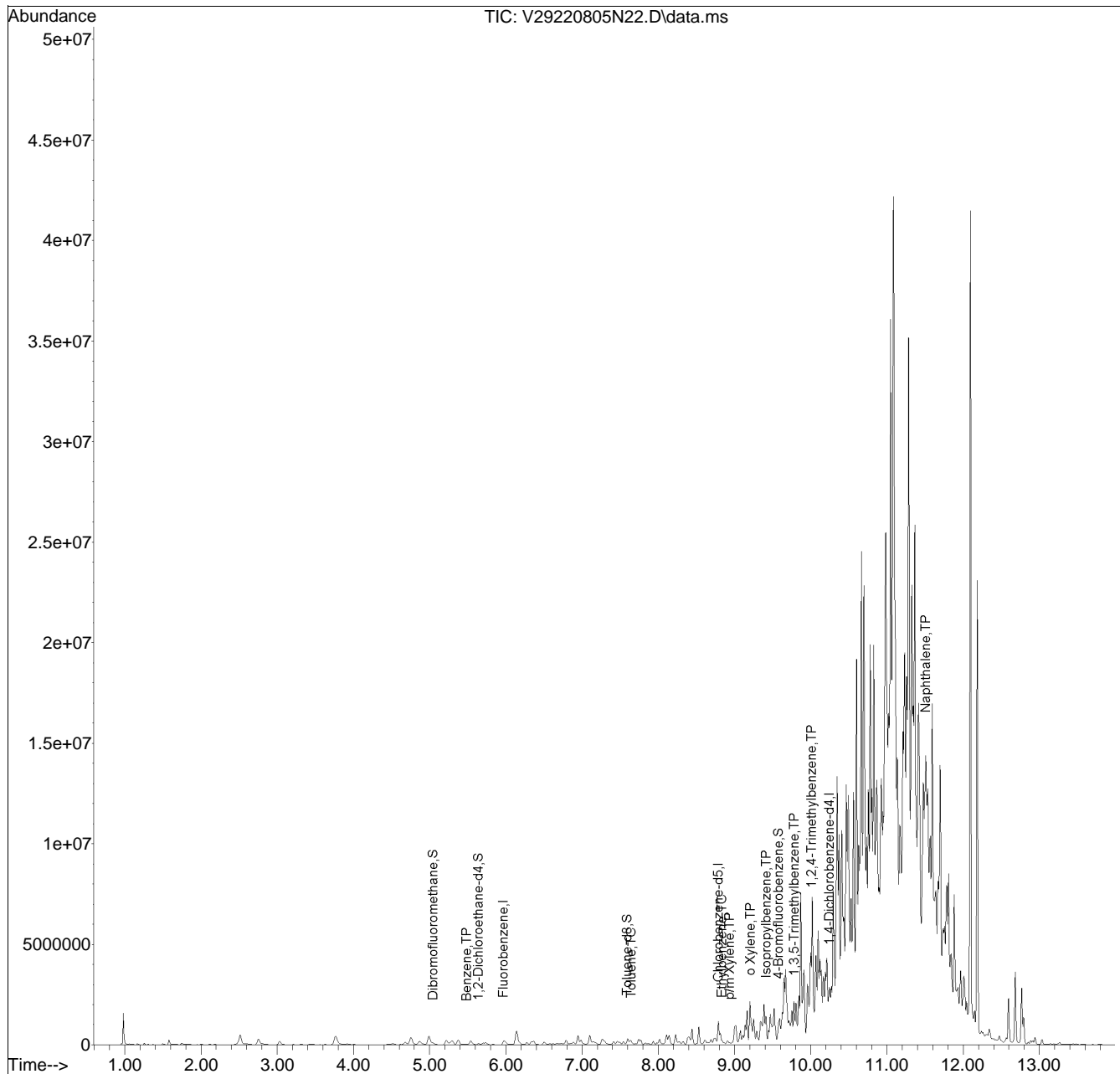


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220805N\
 Data File : V29220805N22.D
 Acq On : 05 Aug 2022 10:58 pm
 Operator : VOA129:AJK
 Sample : 12241291-02,31,3.08,5,,c
 Misc : WG1672587,ICAL19173
 ALS Vial : 22 Sample Multiplier: 1

Quant Time: Aug 07 17:29:18 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220805N\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05N\V29220805N01.D•

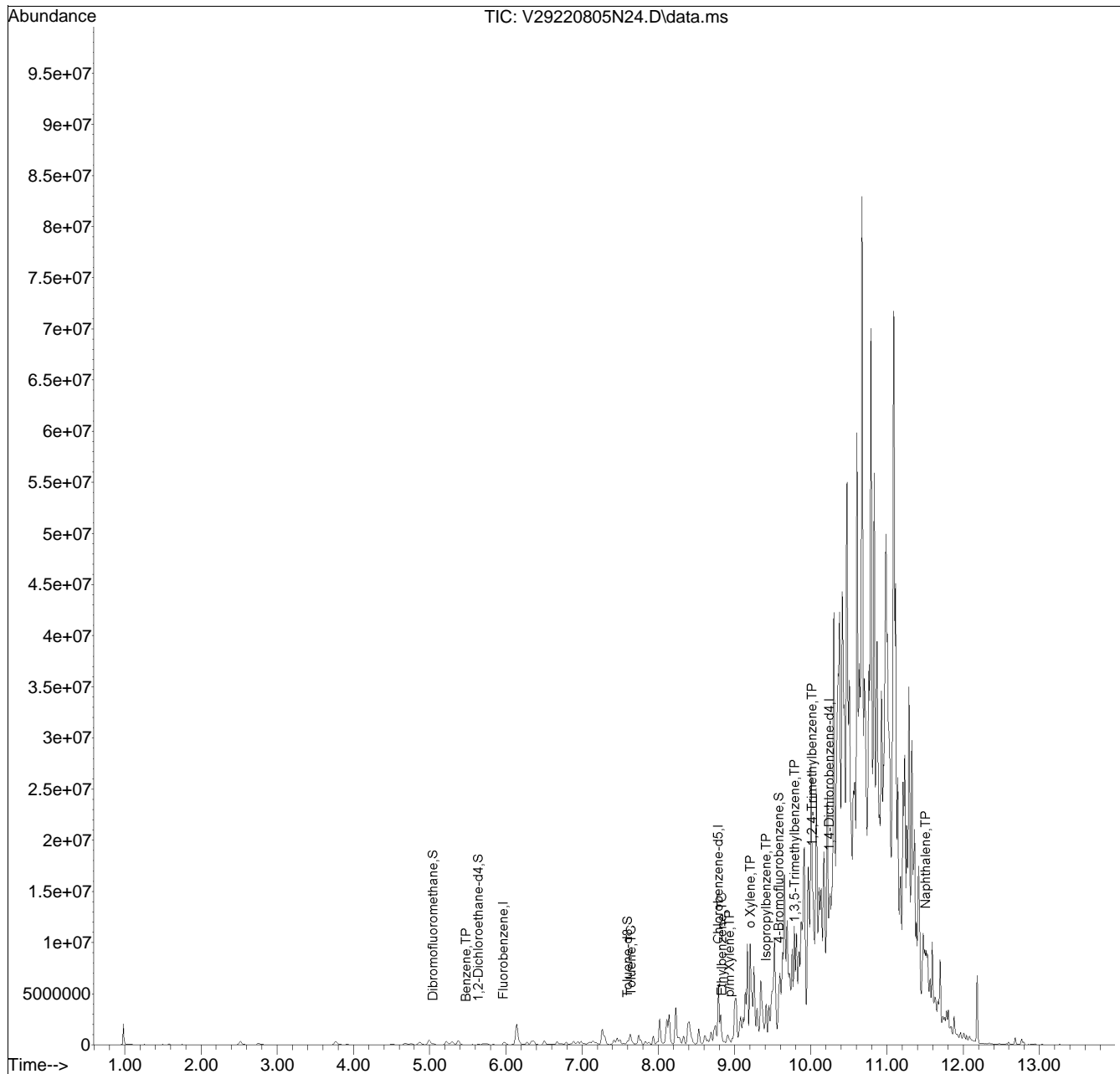


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220805N\
 Data File : V29220805N24.D
 Acq On : 05 Aug 2022 11:40 pm
 Operator : VOA129:AJK
 Sample : 12241291-03,31,5.82,5,,c
 Misc : WG1672587,ICAL19173
 ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 07 17:30:50 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220805N\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05N\V29220805N01.D•

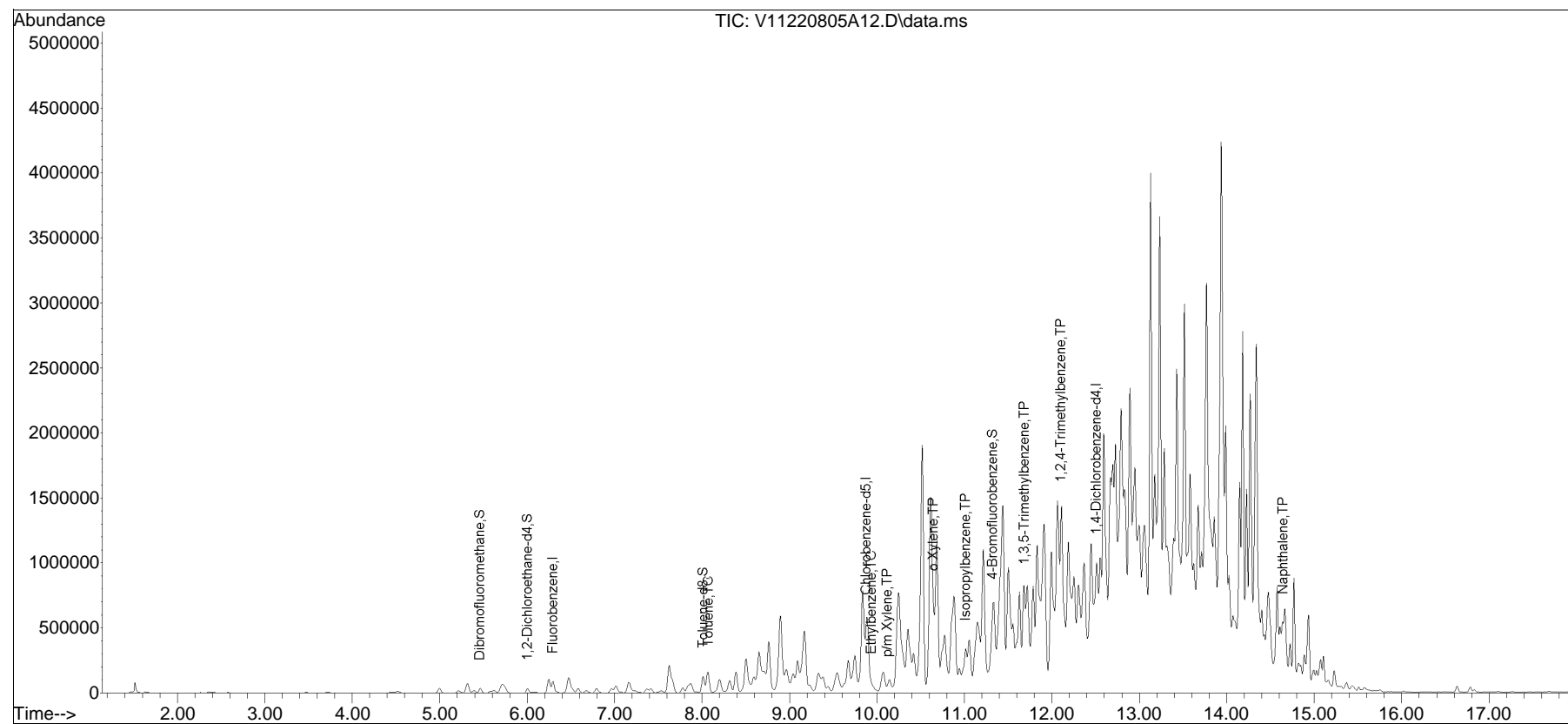


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
Data File : V11220805A12.D
Acq On : 05 Aug 2022 12:00 pm
Operator : VOA111:JC
Sample : L2241291-05D,31H,5.47,5,0.050,,A
Misc : WG1672595,ICAL19072
ALS Vial : 12 Sample Multiplier: 1

Quant Time: Aug 05 13:25:23 2022
Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jun 09 10:30:20 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•

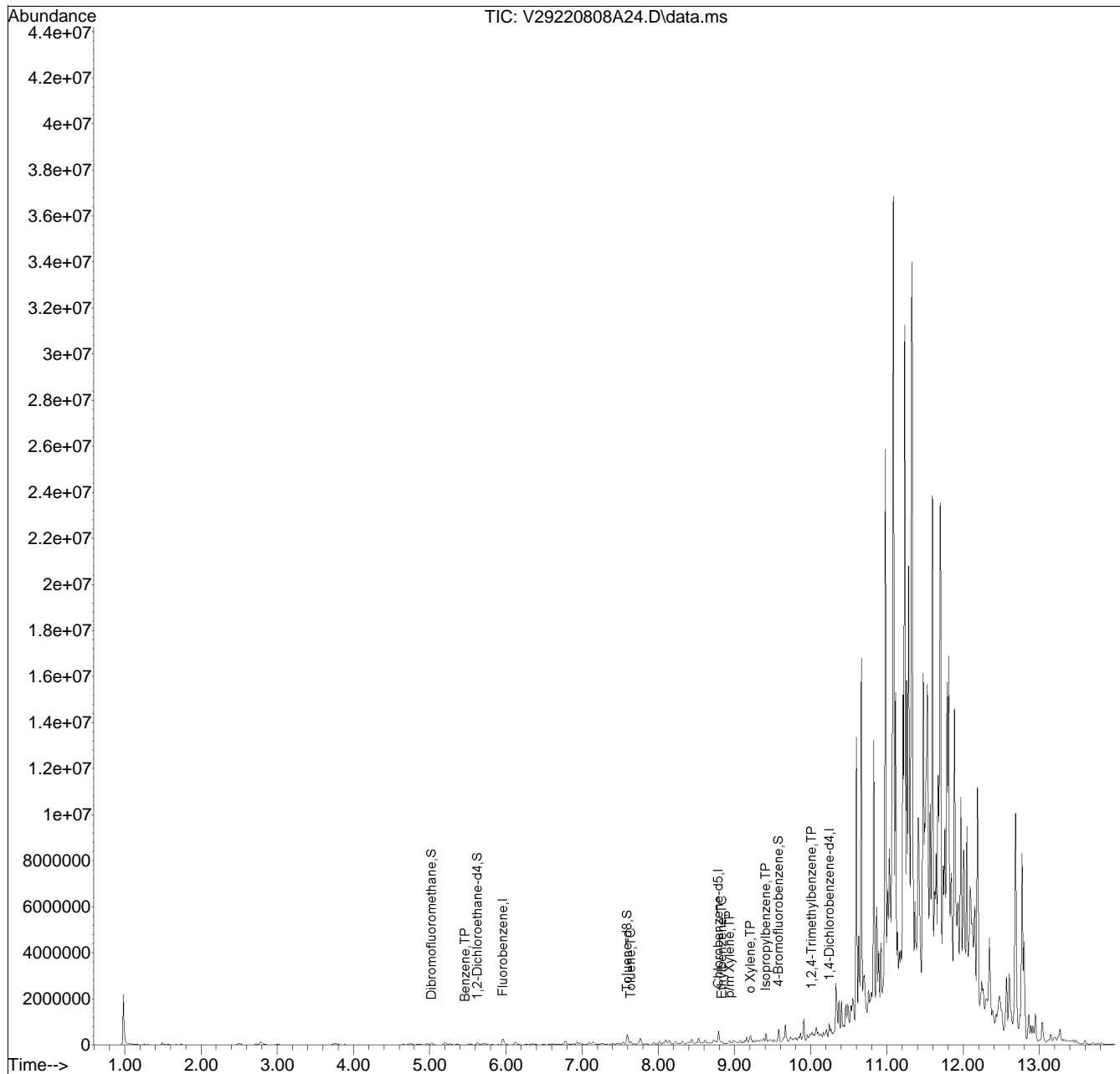


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220808A\
 Data File : V29220808A24.D
 Acq On : 08 Aug 2022 03:30 pm
 Operator : VOA129:NLK
 Sample : 12241291-06,31,4.87,5,,b
 Misc : WG1672815,ICAL19173
 ALS Vial : 24 Sample Multiplier: 1

Quant Time: Aug 09 06:29:08 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220808A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list08A\V29220808A02.D•

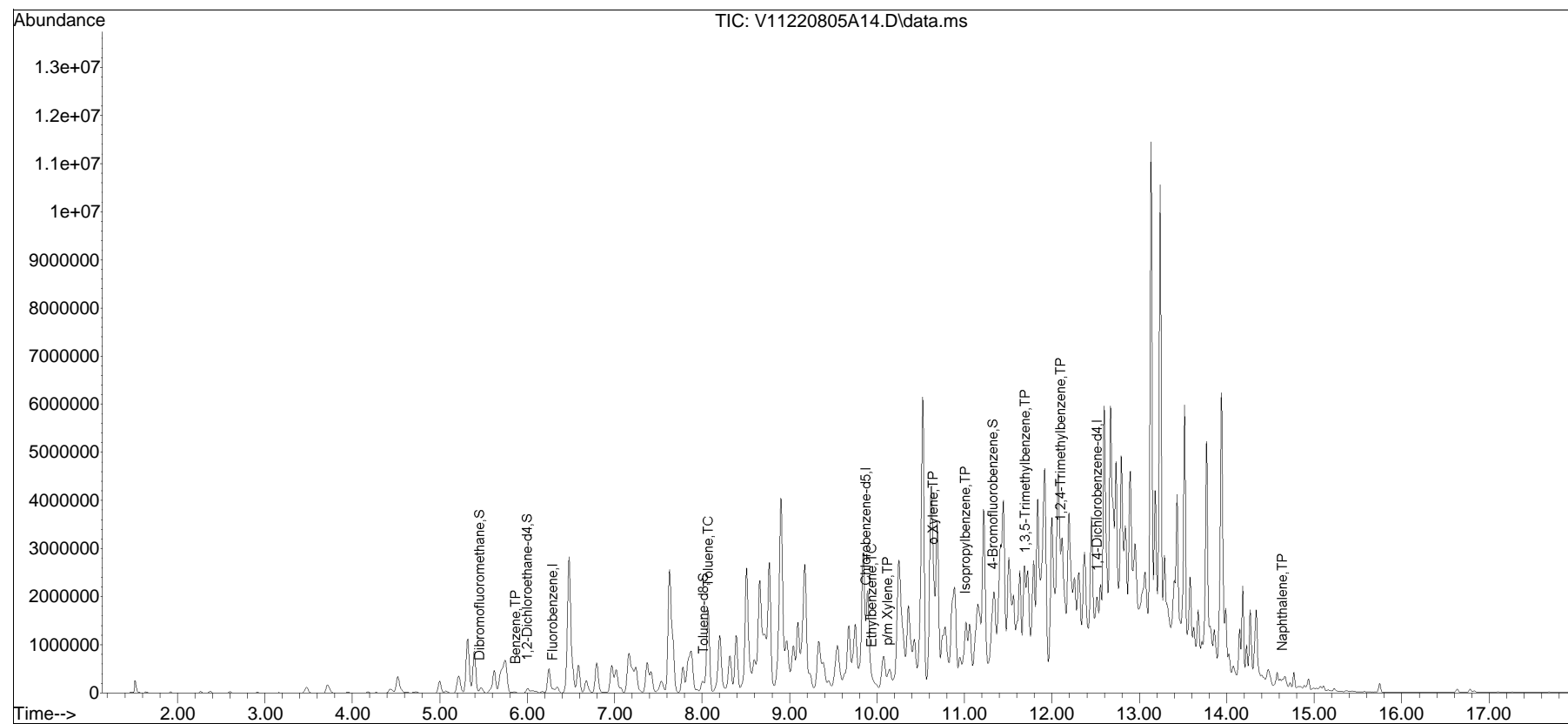


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA111\2022\220805A\
Data File : V11220805A14.D
Acq On : 05 Aug 2022 12:53 pm
Operator : VOA111:JC
Sample : L2241291-07,31,5.02,5,,C
Misc : WG1672597,ICAL19072
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 05 13:28:47 2022
Quant Method : I:\VOLATILES\VOA111\2022\220805A\V111_220608A_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Thu Jun 09 10:30:20 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list05A\V11220805A01.D•





ANALYTICAL REPORT

Lab Number:	L2241635
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/11/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2241635-01	GPR794-01-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:00	08/03/22
L2241635-02	GPR794-02-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:10	08/03/22
L2241635-03	GPR794-03-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:20	08/03/22
L2241635-04	GPR794-04-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:30	08/03/22
L2241635-05	GPR794-05-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:40	08/03/22
L2241635-06	GPR794-06-SS01	SOIL	PHILADELPHIA, PA	08/03/22 11:50	08/03/22
L2241635-07	GPR794-07-SS01	SOIL	PHILADELPHIA, PA	08/03/22 12:00	08/03/22
L2241635-08	GPR794-08-SS01	SOIL	PHILADELPHIA, PA	08/03/22 12:10	08/03/22
L2241635-09	GPR1088-04-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:00	08/03/22
L2241635-10	GPR1088-05-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:10	08/03/22
L2241635-11	GPR1088-06-SS01	SOIL	PHILADELPHIA, PA	08/03/22 13:20	08/03/22
L2241635-12	DUP-51	SOIL	PHILADELPHIA, PA	08/03/22 00:00	08/03/22
L2241635-13	FB-080322-1	WATER	PHILADELPHIA, PA	08/03/22 14:00	08/03/22
L2241635-14	FB-080322-2	WATER	PHILADELPHIA, PA	08/03/22 14:10	08/03/22
L2241635-15	TB-080322	WATER	PHILADELPHIA, PA	08/03/22 00:00	08/03/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2241635-03: The internal standard (IS) responses for chlorobenzene-d5 (48%) and 1,4-dichlorobenzene-d4 (42%) and the surrogate recoveries for 1,2-dichloroethane-d4 (42%) and dibromofluoromethane (51%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis; however, since the IS response was below method criteria, all associated compounds are considered to have a potentially high bias. The results of both analyses are reported.

Semivolatile Organics

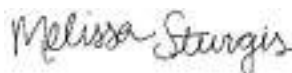
L2241635-01D, -02D, -04D, -06D, and -08D: The sample has elevated detection limits due to the dilution required by the sample matrix.

Semivolatile Organics by SIM

The WG1672949-1 Method Blank, associated with L2241635-13 and -14, has a concentration above the reporting limit for Phenanthrene. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 08/11/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D2
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 08:29
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2200		mg/kg	14	4.8	500
Toluene	3400		mg/kg	29	16.	500
Isopropylbenzene	4000		mg/kg	29	3.1	500

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:25
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	4.6	0.46	40
Benzene	2300	E	mg/kg	1.2	0.38	40
1,2-Dichloroethane	ND		mg/kg	2.3	0.59	40
Toluene	3000	E	mg/kg	2.3	1.2	40
1,2-Dibromoethane	ND		mg/kg	1.2	0.68	40
Ethylbenzene	74.		mg/kg	2.3	0.32	40
p/m-Xylene	240		mg/kg	4.6	1.3	40
o-Xylene	55.		mg/kg	2.3	0.67	40
Xylenes, Total	300		mg/kg	2.3	0.67	40
Isopropylbenzene	1900	E	mg/kg	2.3	0.25	40
1,3,5-Trimethylbenzene	16.		mg/kg	4.6	0.45	40
1,2,4-Trimethylbenzene	32.		mg/kg	4.6	0.77	40

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D2
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 08:08
 Analyst: NLK
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	8.3	0.83	50
Benzene	2400	E	mg/kg	2.1	0.69	50
1,2-Dichloroethane	ND		mg/kg	4.1	1.1	50
Toluene	1200		mg/kg	4.1	2.2	50
1,2-Dibromoethane	ND		mg/kg	2.1	1.2	50
Ethylbenzene	26.		mg/kg	4.1	0.58	50
p/m-Xylene	86.		mg/kg	8.3	2.3	50
o-Xylene	25.		mg/kg	4.1	1.2	50
Xylenes, Total	110		mg/kg	4.1	1.2	50
Isopropylbenzene	2200	E	mg/kg	4.1	0.45	50
1,3,5-Trimethylbenzene	3.9	J	mg/kg	8.3	0.80	50
1,2,4-Trimethylbenzene	8.4		mg/kg	8.3	1.4	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	75		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	80		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:46
 Analyst: NLK
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2800		mg/kg	8.3	2.7	200
Isopropylbenzene	3000		mg/kg	16	1.8	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 09:00
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0018	0.00018	1
Benzene	0.32	E	mg/kg	0.00045	0.00015	1
1,2-Dichloroethane	ND		mg/kg	0.00090	0.00023	1
Toluene	0.43	E	mg/kg	0.00090	0.00049	1
1,2-Dibromoethane	ND		mg/kg	0.00045	0.00026	1
Ethylbenzene	0.020		mg/kg	0.00090	0.00013	1
p/m-Xylene	0.060		mg/kg	0.0018	0.00050	1
o-Xylene	0.013		mg/kg	0.00090	0.00026	1
Xylenes, Total	0.073		mg/kg	0.00090	0.00026	1
Isopropylbenzene	1.4	E	mg/kg	0.00090	0.00009	1
1,3,5-Trimethylbenzene	0.0024		mg/kg	0.0018	0.00017	1
1,2,4-Trimethylbenzene	0.0040		mg/kg	0.0018	0.00030	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	42	Q	70-130
Toluene-d8	118		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	51	Q	70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:31
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.11	0.011	1
Benzene	0.41		mg/kg	0.028	0.0092	1
1,2-Dichloroethane	ND		mg/kg	0.055	0.014	1
Toluene	0.21		mg/kg	0.055	0.030	1
1,2-Dibromoethane	ND		mg/kg	0.028	0.016	1
Ethylbenzene	0.0087	J	mg/kg	0.055	0.0078	1
p/m-Xylene	ND		mg/kg	0.11	0.031	1
o-Xylene	ND		mg/kg	0.055	0.016	1
Xylenes, Total	ND		mg/kg	0.055	0.016	1
Isopropylbenzene	0.38		mg/kg	0.055	0.0060	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.11	0.011	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.11	0.018	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	103		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D2
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:52
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	35	3.5	200
Benzene	7000	E	mg/kg	8.7	2.9	200
1,2-Dichloroethane	ND		mg/kg	17	4.4	200
Toluene	5300	E	mg/kg	17	9.4	200
1,2-Dibromoethane	ND		mg/kg	8.7	5.1	200
Ethylbenzene	120		mg/kg	17	2.4	200
p/m-Xylene	430		mg/kg	35	9.7	200
o-Xylene	95.		mg/kg	17	5.0	200
Xylenes, Total	520		mg/kg	17	5.0	200
Isopropylbenzene	9000	E	mg/kg	17	1.9	200
1,3,5-Trimethylbenzene	35.		mg/kg	35	3.3	200
1,2,4-Trimethylbenzene	79.		mg/kg	35	5.8	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	80		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:07
 Analyst: NLK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	7800		mg/kg	43	14.	1000
Toluene	6100		mg/kg	87	47.	1000
Isopropylbenzene	12000		mg/kg	87	9.4	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	77		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	84		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05 D2
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:48
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	6.7	0.67	50
Benzene	1700	E	mg/kg	1.7	0.56	50
1,2-Dichloroethane	ND		mg/kg	3.4	0.86	50
Toluene	1200	E	mg/kg	3.4	1.8	50
1,2-Dibromoethane	ND		mg/kg	1.7	0.98	50
Ethylbenzene	31.		mg/kg	3.4	0.47	50
p/m-Xylene	110		mg/kg	6.7	1.9	50
o-Xylene	25.		mg/kg	3.4	0.98	50
Xylenes, Total	140		mg/kg	3.4	0.98	50
Isopropylbenzene	1500	E	mg/kg	3.4	0.36	50
1,3,5-Trimethylbenzene	3.5	J	mg/kg	6.7	0.65	50
1,2,4-Trimethylbenzene	7.7		mg/kg	6.7	1.1	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	80		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05 D
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 11:08
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	2600		mg/kg	13	4.4	400
Toluene	1800		mg/kg	27	14.	400
Isopropylbenzene	2500		mg/kg	27	2.9	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	83		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D2
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 07:27
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Toluene	4300		mg/kg	59	32.	1000
Isopropylbenzene	4800		mg/kg	59	6.4	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	80		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	85		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 11:29
 Analyst: NLK
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	24	2.4	200
Benzene	2000		mg/kg	5.9	2.0	200
1,2-Dichloroethane	ND		mg/kg	12	3.0	200
Toluene	4700	E	mg/kg	12	6.4	200
1,2-Dibromoethane	ND		mg/kg	5.9	3.4	200
Ethylbenzene	110		mg/kg	12	1.7	200
p/m-Xylene	390		mg/kg	24	6.6	200
o-Xylene	100		mg/kg	12	3.4	200
Xylenes, Total	490		mg/kg	12	3.4	200
Isopropylbenzene	5500	E	mg/kg	12	1.3	200
1,3,5-Trimethylbenzene	23.	J	mg/kg	24	2.3	200
1,2,4-Trimethylbenzene	48.		mg/kg	24	3.9	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07 D2
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 09:10
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.89	0.090	10
Benzene	130		mg/kg	0.22	0.074	10
1,2-Dichloroethane	ND		mg/kg	0.45	0.11	10
Toluene	8.7		mg/kg	0.45	0.24	10
1,2-Dibromoethane	ND		mg/kg	0.22	0.13	10
Ethylbenzene	1.5		mg/kg	0.45	0.063	10
p/m-Xylene	3.1		mg/kg	0.89	0.25	10
o-Xylene	ND		mg/kg	0.45	0.13	10
Xylenes, Total	3.1		mg/kg	0.45	0.13	10
Isopropylbenzene	250	E	mg/kg	0.45	0.049	10
1,3,5-Trimethylbenzene	0.20	J	mg/kg	0.89	0.086	10
1,2,4-Trimethylbenzene	0.81	J	mg/kg	0.89	0.15	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	79		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	81		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07 D
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 09:42
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	330		mg/kg	2.2	0.24	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D2
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/10/22 10:54
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	12000		mg/kg	30	10.	1000
Toluene	6200		mg/kg	60	33.	1000
Isopropylbenzene	7600		mg/kg	60	6.6	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	79		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	82		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/08/22 10:04
 Analyst: NLK
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	3.0	0.30	25
Benzene	3500	E	mg/kg	0.76	0.25	25
1,2-Dichloroethane	ND		mg/kg	1.5	0.39	25
Toluene	3000	E	mg/kg	1.5	0.82	25
1,2-Dibromoethane	ND		mg/kg	0.76	0.44	25
Ethylbenzene	120		mg/kg	1.5	0.21	25
p/m-Xylene	390		mg/kg	3.0	0.85	25
o-Xylene	86.		mg/kg	1.5	0.44	25
Xylenes, Total	480		mg/kg	1.5	0.44	25
Isopropylbenzene	1600	E	mg/kg	1.5	0.16	25
1,3,5-Trimethylbenzene	15.		mg/kg	3.0	0.29	25
1,2,4-Trimethylbenzene	35.		mg/kg	3.0	0.50	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	87		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:17
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 16:47
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	111		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:24
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 17:10
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	102		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-15
 Client ID: TB-080322
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 00:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/08/22 19:31
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-15
 Client ID: TB-080322
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 00:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/04/22 17:32
 Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	107		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
 Analytical Date: 08/08/22 17:23
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/08/22 14:52

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 13-15 Batch: WG1672421-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/04/22 12:23
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 13-15 Batch: WG1672513-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	105		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/08/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 03 Batch: WG1672815-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 08/08/22 08:37
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-02,05-08 Batch: WG1672957-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	95		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/10/22 06:44
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-08 Batch: WG1673529-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	113		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 13-15 Batch: WG1672421-2									
1,2-Dibromoethane	92		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 13-15 Batch: WG1672513-3 WG1672513-4								
Methyl tert butyl ether	87		85		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	110		110		70-130	0		20
Toluene	120		110		70-130	9		20
Ethylbenzene	120		110		70-130	9		20
p/m-Xylene	120		115		70-130	4		20
o-Xylene	110		110		70-130	0		20
Isopropylbenzene	120		110		70-130	9		20
1,3,5-Trimethylbenzene	120		110		64-130	9		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	105		105		70-130
Toluene-d8	106		103		70-130
4-Bromofluorobenzene	94		95		70-130
Dibromofluoromethane	101		97		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 03 Batch: WG1672815-3 WG1672815-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-02,05-08 Batch: WG1672957-3 WG1672957-4								
Methyl tert butyl ether	85		89		66-130	5		30
Benzene	96		98		70-130	2		30
1,2-Dichloroethane	90		95		70-130	5		30
Toluene	92		94		70-130	2		30
1,2-Dibromoethane	94		97		70-130	3		30
Ethylbenzene	97		98		70-130	1		30
p/m-Xylene	97		98		70-130	1		30
o-Xylene	96		98		70-130	2		30
Isopropylbenzene	96		97		70-130	1		30
1,3,5-Trimethylbenzene	97		98		70-130	1		30
1,2,4-Trimethylbenzene	97		98		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	91		90		70-130
Dibromofluoromethane	92		94		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-08 Batch: WG1673529-3 WG1673529-4								
Methyl tert butyl ether	75		75		66-130	0		30
Benzene	86		85		70-130	1		30
1,2-Dichloroethane	75		75		70-130	0		30
Toluene	86		85		70-130	1		30
1,2-Dibromoethane	86		87		70-130	1		30
Ethylbenzene	88		88		70-130	0		30
p/m-Xylene	90		90		70-130	0		30
o-Xylene	89		89		70-130	0		30
Isopropylbenzene	90		88		70-130	2		30
1,3,5-Trimethylbenzene	91		90		70-130	1		30
1,2,4-Trimethylbenzene	92		89		70-130	3		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	86		85		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	97		95		70-130
Dibromofluoromethane	89		87		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01 D
 Client ID: GPR794-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 13:31
 Analyst: JG
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.5		mg/kg	1.9	0.23	10
Fluorene	2.0		mg/kg	1.9	0.19	10
Phenanthrene	8.7		mg/kg	1.2	0.23	10
Anthracene	0.51	J	mg/kg	1.2	0.38	10
Pyrene	0.71	J	mg/kg	1.2	0.19	10
Benzo(a)anthracene	0.27	J	mg/kg	1.2	0.22	10
Chrysene	0.35	J	mg/kg	1.2	0.20	10
Benzo(b)fluoranthene	ND		mg/kg	1.2	0.32	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.47	10
Benzo(ghi)perylene	ND		mg/kg	1.5	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	48		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	71		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02 D
 Client ID: GPR794-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 20:02
 Analyst: JG
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.0	J	mg/kg	2.1	0.26	10
Fluorene	0.47	J	mg/kg	2.1	0.21	10
Phenanthrene	2.9		mg/kg	1.3	0.26	10
Anthracene	ND		mg/kg	1.3	0.42	10
Pyrene	0.86	J	mg/kg	1.3	0.21	10
Benzo(a)anthracene	0.46	J	mg/kg	1.3	0.24	10
Chrysene	0.44	J	mg/kg	1.3	0.22	10
Benzo(b)fluoranthene	0.47	J	mg/kg	1.3	0.36	10
Benzo(a)pyrene	ND		mg/kg	1.7	0.52	10
Benzo(ghi)perylene	ND		mg/kg	1.7	0.25	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	55		23-120
2-Fluorobiphenyl	67		30-120
4-Terphenyl-d14	63		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03
 Client ID: GPR794-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:20
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 05:34
 Analyst: SZ
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.017	1
Phenanthrene	0.037	J	mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.035	1
Pyrene	0.049	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.038	J	mg/kg	0.11	0.020	1
Chrysene	0.038	J	mg/kg	0.11	0.018	1
Benzo(b)fluoranthene	0.065	J	mg/kg	0.11	0.030	1
Benzo(a)pyrene	0.049	J	mg/kg	0.14	0.043	1
Benzo(ghi)perylene	0.030	J	mg/kg	0.14	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	41		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	56		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04 D
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 14:16
 Analyst: EK
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	3.1		mg/kg	1.9	0.23	10
Fluorene	1.0	J	mg/kg	1.9	0.19	10
Phenanthrene	1.9		mg/kg	1.2	0.23	10
Anthracene	0.46	J	mg/kg	1.2	0.38	10
Pyrene	2.0		mg/kg	1.2	0.19	10
Benzo(a)anthracene	0.64	J	mg/kg	1.2	0.22	10
Chrysene	1.4		mg/kg	1.2	0.20	10
Benzo(b)fluoranthene	0.78	J	mg/kg	1.2	0.32	10
Benzo(a)pyrene	0.48	J	mg/kg	1.5	0.47	10
Benzo(ghi)perylene	0.41	J	mg/kg	1.5	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	38		23-120
2-Fluorobiphenyl	52		30-120
4-Terphenyl-d14	58		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05
 Client ID: GPR794-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:40
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 06:19
 Analyst: SZ
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.7		mg/kg	0.20	0.024	1
Fluorene	0.17	J	mg/kg	0.20	0.019	1
Phenanthrene	0.43		mg/kg	0.12	0.024	1
Anthracene	0.070	J	mg/kg	0.12	0.039	1
Pyrene	0.058	J	mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.035	J	mg/kg	0.12	0.022	1
Chrysene	0.033	J	mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.034	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.049	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	62		30-120
4-Terphenyl-d14	60		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06 D
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 14:38
 Analyst: EK
 Percent Solids: 89%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	6.3		mg/kg	1.9	0.23	10
Fluorene	1.4	J	mg/kg	1.9	0.18	10
Phenanthrene	3.0		mg/kg	1.1	0.23	10
Anthracene	0.67	J	mg/kg	1.1	0.36	10
Pyrene	0.94	J	mg/kg	1.1	0.18	10
Benzo(a)anthracene	0.41	J	mg/kg	1.1	0.21	10
Chrysene	0.35	J	mg/kg	1.1	0.19	10
Benzo(b)fluoranthene	0.36	J	mg/kg	1.1	0.32	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.46	10
Benzo(ghi)perylene	ND		mg/kg	1.5	0.22	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	24		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	70		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 04:04
 Analyst: SZ
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.054	J	mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.018	1
Phenanthrene	0.19		mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.036	1
Pyrene	0.077	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	0.027	J	mg/kg	0.11	0.021	1
Chrysene	0.041	J	mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	0.034	J	mg/kg	0.11	0.031	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1
Benzo(ghi)perylene	ND		mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	73		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08 D
 Client ID: GPR794-08-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/10/22 15:01
 Analyst: EK
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 08/04/22 20:32

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	8.7		mg/kg	2.0	0.24	10
Fluorene	0.75	J	mg/kg	2.0	0.19	10
Phenanthrene	2.3		mg/kg	1.2	0.24	10
Anthracene	ND		mg/kg	1.2	0.39	10
Pyrene	0.28	J	mg/kg	1.2	0.20	10
Benzo(a)anthracene	ND		mg/kg	1.2	0.22	10
Chrysene	ND		mg/kg	1.2	0.21	10
Benzo(b)fluoranthene	ND		mg/kg	1.2	0.34	10
Benzo(a)pyrene	ND		mg/kg	1.6	0.48	10
Benzo(ghi)perylene	ND		mg/kg	1.6	0.23	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	49		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	68		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13
 Client ID: FB-080322-1
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/10/22 11:56
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	100		23-120
2-Fluorobiphenyl	84		15-120
4-Terphenyl-d14	90		41-149



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/10/22 12:13
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	108		23-120
2-Fluorobiphenyl	91		15-120
4-Terphenyl-d14	96		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/08/22 23:47
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 08/04/22 02:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01,03-06,08 Batch: WG1671002-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	84		30-120
4-Terphenyl-d14	103		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/09/22 22:28
Analyst: SZ

Extraction Method: EPA 3546
Extraction Date: 08/06/22 01:14

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02,07 Batch: WG1671945-1					
Naphthalene	ND		mg/kg	0.17	0.020
Fluorene	ND		mg/kg	0.17	0.016
Phenanthrene	ND		mg/kg	0.10	0.020
Anthracene	ND		mg/kg	0.10	0.032
Pyrene	ND		mg/kg	0.10	0.016
Benzo(a)anthracene	ND		mg/kg	0.10	0.019
Chrysene	ND		mg/kg	0.10	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.10	0.028
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Benzo(ghi)perylene	ND		mg/kg	0.13	0.020

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	58		23-120
2-Fluorobiphenyl	56		30-120
4-Terphenyl-d14	84		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 08/10/22 07:35
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 08/09/22 09:52

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 13-14 Batch: WG1672949-1					
Naphthalene	2.8		ug/l	0.10	0.05
Fluorene	0.06	J	ug/l	0.10	0.01
Phenanthrene	0.07		ug/l	0.05	0.02
Anthracene	0.02	J	ug/l	0.10	0.01
Pyrene	0.03	J	ug/l	0.10	0.02
Benzo(a)anthracene	0.03	J	ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	101		23-120
2-Fluorobiphenyl	86		15-120
4-Terphenyl-d14	92		41-149



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,03-06,08 Batch: WG1671002-2 WG1671002-3								
Naphthalene	83		77		40-140	8		50
Fluorene	91		84		40-140	8		50
Phenanthrene	81		76		40-140	6		50
Anthracene	87		80		40-140	8		50
Pyrene	83		76		35-142	9		50
Benzo(a)anthracene	93		87		40-140	7		50
Chrysene	88		84		40-140	5		50
Benzo(b)fluoranthene	113		103		40-140	9		50
Benzo(a)pyrene	114		108		40-140	5		50
Benzo(ghi)perylene	92		87		40-140	6		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	94		84		23-120
2-Fluorobiphenyl	83		77		30-120
4-Terphenyl-d14	99		90		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02,07 Batch: WG1671945-2 WG1671945-3								
Naphthalene	74		80		40-140	8		50
Fluorene	78		86		40-140	10		50
Phenanthrene	74		84		40-140	13		50
Anthracene	79		88		40-140	11		50
Pyrene	75		80		35-142	6		50
Benzo(a)anthracene	80		90		40-140	12		50
Chrysene	76		82		40-140	8		50
Benzo(b)fluoranthene	93		105		40-140	12		50
Benzo(a)pyrene	98		110		40-140	12		50
Benzo(ghi)perylene	79		92		40-140	15		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	83		88		23-120
2-Fluorobiphenyl	74		77		30-120
4-Terphenyl-d14	87		92		18-120



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 13-14 Batch: WG1672949-2 WG1672949-3								
Naphthalene	74		83		40-140	11		40
Fluorene	87		91		40-140	4		40
Phenanthrene	91		90		40-140	1		40
Anthracene	93		93		40-140	0		40
Pyrene	90		85		26-127	6		40
Benzo(a)anthracene	100		96		40-140	4		40
Chrysene	105		103		40-140	2		40
Benzo(b)fluoranthene	94		93		40-140	1		40
Benzo(a)pyrene	88		86		40-140	2		40
Benzo(ghi)perylene	107		101		40-140	6		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	84		99		23-120
2-Fluorobiphenyl	75		82		15-120
4-Terphenyl-d14	86		83		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01

Date Collected: 08/03/22 11:00

Client ID: GPR794-01-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	408		mg/kg	2.32	0.124	1	08/04/22 23:16	08/09/22 11:35	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-02

Date Collected: 08/03/22 11:10

Client ID: GPR794-02-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	347		mg/kg	2.56	0.138	1	08/04/22 23:16	08/09/22 11:40	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-03

Date Collected: 08/03/22 11:20

Client ID: GPR794-03-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	24.2		mg/kg	2.20	0.118	1	08/04/22 23:16	08/09/22 11:45	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-04
 Client ID: GPR794-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:30
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	63.8		mg/kg	2.34	0.125	1	08/04/22 23:16	08/09/22 11:50	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-05

Date Collected: 08/03/22 11:40

Client ID: GPR794-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	23.6		mg/kg	2.35	0.126	1	08/04/22 23:16	08/09/22 13:17	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-06
 Client ID: GPR794-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 11:50
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 89%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	429		mg/kg	2.20	0.118	1	08/04/22 23:16	08/09/22 13:22	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-07
 Client ID: GPR794-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 12:00
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	3.73		mg/kg	2.21	0.118	1	08/04/22 23:16	08/09/22 13:27	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-08

Date Collected: 08/03/22 12:10

Client ID: GPR794-08-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	132		mg/kg	2.40	0.129	1	08/04/22 23:16	08/09/22 13:32	EPA 3050B	1,6010D	NB



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-13

Date Collected: 08/03/22 14:00

Client ID: FB-080322-1

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 14:59	EPA 3005A	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-14
 Client ID: FB-080322-2
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 14:10
 Date Received: 08/03/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 15:46	EPA 3005A	1,6010D	NB



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 13-14 Batch: WG1671033-1									
Lead, Total	ND	mg/l	0.010	0.003	1	08/05/22 04:15	08/08/22 14:44	1,6010D	NB

Prep Information

Digestion Method: EPA 3005A

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-08 Batch: WG1671440-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	08/04/22 23:16	08/09/22 10:29	1,6010D	NB

Prep Information

Digestion Method: EPA 3050B



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 13-14 Batch: WG1671033-2								
Lead, Total	96		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 01-08 Batch: WG1671440-2 SRM Lot Number: D113-540								
Lead, Total	87		-		72-128	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1671033-3 QC Sample: L2241764-02 Client ID: MS Sample												
Lead, Total	ND	0.53	0.491	93		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1671440-3 QC Sample: L2241632-02 Client ID: MS Sample												
Lead, Total	10.8	49.6	54.9	89		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1671440-4 QC Sample: L2241632-02 Client ID: DUP Sample						
Lead, Total	10.8	10.1	mg/kg	7		20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-01

Date Collected: 08/03/22 11:00

Client ID: GPR794-01-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.3		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-02

Date Collected: 08/03/22 11:10

Client ID: GPR794-02-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.4		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-03

Date Collected: 08/03/22 11:20

Client ID: GPR794-03-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-04

Date Collected: 08/03/22 11:30

Client ID: GPR794-04-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.2		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-05

Date Collected: 08/03/22 11:40

Client ID: GPR794-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.5		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-06

Date Collected: 08/03/22 11:50

Client ID: GPR794-06-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.6		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-07

Date Collected: 08/03/22 12:00

Client ID: GPR794-07-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.5		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-08

Date Collected: 08/03/22 12:10

Client ID: GPR794-08-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-09

Date Collected: 08/03/22 13:00

Client ID: GPR1088-04-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	74.2		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.2		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-10

Date Collected: 08/03/22 13:10

Client ID: GPR1088-05-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	8.9		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-11

Date Collected: 08/03/22 13:20

Client ID: GPR1088-06-SS01

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.3		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.7		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2241635
Report Date: 08/11/22

SAMPLE RESULTS

Lab ID: L2241635-12
Client ID: DUP-51
Sample Location: PHILADELPHIA, PA

Date Collected: 08/03/22 00:00
Date Received: 08/03/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	73.0		%	0.100	NA	1	-	08/04/22 12:45	121,2540G	RI
pH (H)	6.1		SU	-	NA	1	-	08/08/22 09:52	1,9045D	KS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-13

Date Collected: 08/03/22 14:00

Client ID: FB-080322-1

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.1		SU	-	NA	1	-	08/08/22 17:57	1,9040C	AS



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**SAMPLE RESULTS**

Lab ID: L2241635-14

Date Collected: 08/03/22 14:10

Client ID: FB-080322-2

Date Received: 08/03/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	6.3		SU	-	NA	1	-	08/08/22 17:57	1,9040C	AS



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 13-14 Batch: WG1672434-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 09-12 Batch: WG1672436-1								
pH	100		-		99-101	-		

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2241635

Report Date: 08/11/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-12 QC Batch ID: WG1671234-1 QC Sample: L2241632-01 Client ID: DUP Sample						
Solids, Total	86.6	86.4	%	0		20
General Chemistry - Westborough Lab Associated sample(s): 13-14 QC Batch ID: WG1672434-2 QC Sample: L2241635-13 Client ID: FB-080322-1						
pH (H)	6.1	6.0	SU	2		5
General Chemistry - Westborough Lab Associated sample(s): 09-12 QC Batch ID: WG1672436-2 QC Sample: L2242054-01 Client ID: DUP Sample						
pH	9.5	9.8	SU	3		5

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-01A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-01B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-01C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-01D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-01E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-01F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-02A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-02B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-02C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-02D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-02E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-02F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-03A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2241635-03B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260H(14),PA-8260HLW(14)
L2241635-03C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260H(14),PA-8260HLW(14)
L2241635-03D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-03E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-03F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-04A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-04B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-04C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-04D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-04E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-04F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-05A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-05B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-05C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-05D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-05E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-05F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-06A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-06B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-06C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-06D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-06E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-06F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-07A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-07B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-07C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-07D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-07E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-07F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-08A	Vial MeOH preserved	A	NA		2.7	Y	Absent		PA-8260HLW(14)
L2241635-08B	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-08C	Vial water preserved	A	NA		2.7	Y	Absent	04-AUG-22 09:14	PA-8260HLW(14)
L2241635-08D	Plastic 2oz unpreserved for TS	A	NA		2.7	Y	Absent		TS(7)
L2241635-08E	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.7	Y	Absent		PB-TI(180)
L2241635-08F	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		PA-PAH(14)
L2241635-09A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-10A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-11A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2241635**Project Number:** 200.00135.006**Report Date:** 08/11/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2241635-12A	Glass 120ml/4oz unpreserved	A	NA		2.7	Y	Absent		TS(7),PH-9045(1)
L2241635-13A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13C	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-13D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-13E	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-13F	Plastic 60ml unpreserved	A	7	7	2.7	Y	Absent		PH-9040(1)
L2241635-13G	Plastic 250ml HNO3 preserved	A	<2	<2	2.7	Y	Absent		PB-TI(180)
L2241635-13H	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-13I	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-14A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14C	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-14D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-14E	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-14F	Plastic 60ml unpreserved	A	7	7	2.7	Y	Absent		PH-9040(1)
L2241635-14G	Plastic 250ml HNO3 preserved	A	<2	<2	2.7	Y	Absent		PB-TI(180)
L2241635-14H	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-14I	Amber 250ml unpreserved	A	7	7	2.7	Y	Absent		PA-PAHSIM-LVI(7)
L2241635-15A	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-15B	Vial HCl preserved	A	NA		2.7	Y	Absent		PA-8260(14)
L2241635-15C	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)
L2241635-15D	Vial Na2S2O3 preserved	A	NA		2.7	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
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Lab Number: L2241635
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2241635

Project Number: 200.00135.006

Report Date: 08/11/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

①



CHAIN OF CUSTODY

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Project Information

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-898-9193 FAX: 508-822-3286

Project Name: Philadelphia Refinery

Client Information

Client: Ransom Consulting, LLC
 Address: 2127 Hamilton Avenue
 Trenton, NJ 08619
 Phone: 215-901-4974

Project Location: Philadelphia, PA
 Project #: 200.00135.006
 Project Manager: William Schmidt
 ALPHA Quote #: 18599

Turn-Around Time
 Standard Rush (ONLY IF PRE-APPROVED)
 # 5-DAY
 Due Date: Time:

Fax: Email: William.Schmidt@ransomenv.com
 These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:
 Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/4/22

ALPHA Job #: L2241635

Report Information Data Deliverables
 FAX EMAIL
 ADEx Add'l Deliverables

Billing Information
 Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ANALYSIS

Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Short list 1-5	TEG	PH												
41635-01	8/3/22	1100	S	W	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-02		1110			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-03		1120			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-04		1130			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-05		1140			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-06		1150			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-07		1200			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-08		1210			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-09		1300			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-10		1310			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
41635-01	GPR-794-01-SS01	8/3/22	1100	S	W
-02	GPR-794-02-SS01		1110		
-03	GPR-794-03-SS01		1120		
-04	GPR-794-04-SS01		1130		
-05	GPR-794-05-SS01		1140		
-06	GPR-794-06-SS01		1150		
-07	GPR-794-07-SS01		1200		
-08	GPR-794-08-SS01		1210		
-09	GPR-1088-04-SS01		1300		
-10	GPR-1088-05-SS01		1310		

Container Type: G
 Preservative: -

Relinquished By: *[Signature]* Date/Time: 8/3/22 15:00
 Received By: *[Signature]* Date/Time: 8/3/22 15:10
 8/3/22 15:00 8/3/22 15:10

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.



CHAIN OF CUSTODY

PAGE 2 OF 2

Project Information

Project Name: Philadelphia Refinery

Project Location: Philadelphia, PA

Project #: 200.00135.006

Project Manager: William Schmidt

ALPHA Quote #: 18599

Turn-Around Time

Standard Rush (ONLY IF PRE-APPROVED)

Due Date: **x 5-DAY** Time:

Westborough, MA Mansfield, MA
 TEL: 508-898-9220 TEL: 508-822-9300
 FAX: 508-896-9193 FAX: 508-822-3288

Client Information

Client: Ransom Consulting, LLC

Address: 2127 Hamilton Avenue

Trenton, NJ 08619

Phone: 215-901-4974

Fax: _____
 Email: William.Schmidt@ransomenv.com

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Report only attached project-specific analyte list of PADEP Leaded/Unleaded Gasoline and No. 2, 4, 5, and 6 Fuel Oil Shortlist. Run Naphthalene using Method 8270 ONLY!! Email results to edd@terraphase.com, William.Schmidt@ransomenv.com, and jjeray@hilcoglobal.com

Date Rec'd in Lab: 8/4/22

ALPHA Job #: 12241035

Report Information Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #: 3562

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Shortlist 1-5	TEG	PH	Vol Petro of SLI-5	EBD (8011)											
41635-11	GPR-1088-06-SS01	8/3/22	1320	S	an	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-12	DUP-51			S		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-13	FB-080322-1		1400	W		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-14	FB-080322-2		1410	W		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-15	TB-080322			W		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLE HANDLING
 Filtration
 Done
 Not Needed
 Preservation
 Lab to do
 Lab to do
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

PH ONLY

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

PADEP Short List Analytical Suites per Table III-5:

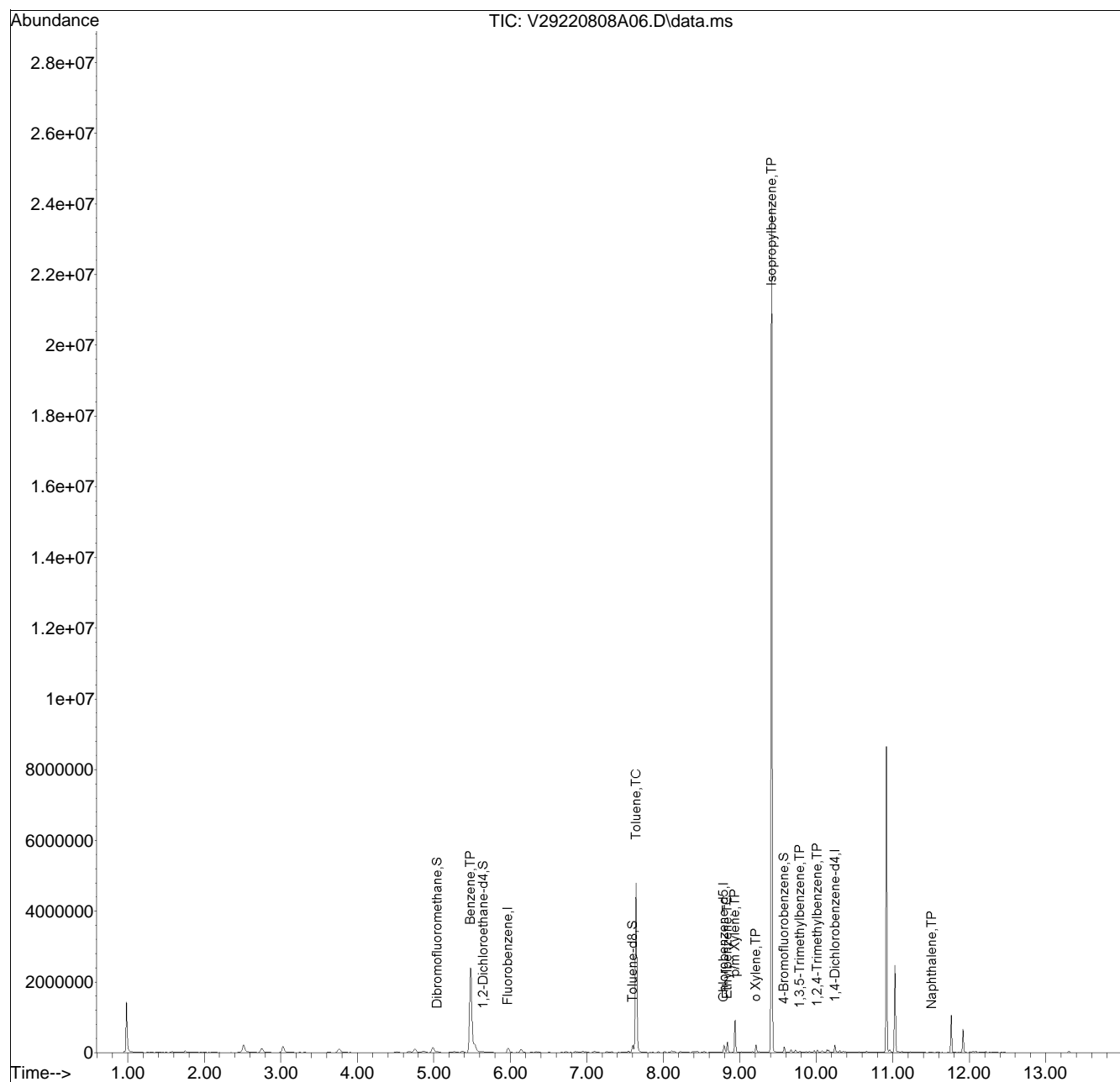
1. Leaded Gasoline, Aviation Gasoline and Jet Fuel - benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, lead
2. Unleaded Gasoline - benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
3. Kerosene, Fuel Oil No. 1 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene
4. Diesel Fuel and Fuel Oil No. 2 - benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethyl benzene
5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids - benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220808A\
 Data File : V29220808A06.D
 Acq On : 08 Aug 2022 09:00 am
 Operator : VOA129:NLK
 Sample : 12241635-03,31,6.09,5,,c
 Misc : WG1672815,ICAL19173
 ALS Vial : 6 Sample Multiplier: 1

Quant Time: Aug 09 08:30:01 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220808A\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list08A\V29220808A02.D•





ANALYTICAL REPORT

Lab Number:	L2243874
Client:	Ransom/Hilco 99 Summer St. Suite 1110 Boston, MA 02110
ATTN:	Joe Jeray
Phone:	(978) 729-3209
Project Name:	PHILADELPHIA REFINERY
Project Number:	200.00135.006
Report Date:	08/22/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2243874-01	GPU767-01-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:30	08/15/22
L2243874-02	GPU767-02-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:40	08/15/22
L2243874-03	GPU767-03-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:45	08/15/22
L2243874-04	GPU767-04-SS01	SOIL	PHILADELPHIA, PA	08/15/22 12:55	08/15/22
L2243874-05	GPU767-05-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:30	08/15/22
L2243874-06	GPU767-06-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:40	08/15/22
L2243874-07	GPU767-07-SS01	SOIL	PHILADELPHIA, PA	08/15/22 13:50	08/15/22
L2243874-08	TB-081522	WATER	PHILADELPHIA, PA	08/15/22 00:00	08/15/22
L2243874-09	FB-081522	WATER	PHILADELPHIA, PA	08/15/22 13:45	08/15/22

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2243874-01: The collection date and time on the chain of custody was 12-AUG-22 12:30; however, the collection date/time on the container label was 15-AUG-22 12:30. At the client's request, the collection date/time is reported as 15-AUG-22 12:30.

L2243874-02: The collection date and time on the chain of custody was 12-AUG-22 12:40; however, the collection date/time on the container label was 15-AUG-22 12:40. At the client's request, the collection date/time is reported as 15-AUG-22 12:40.

L2243874-03: The collection date and time on the chain of custody was 12-AUG-22 12:45; however, the collection date/time on the container label was 15-AUG-22 12:45. At the client's request, the collection date/time is reported as 15-AUG-22 12:45.

L2243874-04: The collection date and time on the chain of custody was 12-AUG-22 12:55; however, the collection date/time on the container label was 15-AUG-22 12:55. At the client's request, the collection date/time is reported as 15-AUG-22 12:55.

L2243874-05: The collection date and time on the chain of custody was 12-AUG-22 13:30; however, the collection date/time on the container label was 15-AUG-22 13:30. At the client's request, the collection date/time is reported as 15-AUG-22 13:30.

L2243874-06: The collection date and time on the chain of custody was 12-AUG-22 13:40; however, the collection date/time on the container label was 15-AUG-22 13:40. At the client's request, the collection date/time is reported as 15-AUG-22 13:40.

L2243874-07: The collection date and time on the chain of custody was 12-AUG-22 13:50; however, the collection date/time on the container label was 15-AUG-22 13:50. At the client's request, the collection date/time is reported as 15-AUG-22 13:50.

L2243874-08: The collection date and time on the chain of custody was 12-AUG-22 00:00; however, the

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Case Narrative (continued)

collection date/time on the container label was 15-AUG-22 00:00. At the client's request, the collection date/time is reported as 15-AUG-22 00:00.

L2243874-09: The collection date and time on the chain of custody was 12-AUG-22 14:00; however, the collection date/time on the container label was 15-AUG-22 14:00. At the client's request, the collection date/time is reported as 15-AUG-22 13:45.

Volatile Organics

L2243874-02: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (174%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2243874-03: The sample was analyzed as a High Level Methanol in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial Low Level analysis. The results of both analyses are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Steven Gniadek

Title: Technical Director/Representative

Date: 08/22/22

ORGANICS

VOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01
 Client ID: GPU767-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 13:08
 Analyst: AJK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0028	0.00028	1
Benzene	ND		mg/kg	0.00069	0.00023	1
1,2-Dichloroethane	ND		mg/kg	0.0014	0.00036	1
Toluene	ND		mg/kg	0.0014	0.00075	1
1,2-Dibromoethane	ND		mg/kg	0.00069	0.00040	1
Ethylbenzene	ND		mg/kg	0.0014	0.00019	1
p/m-Xylene	ND		mg/kg	0.0028	0.00077	1
o-Xylene	ND		mg/kg	0.0014	0.00040	1
Xylenes, Total	ND		mg/kg	0.0014	0.00040	1
Isopropylbenzene	0.0011	J	mg/kg	0.0014	0.00015	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0028	0.00027	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0028	0.00046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 13:28
 Analyst: AJK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.00035	0.00003	1
Benzene	0.00007	J	mg/kg	0.00008	0.00002	1
1,2-Dichloroethane	ND		mg/kg	0.00018	0.00004	1
Toluene	0.00018		mg/kg	0.00018	0.00009	1
1,2-Dibromoethane	ND		mg/kg	0.00008	0.00005	1
Ethylbenzene	0.00016	J	mg/kg	0.00018	0.00002	1
p/m-Xylene	0.00026	J	mg/kg	0.00035	0.00009	1
o-Xylene	0.00011	J	mg/kg	0.00018	0.00005	1
Xylenes, Total	0.00037	J	mg/kg	0.00018	0.00005	1
Isopropylbenzene	0.0093		mg/kg	0.00018	0.00001	1
1,3,5-Trimethylbenzene	0.00010	J	mg/kg	0.00035	0.00003	1
1,2,4-Trimethylbenzene	0.00027	J	mg/kg	0.00035	0.00005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	112		70-130
4-Bromofluorobenzene	174	Q	70-130
Dibromofluoromethane	88		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 14:10
 Analyst: AJK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	0.0030		mg/kg	0.00048	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00095	0.00024	1
Toluene	0.00091	J	mg/kg	0.00095	0.00052	1
1,2-Dibromoethane	ND		mg/kg	0.00048	0.00028	1
Ethylbenzene	0.0015		mg/kg	0.00095	0.00013	1
p/m-Xylene	0.00082	J	mg/kg	0.0019	0.00053	1
o-Xylene	0.0010		mg/kg	0.00095	0.00028	1
Xylenes, Total	0.0018	J	mg/kg	0.00095	0.00028	1
Isopropylbenzene	0.42	E	mg/kg	0.00095	0.00010	1
1,3,5-Trimethylbenzene	0.00058	J	mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	0.00089	J	mg/kg	0.0019	0.00032	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	88		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/18/22 08:55
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.13	0.014	1
Benzene	0.071		mg/kg	0.034	0.011	1
1,2-Dichloroethane	ND		mg/kg	0.067	0.017	1
Toluene	0.052	J	mg/kg	0.067	0.036	1
1,2-Dibromoethane	ND		mg/kg	0.034	0.020	1
Ethylbenzene	0.030	J	mg/kg	0.067	0.0095	1
p/m-Xylene	0.049	J	mg/kg	0.13	0.038	1
o-Xylene	0.022	J	mg/kg	0.067	0.020	1
Xylenes, Total	0.071	J	mg/kg	0.067	0.020	1
Isopropylbenzene	1.6		mg/kg	0.067	0.0073	1
1,3,5-Trimethylbenzene	0.016	J	mg/kg	0.13	0.013	1
1,2,4-Trimethylbenzene	0.032	J	mg/kg	0.13	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04
 Client ID: GPU767-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:55
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 14:51
 Analyst: AJK
 Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.14	0.014	1
Benzene	0.021	J	mg/kg	0.036	0.012	1
1,2-Dichloroethane	ND		mg/kg	0.071	0.018	1
Toluene	0.17		mg/kg	0.071	0.039	1
1,2-Dibromoethane	ND		mg/kg	0.036	0.021	1
Ethylbenzene	0.047	J	mg/kg	0.071	0.010	1
p/m-Xylene	0.14		mg/kg	0.14	0.040	1
o-Xylene	ND		mg/kg	0.071	0.021	1
Xylenes, Total	0.14		mg/kg	0.071	0.021	1
Isopropylbenzene	4.8		mg/kg	0.071	0.0078	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.14	0.014	1
1,2,4-Trimethylbenzene	0.037	J	mg/kg	0.14	0.024	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	102		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:12
 Analyst: AJK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.12	0.012	1
Benzene	0.044		mg/kg	0.029	0.0098	1
1,2-Dichloroethane	ND		mg/kg	0.059	0.015	1
Toluene	0.062		mg/kg	0.059	0.032	1
1,2-Dibromoethane	ND		mg/kg	0.029	0.017	1
Ethylbenzene	0.12		mg/kg	0.059	0.0083	1
p/m-Xylene	0.19		mg/kg	0.12	0.033	1
o-Xylene	0.021	J	mg/kg	0.059	0.017	1
Xylenes, Total	0.21	J	mg/kg	0.059	0.017	1
Isopropylbenzene	22.	E	mg/kg	0.059	0.0064	1
1,3,5-Trimethylbenzene	0.017	J	mg/kg	0.12	0.011	1
1,2,4-Trimethylbenzene	0.075	J	mg/kg	0.12	0.020	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05 D
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/18/22 10:34
 Analyst: NLK
 Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Isopropylbenzene	24.		mg/kg	0.24	0.026	4
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	97		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06
 Client ID: GPU767-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:33
 Analyst: AJK
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	ND		mg/kg	0.00047	0.00016	1
1,2-Dichloroethane	ND		mg/kg	0.00094	0.00024	1
Toluene	ND		mg/kg	0.00094	0.00051	1
1,2-Dibromoethane	ND		mg/kg	0.00047	0.00027	1
Ethylbenzene	ND		mg/kg	0.00094	0.00013	1
p/m-Xylene	ND		mg/kg	0.0019	0.00052	1
o-Xylene	ND		mg/kg	0.00094	0.00027	1
Xylenes, Total	ND		mg/kg	0.00094	0.00027	1
Isopropylbenzene	0.0010		mg/kg	0.00094	0.00010	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0019	0.00031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	93		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07
 Client ID: GPU767-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:50
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260C
 Analytical Date: 08/17/22 15:53
 Analyst: AJK
 Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0040	0.00040	1
Benzene	ND		mg/kg	0.0010	0.00033	1
1,2-Dichloroethane	ND		mg/kg	0.0020	0.00051	1
Toluene	ND		mg/kg	0.0020	0.0011	1
1,2-Dibromoethane	ND		mg/kg	0.0010	0.00059	1
Ethylbenzene	ND		mg/kg	0.0020	0.00028	1
p/m-Xylene	ND		mg/kg	0.0040	0.0011	1
o-Xylene	ND		mg/kg	0.0020	0.00058	1
Xylenes, Total	ND		mg/kg	0.0020	0.00058	1
Isopropylbenzene	0.00049	J	mg/kg	0.0020	0.00022	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0040	0.00039	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0040	0.00067	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	96		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-08
 Client ID: TB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 00:00
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/16/22 16:07
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-08
 Client ID: TB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 00:00
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/16/22 09:54
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	99		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 08/16/22 16:14
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.011	0.005	1	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260C
 Analytical Date: 08/16/22 10:20
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	98		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 08/16/22 14:34
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 08/16/22 13:34

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 08-09 Batch: WG1675742-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/16/22 08:36
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 08-09 Batch: WG1676096-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	99		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260C
 Analytical Date: 08/17/22 11:11
 Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03,06-07 Batch: WG1676803-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
1,2-Dichloroethane	ND		mg/kg	0.0010	0.00026
Toluene	ND		mg/kg	0.0010	0.00054
1,2-Dibromoethane	ND		mg/kg	0.00050	0.00029
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	111		70-130

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/17/22 11:11
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04-05 Batch: WG1676810-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	111		70-130



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260C
Analytical Date: 08/18/22 08:27
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03,05 Batch: WG1677395-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
1,2-Dichloroethane	ND		mg/kg	0.050	0.013
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	96		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2243874

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 08-09 Batch: WG1675742-2									
1,2-Dibromoethane	101		-		80-120	-		20	A

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 08-09 Batch: WG1676096-3 WG1676096-4								
Methyl tert butyl ether	87		97		63-130	11		20
Benzene	100		100		70-130	0		20
1,2-Dichloroethane	100		110		70-130	10		20
Toluene	98		99		70-130	1		20
Ethylbenzene	98		99		70-130	1		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
Isopropylbenzene	92		96		70-130	4		20
1,3,5-Trimethylbenzene	92		95		64-130	3		20
1,2,4-Trimethylbenzene	91		93		70-130	2		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	110		112		70-130
Toluene-d8	103		103		70-130
4-Bromofluorobenzene	92		93		70-130
Dibromofluoromethane	98		98		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03,06-07 Batch: WG1676803-3 WG1676803-4								
Methyl tert butyl ether	70		70		66-130	0		30
Benzene	88		87		70-130	1		30
1,2-Dichloroethane	90		89		70-130	1		30
Toluene	90		93		70-130	3		30
1,2-Dibromoethane	83		84		70-130	1		30
Ethylbenzene	94		96		70-130	2		30
p/m-Xylene	96		98		70-130	2		30
o-Xylene	95		97		70-130	2		30
Isopropylbenzene	95		98		70-130	3		30
1,3,5-Trimethylbenzene	98		101		70-130	3		30
1,2,4-Trimethylbenzene	99		102		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		91		70-130
Toluene-d8	101		103		70-130
4-Bromofluorobenzene	96		98		70-130
Dibromofluoromethane	87		89		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04-05 Batch: WG1676810-3 WG1676810-4								
Methyl tert butyl ether	70		70		66-130	0		30
Benzene	88		87		70-130	1		30
1,2-Dichloroethane	90		89		70-130	1		30
Toluene	90		93		70-130	3		30
1,2-Dibromoethane	83		84		70-130	1		30
Ethylbenzene	94		96		70-130	2		30
p/m-Xylene	96		98		70-130	2		30
o-Xylene	95		97		70-130	2		30
Isopropylbenzene	95		98		70-130	3		30
1,3,5-Trimethylbenzene	98		101		70-130	3		30
1,2,4-Trimethylbenzene	99		102		70-130	3		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	94		91		70-130
Toluene-d8	100		103		70-130
4-Bromofluorobenzene	96		98		70-130
Dibromofluoromethane	87		90		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03,05 Batch: WG1677395-3 WG1677395-4								
Methyl tert butyl ether	92		97		66-130	5		30
Benzene	91		96		70-130	5		30
1,2-Dichloroethane	92		97		70-130	5		30
Toluene	88		89		70-130	1		30
1,2-Dibromoethane	93		95		70-130	2		30
Ethylbenzene	92		95		70-130	3		30
p/m-Xylene	92		96		70-130	4		30
o-Xylene	94		97		70-130	3		30
Isopropylbenzene	93		95		70-130	2		30
1,3,5-Trimethylbenzene	91		96		70-130	5		30
1,2,4-Trimethylbenzene	91		95		70-130	4		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		102		70-130
Toluene-d8	102		99		70-130
4-Bromofluorobenzene	97		98		70-130
Dibromofluoromethane	98		99		70-130



SEMIVOLATILES

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01
 Client ID: GPU767-01-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:08
 Analyst: EK
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.19	0.023	1
Fluorene	ND		mg/kg	0.19	0.018	1
Phenanthrene	ND		mg/kg	0.11	0.023	1
Anthracene	ND		mg/kg	0.11	0.037	1
Pyrene	0.032	J	mg/kg	0.11	0.019	1
Benzo(a)anthracene	0.044	J	mg/kg	0.11	0.021	1
Chrysene	0.046	J	mg/kg	0.11	0.020	1
Benzo(b)fluoranthene	0.10	J	mg/kg	0.11	0.032	1
Benzo(a)pyrene	0.070	J	mg/kg	0.15	0.046	1
Indeno(1,2,3-cd)pyrene	0.077	J	mg/kg	0.15	0.026	1
Benzo(ghi)perylene	0.076	J	mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	59		30-120
4-Terphenyl-d14	62		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:31
 Analyst: EK
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.048	J	mg/kg	0.20	0.024	1
Fluorene	0.085	J	mg/kg	0.20	0.019	1
Phenanthrene	0.24		mg/kg	0.12	0.024	1
Anthracene	0.058	J	mg/kg	0.12	0.039	1
Pyrene	0.18		mg/kg	0.12	0.020	1
Benzo(a)anthracene	0.12		mg/kg	0.12	0.022	1
Chrysene	0.12		mg/kg	0.12	0.021	1
Benzo(b)fluoranthene	0.15		mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.14	J	mg/kg	0.16	0.048	1
Indeno(1,2,3-cd)pyrene	0.091	J	mg/kg	0.16	0.028	1
Benzo(ghi)perylene	0.077	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	34		23-120
2-Fluorobiphenyl	24	Q	30-120
4-Terphenyl-d14	25		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 00:55
 Analyst: EK
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.20	0.024	1
Fluorene	ND		mg/kg	0.20	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	ND		mg/kg	0.12	0.020	1
Benzo(a)anthracene	ND		mg/kg	0.12	0.022	1
Chrysene	ND		mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	ND		mg/kg	0.12	0.033	1
Benzo(a)pyrene	ND		mg/kg	0.16	0.048	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.16	0.028	1
Benzo(ghi)perylene	ND		mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	65		23-120
2-Fluorobiphenyl	44		30-120
4-Terphenyl-d14	48		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04
 Client ID: GPU767-04-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:55
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 01:18
 Analyst: EK
 Percent Solids: 85%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.19	0.024	1
Fluorene	ND		mg/kg	0.19	0.019	1
Phenanthrene	ND		mg/kg	0.12	0.024	1
Anthracene	ND		mg/kg	0.12	0.038	1
Pyrene	0.090	J	mg/kg	0.12	0.019	1
Benzo(a)anthracene	0.037	J	mg/kg	0.12	0.022	1
Chrysene	0.093	J	mg/kg	0.12	0.020	1
Benzo(b)fluoranthene	0.054	J	mg/kg	0.12	0.033	1
Benzo(a)pyrene	0.049	J	mg/kg	0.16	0.047	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.16	0.027	1
Benzo(ghi)perylene	0.064	J	mg/kg	0.16	0.023	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	61		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-05
 Client ID: GPU767-05-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:30
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 01:41
 Analyst: EK
 Percent Solids: 88%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.18	0.022	1
Fluorene	ND		mg/kg	0.18	0.018	1
Phenanthrene	ND		mg/kg	0.11	0.022	1
Anthracene	ND		mg/kg	0.11	0.036	1
Pyrene	0.022	J	mg/kg	0.11	0.018	1
Benzo(a)anthracene	ND		mg/kg	0.11	0.021	1
Chrysene	0.024	J	mg/kg	0.11	0.019	1
Benzo(b)fluoranthene	ND		mg/kg	0.11	0.031	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.15	0.026	1
Benzo(ghi)perylene	0.025	J	mg/kg	0.15	0.022	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	34		30-120
4-Terphenyl-d14	36		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06
 Client ID: GPU767-06-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 02:05
 Analyst: EK
 Percent Solids: 93%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.068	J	mg/kg	0.18	0.021	1
Fluorene	0.030	J	mg/kg	0.18	0.017	1
Phenanthrene	0.19		mg/kg	0.10	0.021	1
Anthracene	0.053	J	mg/kg	0.10	0.034	1
Pyrene	0.34		mg/kg	0.10	0.017	1
Benzo(a)anthracene	0.33		mg/kg	0.10	0.020	1
Chrysene	0.38		mg/kg	0.10	0.018	1
Benzo(b)fluoranthene	0.56		mg/kg	0.10	0.030	1
Benzo(a)pyrene	0.42		mg/kg	0.14	0.043	1
Indeno(1,2,3-cd)pyrene	0.35		mg/kg	0.14	0.024	1
Benzo(ghi)perylene	0.29		mg/kg	0.14	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	117		23-120
2-Fluorobiphenyl	82		30-120
4-Terphenyl-d14	84		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07
 Client ID: GPU767-07-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:50
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270D
 Analytical Date: 08/20/22 02:28
 Analyst: EK
 Percent Solids: 94%

Extraction Method: EPA 3546
 Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.17	0.021	1
Fluorene	ND		mg/kg	0.17	0.017	1
Phenanthrene	ND		mg/kg	0.10	0.021	1
Anthracene	ND		mg/kg	0.10	0.034	1
Pyrene	ND		mg/kg	0.10	0.017	1
Benzo(a)anthracene	ND		mg/kg	0.10	0.019	1
Chrysene	ND		mg/kg	0.10	0.018	1
Benzo(b)fluoranthene	ND		mg/kg	0.10	0.029	1
Benzo(a)pyrene	ND		mg/kg	0.14	0.042	1
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.14	0.024	1
Benzo(ghi)perylene	ND		mg/kg	0.14	0.020	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	99		23-120
2-Fluorobiphenyl	71		30-120
4-Terphenyl-d14	77		18-120

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09
 Client ID: FB-081522
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 13:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270D-SIM
 Analytical Date: 08/21/22 16:24
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 08/21/22 08:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	0.06	J	ug/l	0.10	0.01	1
Phenanthrene	0.04	J	ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.02	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	95		23-120
2-Fluorobiphenyl	78		15-120
4-Terphenyl-d14	83		41-149

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D
Analytical Date: 08/19/22 21:24
Analyst: EK

Extraction Method: EPA 3546
Extraction Date: 08/17/22 01:02

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG1676057-1					
Naphthalene	ND		mg/kg	0.16	0.020
Fluorene	ND		mg/kg	0.16	0.016
Phenanthrene	ND		mg/kg	0.098	0.020
Anthracene	ND		mg/kg	0.098	0.032
Pyrene	ND		mg/kg	0.098	0.016
Benzo(a)anthracene	ND		mg/kg	0.098	0.018
Chrysene	ND		mg/kg	0.098	0.017
Benzo(b)fluoranthene	ND		mg/kg	0.098	0.027
Benzo(a)pyrene	ND		mg/kg	0.13	0.040
Indeno(1,2,3-cd)pyrene	ND		mg/kg	0.13	0.023
Benzo(ghi)perylene	ND		mg/kg	0.13	0.019

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	42		23-120
2-Fluorobiphenyl	32		30-120
4-Terphenyl-d14	40		18-120



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270D-SIM
Analytical Date: 08/21/22 16:07
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 08/21/22 08:16

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 09 Batch: WG1677772-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	0.04	J	ug/l	0.05	0.02
Chrysene	0.02	J	ug/l	0.10	0.01
Benzo(b)fluoranthene	0.02	J	ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	86		23-120
2-Fluorobiphenyl	70		15-120
4-Terphenyl-d14	76		41-149



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG1676057-2 WG1676057-3								
Naphthalene	58		56		40-140	4		50
Fluorene	61		60		40-140	2		50
Phenanthrene	58		58		40-140	0		50
Anthracene	60		59		40-140	2		50
Pyrene	62		63		35-142	2		50
Benzo(a)anthracene	58		57		40-140	2		50
Chrysene	57		56		40-140	2		50
Benzo(b)fluoranthene	58		58		40-140	0		50
Benzo(a)pyrene	58		58		40-140	0		50
Indeno(1,2,3-cd)pyrene	67		66		40-140	2		50
Benzo(ghi)perylene	59		58		40-140	2		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	89		86		23-120
2-Fluorobiphenyl	63		62		30-120
4-Terphenyl-d14	65		68		18-120

Lab Control Sample Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 09 Batch: WG1677772-2 WG1677772-3								
Naphthalene	73		86		40-140	16		40
Fluorene	78		92		40-140	16		40
Phenanthrene	79		89		40-140	12		40
Anthracene	79		87		40-140	10		40
Pyrene	79		86		26-127	8		40
Benzo(a)anthracene	89		90		40-140	1		40
Chrysene	81		94		40-140	15		40
Benzo(b)fluoranthene	77		92		40-140	18		40
Benzo(a)pyrene	73		80		40-140	9		40
Indeno(1,2,3-cd)pyrene	98		102		40-140	4		40
Benzo(ghi)perylene	93		98		40-140	5		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	83		94		23-120
2-Fluorobiphenyl	68		80		15-120
4-Terphenyl-d14	75		84		41-149



METALS



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-01

Date Collected: 08/15/22 12:30

Client ID: GPU767-01-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	380		mg/kg	2.20	0.118	1	08/16/22 21:25	08/22/22 13:00	EPA 3050B	1,6010D	EW



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02
 Client ID: GPU767-02-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:40
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	115		mg/kg	2.30	0.123	1	08/16/22 21:25	08/22/22 13:10	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-03
 Client ID: GPU767-03-SS01
 Sample Location: PHILADELPHIA, PA

Date Collected: 08/15/22 12:45
 Date Received: 08/15/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	72.0		mg/kg	2.30	0.123	1	08/16/22 21:25	08/22/22 13:15	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-04

Date Collected: 08/15/22 12:55

Client ID: GPU767-04-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 85%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	121		mg/kg	2.22	0.119	1	08/16/22 21:25	08/22/22 13:21	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-05

Date Collected: 08/15/22 13:30

Client ID: GPU767-05-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	12.5		mg/kg	2.23	0.120	1	08/16/22 21:25	08/22/22 13:26	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06

Date Collected: 08/15/22 13:40

Client ID: GPU767-06-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	688		mg/kg	2.05	0.110	1	08/16/22 21:25	08/22/22 14:22	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-07

Date Collected: 08/15/22 13:50

Client ID: GPU767-07-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 94%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	87.0		mg/kg	2.01	0.108	1	08/16/22 21:25	08/22/22 14:27	EPA 3050B	1,6010D	ZK



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-09

Date Collected: 08/15/22 13:45

Client ID: FB-081522

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	ND		ug/l	1.000	0.3430	1	08/16/22 21:25	08/19/22 14:40	EPA 3005A	1,6020B	SV



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-07 Batch: WG1675792-1										
Lead, Total	0.117	J	mg/kg	2.08	0.112	1	08/16/22 21:25	08/22/22 10:48	1,6010D	EW

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 09 Batch: WG1675903-1										
Lead, Total	ND		ug/l	1.000	0.3430	1	08/16/22 21:25	08/19/22 14:04	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 Batch: WG1675792-2 SRM Lot Number: D113-540								
Lead, Total	98		-		72-128	-		
Total Metals - Mansfield Lab Associated sample(s): 09 Batch: WG1675903-2								
Lead, Total	107		-		80-120	-		



Matrix Spike Analysis Batch Quality Control

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1675792-3 QC Sample: L2243899-05 Client ID: MS Sample												
Lead, Total	1330	45	288	0	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 09 QC Batch ID: WG1675903-3 QC Sample: L2243874-09 Client ID: FB-081522												
Lead, Total	ND	530	623.7	118		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2243874

Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1675792-4 QC Sample: L2243899-05 Client ID: DUP Sample						
Lead, Total	1330	1110	mg/kg	18		20
Total Metals - Mansfield Lab Associated sample(s): 09 QC Batch ID: WG1675903-4 QC Sample: L2243874-09 Client ID: FB-081522						
Lead, Total	ND	ND	ug/l	NC		20

INORGANICS & MISCELLANEOUS

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-01

Date Collected: 08/15/22 12:30

Client ID: GPU767-01-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.9		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-02

Date Collected: 08/15/22 12:40

Client ID: GPU767-02-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.5		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-03

Date Collected: 08/15/22 12:45

Client ID: GPU767-03-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.8		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-04

Date Collected: 08/15/22 12:55

Client ID: GPU767-04-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.8		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-05

Date Collected: 08/15/22 13:30

Client ID: GPU767-05-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.3		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2243874-06

Date Collected: 08/15/22 13:40

Client ID: GPU767-06-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	93.2		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**SAMPLE RESULTS**

Lab ID: L2243874-07

Date Collected: 08/15/22 13:50

Client ID: GPU767-07-SS01

Date Received: 08/15/22

Sample Location: PHILADELPHIA, PA

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	94.2		%	0.100	NA	1	-	08/16/22 08:51	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: PHILADELPHIA REFINERY

Project Number: 200.00135.006

Lab Number: L2243874

Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-07 QC Batch ID: WG1675702-1 QC Sample: L2243849-01 Client ID: DUP Sample						
Solids, Total	86.0	87.7	%	2		20

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-01A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-01B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-01C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-01D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-01E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-01F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-02A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-02B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-02C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-02D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-02E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-02F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-03A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2243874-03B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260H(14),PA-8260HLW(14)
L2243874-03C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260H(14),PA-8260HLW(14)
L2243874-03D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-03E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-03F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-04A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-04B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-04C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-04D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)

Project Name: PHILADELPHIA REFINERY**Lab Number:** L2243874**Project Number:** 200.00135.006**Report Date:** 08/22/22**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-04E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-04F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-05A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-05B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-05C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-05D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-05E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-05F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-06A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-06B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-06C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-06D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-06E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-06F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-07A	Vial MeOH preserved	B	NA		3.2	Y	Absent		PA-8260HLW(14)
L2243874-07B	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-07C	Vial water preserved	B	NA		3.2	Y	Absent	16-AUG-22 08:09	PA-8260HLW(14)
L2243874-07D	Glass 60mL/2oz unpreserved	B	NA		3.2	Y	Absent		PB-TI(180)
L2243874-07E	Plastic 120ml unpreserved	B	NA		3.2	Y	Absent		TS(7)
L2243874-07F	Glass 120ml/4oz unpreserved	B	NA		3.2	Y	Absent		PA-PAH(14)
L2243874-08A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-08B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-08D	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-08E	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-09A	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09B	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09C	Vial HCl preserved	B	NA		3.2	Y	Absent		PA-8260(14)
L2243874-09D	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)

Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Serial_No:08222218:48
Lab Number: L2243874
Report Date: 08/22/22

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2243874-09E	Vial Na2S2O3 preserved	B	NA		3.2	Y	Absent		8011(14)
L2243874-09F	Plastic 250ml HNO3 preserved	B	<2	<2	3.2	Y	Absent		PB-6020T-PPB(180)
L2243874-09G	Amber 250ml unpreserved	B	NA		3.2	Y	Absent		PA-PAHSIM-LVI(7)
L2243874-09H	Amber 250ml unpreserved	B	NA		3.2	Y	Absent		PA-PAHSIM-LVI(7)



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: PHILADELPHIA REFINERY
Project Number: 200.00135.006

Lab Number: L2243874
Report Date: 08/22/22

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: PHILADELPHIA REFINERY

Lab Number: L2243874

Project Number: 200.00135.006

Report Date: 08/22/22

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

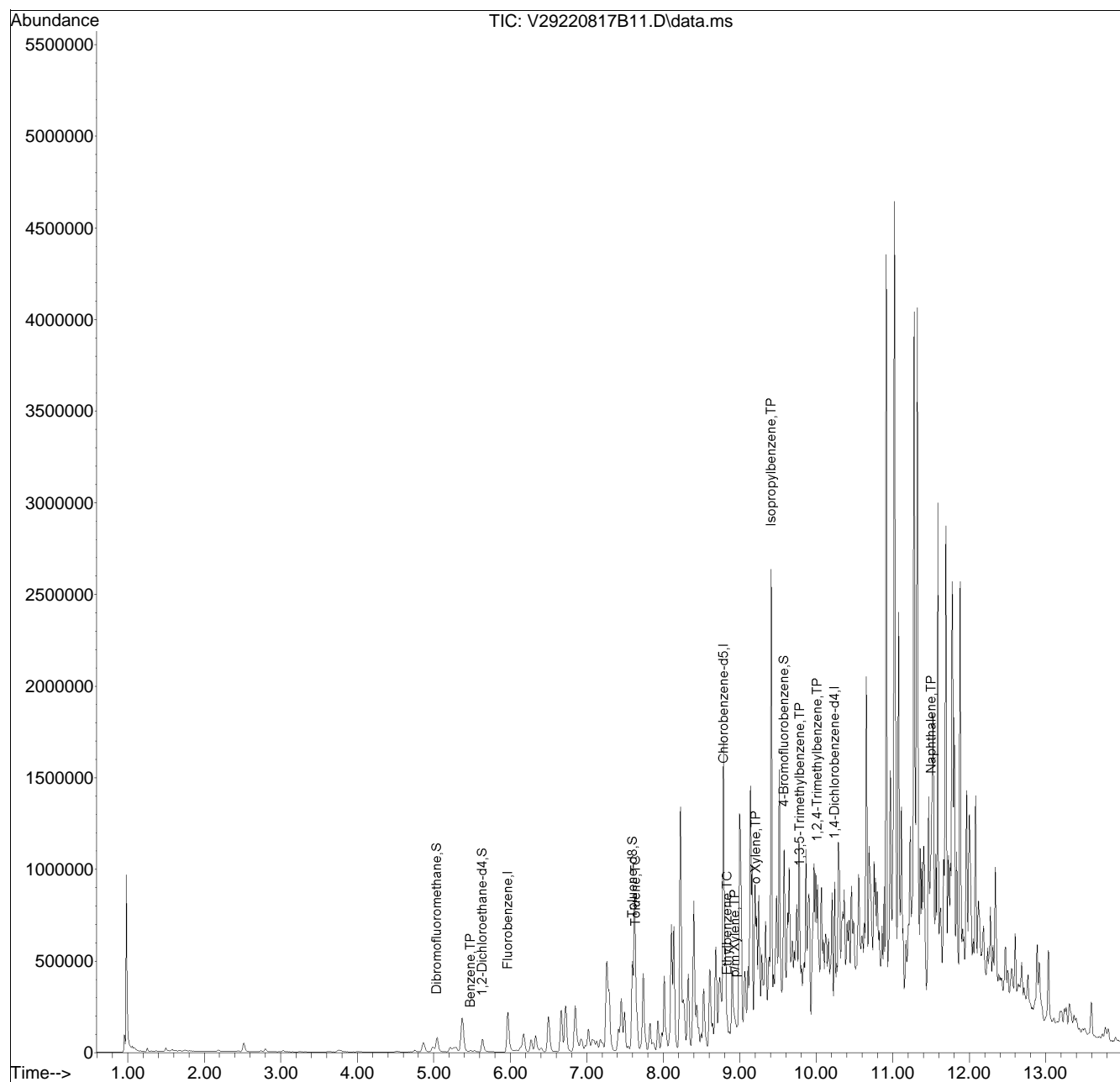
For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA129\2022\220817B\
 Data File : V29220817B11.D
 Acq On : 17 Aug 2022 01:28 pm
 Operator : VOA129:AJK
 Sample : 12243874-02,31,34.63,5,,b
 Misc : WG1676803,ICAL19173
 ALS Vial : 11 Sample Multiplier: 1

Quant Time: Aug 18 09:27:42 2022
 Quant Method : I:\VOLATILES\VOA129\2022\220817B\V129_220712N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Thu Jul 14 08:00:36 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list17B\V29220817B01.D•





ANALYTICAL REPORT

Lab Number:	L2272207
Client:	Terraphase Engineering Inc. 100 Canal Pointe Boulevard Suite 108 Princeton, NJ 08540
ATTN:	Nick Scala
Phone:	(609) 236-8171
Project Name:	FORMER PHILADELPHIA REFINERY
Project Number:	P044.001.002
Report Date:	01/09/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2272207-01	TG07-MW-03-3.0-3.5	SOIL	AST CLOSURE	12/21/22 09:30	12/22/22
L2272207-02	TG07-MW-03-3.0-3.5D	SOIL	AST CLOSURE	12/21/22 09:30	12/22/22
L2272207-03	TG07-MW-01-0.0-0.5	SOIL	AST CLOSURE	12/21/22 11:05	12/22/22
L2272207-04	TG07-MW-07-4.0-4.5	SOIL	AST CLOSURE	12/21/22 12:45	12/22/22
L2272207-05	TG07-MW-07-4.5-5.0	SOIL	AST CLOSURE	12/21/22 12:50	12/22/22
L2272207-06	TG07-MW-05-4.5-5.0	SOIL	AST CLOSURE	12/21/22 13:35	12/22/22
L2272207-07	TG07-MW-05-4.0-4.5	SOIL	AST CLOSURE	12/21/22 13:40	12/22/22
L2272207-08	GPR-799-03R-3.5-4.0	SOIL	AST CLOSURE	12/21/22 14:45	12/22/22
L2272207-09	GPR-799-03R-3.0-3.5	SOIL	AST CLOSURE	12/21/22 14:50	12/22/22
L2272207-10	TG07-MW-06-4.0-4.5	SOIL	AST CLOSURE	12/22/22 08:30	12/22/22
L2272207-11	TG07-MW-06-4.5-5.0	SOIL	AST CLOSURE	12/22/22 08:35	12/22/22
L2272207-12	TB-221222-1	WATER	AST CLOSURE	12/22/22 00:00	12/22/22

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Case Narrative (continued)

Report Submission

January 09, 2023: This final report includes the results of the Volatile Organics and Semivolatile Organics analyses performed on L2272207-05, -06, -08, and -11. In addition, the Client IDs were amended on L2272207-08 and -09.

December 30, 2022: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2272207-04: The internal standard (IS) response for fluorobenzene (319%) and the surrogate recoveries for dibromofluoromethane (31%), 1,2-dichloroethane-d4 (139%), toluene-d8 (133%) and 4-bromofluorobenzene (466%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. The sample was re-analyzed on a larger dilution in order to quantitate results within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial analysis; however, since the IS response was above method criteria, all associated compounds and surrogate recoveries are considered to have a potentially low bias. The results of both analyses are reported.

L2272207-07D: The surrogate recoveries were outside the acceptance criteria for dibromofluoromethane (68%) and 4-bromofluorobenzene (320%); however, re-analysis on a larger dilution was required in order to quantitate the sample within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial analysis. The results of both analyses are reported; however, all associated compounds are considered to have a potential bias. A copy of the chromatogram is included as an attachment to this report.

L2272207-09: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (154%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Case Narrative (continued)

L2272207-10D: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (139%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

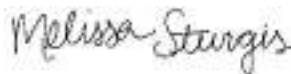
Semivolatile Organics

L2272207-03: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2272207-04D, -06D, -07D, -08D, -09D, and -11D: The sample has elevated detection limits due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 01/09/23

ORGANICS

VOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-01
 Client ID: TG07-MW-03-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 00:52
 Analyst: NLK
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0021	0.00021	1
Benzene	0.036		mg/kg	0.00052	0.00017	1
Toluene	ND		mg/kg	0.0010	0.00056	1
Ethylbenzene	ND		mg/kg	0.0010	0.00014	1
p/m-Xylene	0.0010	J	mg/kg	0.0021	0.00058	1
o-Xylene	0.00084	J	mg/kg	0.0010	0.00030	1
Xylenes, Total	0.0018	J	mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.0068		mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0021	0.00020	1
1,2,4-Trimethylbenzene	0.0026		mg/kg	0.0021	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-02
 Client ID: TG07-MW-03-3.0-3.5D
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 01:45
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	ND		mg/kg	0.00050	0.00016	1
Toluene	ND		mg/kg	0.00099	0.00054	1
Ethylbenzene	ND		mg/kg	0.00099	0.00014	1
p/m-Xylene	0.00099	J	mg/kg	0.0020	0.00055	1
o-Xylene	0.00087	J	mg/kg	0.00099	0.00029	1
Xylenes, Total	0.0019	J	mg/kg	0.00099	0.00029	1
Isopropylbenzene	0.0074		mg/kg	0.00099	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019	1
1,2,4-Trimethylbenzene	0.0018	J	mg/kg	0.0020	0.00033	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	102		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-03
 Client ID: TG07-MW-01-0.0-0.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 11:05
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 01:19
 Analyst: NLK
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0017	0.00017	1
Benzene	0.0088		mg/kg	0.00043	0.00014	1
Toluene	ND		mg/kg	0.00086	0.00047	1
Ethylbenzene	ND		mg/kg	0.00086	0.00012	1
p/m-Xylene	0.00084	J	mg/kg	0.0017	0.00048	1
o-Xylene	0.00071	J	mg/kg	0.00086	0.00025	1
Xylenes, Total	0.0016	J	mg/kg	0.00086	0.00025	1
Isopropylbenzene	ND		mg/kg	0.00086	0.00009	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0017	0.00017	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0017	0.00029	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	103		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-04
 Client ID: TG07-MW-07-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 03:57
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.11	0.011	1
Benzene	80.	E	mg/kg	0.028	0.0093	1
Toluene	150	E	mg/kg	0.056	0.030	1
Ethylbenzene	48.	E	mg/kg	0.056	0.0079	1
p/m-Xylene	130	E	mg/kg	0.11	0.032	1
o-Xylene	45.	E	mg/kg	0.056	0.016	1
Isopropylbenzene	130	E	mg/kg	0.056	0.0061	1
1,3,5-Trimethylbenzene	56.	E	mg/kg	0.11	0.011	1
1,2,4-Trimethylbenzene	77.	E	mg/kg	0.11	0.019	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	139	Q	70-130
Toluene-d8	133	Q	70-130
4-Bromofluorobenzene	466	Q	70-130
Dibromofluoromethane	31	Q	70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-04 D
 Client ID: TG07-MW-07-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/30/22 08:33
 Analyst: NLK
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	22	2.3	200
Benzene	2500		mg/kg	5.6	1.9	200
Toluene	240		mg/kg	11	6.1	200
Ethylbenzene	48.		mg/kg	11	1.6	200
p/m-Xylene	240		mg/kg	22	6.3	200
o-Xylene	54.		mg/kg	11	3.3	200
Xylenes, Total	290		mg/kg	11	3.3	200
Isopropylbenzene	750		mg/kg	11	1.2	200
1,3,5-Trimethylbenzene	57.		mg/kg	22	2.2	200
1,2,4-Trimethylbenzene	140		mg/kg	22	3.8	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	97		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-05 D2
 Client ID: TG07-MW-07-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/04/23 19:35
 Analyst: AJK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	3700		mg/kg	29	9.7	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	94		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-05 D
 Client ID: TG07-MW-07-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/04/23 14:02
 Analyst: MKS
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	12	1.2	100
Benzene	4500	E	mg/kg	2.9	0.97	100
Toluene	540		mg/kg	5.8	3.2	100
Ethylbenzene	93.		mg/kg	5.8	0.82	100
p/m-Xylene	460		mg/kg	12	3.3	100
o-Xylene	100		mg/kg	5.8	1.7	100
Xylenes, Total	560		mg/kg	5.8	1.7	100
Isopropylbenzene	1600		mg/kg	5.8	0.64	100
1,3,5-Trimethylbenzene	140		mg/kg	12	1.1	100
1,2,4-Trimethylbenzene	330		mg/kg	12	1.9	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	94		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-06 D2
 Client ID: TG07-MW-05-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/04/23 12:59
 Analyst: MKS
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	1700		mg/kg	4.9	1.6	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-06 D
 Client ID: TG07-MW-05-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/02/23 21:52
 Analyst: JIC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	9.9	0.99	100
Benzene	1800	E	mg/kg	2.5	0.82	100
Toluene	230		mg/kg	4.9	2.7	100
Ethylbenzene	12.		mg/kg	4.9	0.70	100
p/m-Xylene	57.		mg/kg	9.9	2.8	100
o-Xylene	9.2		mg/kg	4.9	1.4	100
Xylenes, Total	66.		mg/kg	4.9	1.4	100
Isopropylbenzene	99.		mg/kg	4.9	0.54	100
1,3,5-Trimethylbenzene	14.		mg/kg	9.9	0.95	100
1,2,4-Trimethylbenzene	27.		mg/kg	9.9	1.6	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	97		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-07 D2
 Client ID: TG07-MW-05-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:40
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/30/22 08:14
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	24	2.4	200
Benzene	2300		mg/kg	5.9	2.0	200
Toluene	350		mg/kg	12	6.4	200
Ethylbenzene	25.		mg/kg	12	1.6	200
p/m-Xylene	120		mg/kg	24	6.6	200
o-Xylene	21.		mg/kg	12	3.4	200
Xylenes, Total	140		mg/kg	0.12	0.034	200
Isopropylbenzene	240		mg/kg	12	1.3	200
1,3,5-Trimethylbenzene	33.		mg/kg	24	2.3	200
1,2,4-Trimethylbenzene	65.		mg/kg	24	3.9	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-07 D
 Client ID: TG07-MW-05-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:40
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 04:23
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.24	0.024	2
Benzene	290	E	mg/kg	0.059	0.020	2
Toluene	300	E	mg/kg	0.12	0.064	2
Ethylbenzene	26.		mg/kg	0.12	0.016	2
p/m-Xylene	110	E	mg/kg	0.24	0.066	2
o-Xylene	18.		mg/kg	0.12	0.034	2
Isopropylbenzene	150	E	mg/kg	0.12	0.013	2
1,3,5-Trimethylbenzene	35.		mg/kg	0.24	0.023	2
1,2,4-Trimethylbenzene	70.	E	mg/kg	0.24	0.039	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	114		70-130
4-Bromofluorobenzene	320	Q	70-130
Dibromofluoromethane	68	Q	70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-08
 Client ID: GPR-799-03R-3.5-4.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/04/23 14:23
 Analyst: MKS
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.16	0.016	1
Benzene	1.2		mg/kg	0.040	0.013	1
Toluene	0.44		mg/kg	0.079	0.043	1
Ethylbenzene	0.13		mg/kg	0.079	0.011	1
p/m-Xylene	0.43		mg/kg	0.16	0.044	1
o-Xylene	0.098		mg/kg	0.079	0.023	1
Xylenes, Total	0.53		mg/kg	0.079	0.023	1
Isopropylbenzene	8.2		mg/kg	0.079	0.0086	1
1,3,5-Trimethylbenzene	0.63		mg/kg	0.16	0.015	1
1,2,4-Trimethylbenzene	0.80		mg/kg	0.16	0.026	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	113		70-130
4-Bromofluorobenzene	118		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-09
 Client ID: GPR-799-03R-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 21:15
 Analyst: NLK
 Percent Solids: 83%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.12	0.012	1
Benzene	2.6		mg/kg	0.031	0.010	1
Toluene	0.089		mg/kg	0.062	0.034	1
Ethylbenzene	0.025	J	mg/kg	0.062	0.0088	1
p/m-Xylene	0.16		mg/kg	0.12	0.035	1
o-Xylene	0.11		mg/kg	0.062	0.018	1
Xylenes, Total	0.27		mg/kg	0.062	0.018	1
Isopropylbenzene	0.78		mg/kg	0.062	0.0068	1
1,3,5-Trimethylbenzene	0.018	J	mg/kg	0.12	0.012	1
1,2,4-Trimethylbenzene	0.043	J	mg/kg	0.12	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	154	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-10 D2
 Client ID: TG07-MW-06-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/29/22 22:40
 Analyst: NLK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	170		mg/kg	6.2	2.0	200
Isopropylbenzene	3400		mg/kg	12	1.3	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	105		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-10 D
 Client ID: TG07-MW-06-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 22:34
 Analyst: NLK
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.2	0.12	10
Benzene	220	E	mg/kg	0.31	0.10	10
Toluene	3.6		mg/kg	0.62	0.33	10
Ethylbenzene	2.7		mg/kg	0.62	0.087	10
p/m-Xylene	2.1		mg/kg	1.2	0.34	10
o-Xylene	0.53	J	mg/kg	0.62	0.18	10
Xylenes, Total	2.6	J	mg/kg	0.62	0.18	10
Isopropylbenzene	1400	E	mg/kg	0.62	0.067	10
1,3,5-Trimethylbenzene	0.28	J	mg/kg	1.2	0.12	10
1,2,4-Trimethylbenzene	4.9		mg/kg	1.2	0.20	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	139	Q	70-130
Dibromofluoromethane	88		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-11 D2
 Client ID: TG07-MW-06-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/04/23 13:20
 Analyst: MKS
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1900		mg/kg	12	1.3	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-11 D
 Client ID: TG07-MW-06-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/02/23 22:12
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	12	1.2	100
Benzene	140		mg/kg	3.0	0.99	100
Toluene	3.8	J	mg/kg	6.0	3.2	100
Ethylbenzene	1.0	J	mg/kg	6.0	0.84	100
p/m-Xylene	ND		mg/kg	12	3.4	100
o-Xylene	ND		mg/kg	6.0	1.7	100
Xylenes, Total	ND		mg/kg	6.0	1.7	100
Isopropylbenzene	2000	E	mg/kg	6.0	0.65	100
1,3,5-Trimethylbenzene	ND		mg/kg	12	1.2	100
1,2,4-Trimethylbenzene	2.8	J	mg/kg	12	2.0	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	103		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-12
 Client ID: TB-221222-1
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 00:00
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 12/28/22 09:04
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	0.75	0.20	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	111		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 12/27/22 20:03
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 01-03 Batch: WG1727950-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
Toluene	ND		mg/kg	0.0010	0.00054
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 12/27/22 20:03
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04,07 Batch: WG1728132-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 12/28/22 06:25
Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 12 Batch: WG1728159-12					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	107		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260D
 Analytical Date: 12/28/22 17:15
 Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 09-10 Batch: WG1728506-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	0.011	J	mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	0.045	J	mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	96		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 12/30/22 07:53
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 04,07 Batch: WG1728860-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	105		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 12/29/22 17:46
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 10 Batch: WG1728863-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	104		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/02/23 15:41
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 06,11 Batch: WG1729546-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	108		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8260D
 Analytical Date: 01/04/23 09:51
 Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 05-06,08,11 Batch: WG1730273-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	107		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 01/04/23 18:25
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 05 Batch: WG1730287-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	98		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2272207

Project Number: P044.001.002

Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 01-03 Batch: WG1727950-3 WG1727950-4								
Methyl tert butyl ether	107		110		66-130	3		30
Benzene	113		114		70-130	1		30
Toluene	109		110		70-130	1		30
Ethylbenzene	117		118		70-130	1		30
p/m-Xylene	104		105		70-130	1		30
o-Xylene	101		103		70-130	2		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	114		114		70-130	0		30
1,2,4-Trimethylbenzene	115		114		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		96		70-130
Toluene-d8	102		101		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	94		95		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04,07 Batch: WG1728132-3 WG1728132-4								
Methyl tert butyl ether	107		110		66-130	3		30
Benzene	113		114		70-130	1		30
Toluene	109		110		70-130	1		30
Ethylbenzene	117		118		70-130	1		30
p/m-Xylene	104		105		70-130	1		30
o-Xylene	101		103		70-130	2		30
Isopropylbenzene	104		104		70-130	0		30
1,3,5-Trimethylbenzene	114		114		70-130	0		30
1,2,4-Trimethylbenzene	115		114		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		96		70-130
Toluene-d8	102		101		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	94		95		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 12 Batch: WG1728159-10 WG1728159-11								
Methyl tert butyl ether	85		87		63-130	2		20
Benzene	93		96		70-130	3		20
Toluene	92		94		70-130	2		20
Ethylbenzene	95		97		70-130	2		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
Isopropylbenzene	96		100		70-130	4		20
1,3,5-Trimethylbenzene	87		91		64-130	4		20
1,2,4-Trimethylbenzene	85		90		70-130	6		20

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	108		108		70-130
Toluene-d8	104		104		70-130
4-Bromofluorobenzene	108		108		70-130
Dibromofluoromethane	103		101		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 09-10 Batch: WG1728506-3 WG1728506-4								
Methyl tert butyl ether	98		98		66-130	0		30
Benzene	104		102		70-130	2		30
Toluene	105		102		70-130	3		30
Ethylbenzene	111		108		70-130	3		30
p/m-Xylene	102		99		70-130	3		30
o-Xylene	101		98		70-130	3		30
Isopropylbenzene	97		95		70-130	2		30
1,3,5-Trimethylbenzene	108		105		70-130	3		30
1,2,4-Trimethylbenzene	109		106		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	92		92		70-130
Toluene-d8	103		102		70-130
4-Bromofluorobenzene	105		105		70-130
Dibromofluoromethane	91		92		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 04,07 Batch: WG1728860-3 WG1728860-4								
Methyl tert butyl ether	93		92		66-130	1		30
Benzene	98		92		70-130	6		30
Toluene	96		92		70-130	4		30
Ethylbenzene	98		93		70-130	5		30
p/m-Xylene	100		96		70-130	4		30
o-Xylene	98		95		70-130	3		30
Isopropylbenzene	97		93		70-130	4		30
1,3,5-Trimethylbenzene	98		95		70-130	3		30
1,2,4-Trimethylbenzene	96		95		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	95		96		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	97		100		70-130
Dibromofluoromethane	99		99		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 10 Batch: WG1728863-3 WG1728863-4								
Methyl tert butyl ether	93		94		66-130	1		30
Benzene	97		97		70-130	0		30
Toluene	97		97		70-130	0		30
Ethylbenzene	98		100		70-130	2		30
p/m-Xylene	100		102		70-130	2		30
o-Xylene	99		100		70-130	1		30
Isopropylbenzene	98		98		70-130	0		30
1,3,5-Trimethylbenzene	99		99		70-130	0		30
1,2,4-Trimethylbenzene	98		98		70-130	0		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	96		97		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	99		98		70-130
Dibromofluoromethane	97		96		70-130



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 06,11 Batch: WG1729546-3 WG1729546-4								
Methyl tert butyl ether	100		96		66-130	4		30
Benzene	101		95		70-130	6		30
Toluene	98		93		70-130	5		30
Ethylbenzene	99		93		70-130	6		30
p/m-Xylene	102		95		70-130	7		30
o-Xylene	101		95		70-130	6		30
Isopropylbenzene	97		91		70-130	6		30
1,3,5-Trimethylbenzene	99		93		70-130	6		30
1,2,4-Trimethylbenzene	99		93		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	95		96		70-130
Toluene-d8	99		98		70-130
4-Bromofluorobenzene	98		98		70-130
Dibromofluoromethane	98		98		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2272207

Project Number: P044.001.002

Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 05-06,08,11 Batch: WG1730273-3 WG1730273-4								
Methyl tert butyl ether	99		101		66-130	2		30
Benzene	96		100		70-130	4		30
Toluene	96		98		70-130	2		30
Ethylbenzene	97		99		70-130	2		30
p/m-Xylene	98		100		70-130	2		30
o-Xylene	99		100		70-130	1		30
Isopropylbenzene	98		102		70-130	4		30
1,3,5-Trimethylbenzene	100		102		70-130	2		30
1,2,4-Trimethylbenzene	99		102		70-130	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	99		101		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	100		100		70-130
Dibromofluoromethane	102		101		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 05 Batch: WG1730287-3 WG1730287-4								
Methyl tert butyl ether	89		90		66-130	1		30
Benzene	90		90		70-130	0		30
Toluene	90		88		70-130	2		30
Ethylbenzene	92		90		70-130	2		30
p/m-Xylene	92		89		70-130	3		30
o-Xylene	88		86		70-130	2		30
Isopropylbenzene	92		90		70-130	2		30
1,3,5-Trimethylbenzene	92		90		70-130	2		30
1,2,4-Trimethylbenzene	88		87		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	100		100		70-130
Toluene-d8	106		106		70-130
4-Bromofluorobenzene	106		108		70-130
Dibromofluoromethane	94		94		70-130



SEMIVOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-01
 Client ID: TG07-MW-03-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/27/22 14:02
 Analyst: MG
 Percent Solids: 87%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.081		mg/kg	0.038	0.023	1
Benzo(a)pyrene	0.067	J	mg/kg	0.15	0.046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	121	Q	23-120
2-Fluorobiphenyl	63		30-120
4-Terphenyl-d14	50		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-02
 Client ID: TG07-MW-03-3.0-3.5D
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/27/22 14:26
 Analyst: MG
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.098		mg/kg	0.038	0.023	1
Benzo(a)pyrene	0.085	J	mg/kg	0.15	0.046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	134	Q	23-120
2-Fluorobiphenyl	75		30-120
4-Terphenyl-d14	57		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-03
 Client ID: TG07-MW-01-0.0-0.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 11:05
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/27/22 14:50
 Analyst: MG
 Percent Solids: 87%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	ND		mg/kg	0.11	0.070	1
Benzo(a)pyrene	0.62		mg/kg	0.46	0.14	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	71		23-120
2-Fluorobiphenyl	57		30-120
4-Terphenyl-d14	49		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-04 D
 Client ID: TG07-MW-07-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/30/22 07:02
 Analyst: CMM
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	36.		mg/kg	0.39	0.24	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.47	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	163	Q	23-120
2-Fluorobiphenyl	74		30-120
4-Terphenyl-d14	61		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-05 D
 Client ID: TG07-MW-07-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/03/23 16:59
 Analyst: CMM
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 12/31/22 00:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	52.		mg/kg	0.38	0.23	10
Benzo(a)pyrene	ND		mg/kg	1.5	0.47	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	479	Q	23-120
2-Fluorobiphenyl	88		30-120
4-Terphenyl-d14	87		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-06 D
 Client ID: TG07-MW-05-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/03/23 17:23
 Analyst: CMM
 Percent Solids: 87%

Extraction Method: EPA 3546
 Extraction Date: 12/31/22 00:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	5.0		mg/kg	0.19	0.12	5
Benzo(a)pyrene	ND		mg/kg	0.77	0.23	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	88		23-120
2-Fluorobiphenyl	67		30-120
4-Terphenyl-d14	81		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-07 D
 Client ID: TG07-MW-05-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:40
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/30/22 06:39
 Analyst: CMM
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	7.5		mg/kg	0.19	0.12	5
Benzo(a)pyrene	ND		mg/kg	0.77	0.23	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	119		23-120
2-Fluorobiphenyl	80		30-120
4-Terphenyl-d14	75		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-08 D
 Client ID: GPR-799-03R-3.5-4.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/03/23 17:47
 Analyst: CMM
 Percent Solids: 93%

Extraction Method: EPA 3546
 Extraction Date: 12/31/22 00:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	2.2		mg/kg	0.18	0.11	5
Benzo(a)pyrene	0.58	J	mg/kg	0.71	0.22	5

Naphthalene	2.2		mg/kg	0.18	0.11	5
Benzo(a)pyrene	0.58	J	mg/kg	0.71	0.22	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	92		23-120
2-Fluorobiphenyl	79		30-120
4-Terphenyl-d14	85		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-09 D
 Client ID: GPR-799-03R-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/30/22 08:13
 Analyst: CMM
 Percent Solids: 83%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.36		mg/kg	0.20	0.12	5
Benzo(a)pyrene	1.1		mg/kg	0.80	0.24	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
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Nitrobenzene-d5	72		23-120
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2-Fluorobiphenyl	92		30-120
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4-Terphenyl-d14	89		18-120
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Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-10
 Client ID: TG07-MW-06-4.0-4.5
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 12/27/22 16:26
 Analyst: MG
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	5.4		mg/kg	0.037	0.022	1
Benzo(a)pyrene	0.18		mg/kg	0.15	0.045	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	163	Q	23-120
2-Fluorobiphenyl	57		30-120
4-Terphenyl-d14	58		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-11 D
 Client ID: TG07-MW-06-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/03/23 18:11
 Analyst: CMM
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 12/31/22 00:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.37		mg/kg	0.18	0.11	5
Benzo(a)pyrene	ND		mg/kg	0.73	0.22	5

Naphthalene	0.37		mg/kg	0.18	0.11	5
Benzo(a)pyrene	ND		mg/kg	0.73	0.22	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	64		30-120
4-Terphenyl-d14	78		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270E
Analytical Date: 12/27/22 11:14
Analyst: IM

Extraction Method: EPA 3546
Extraction Date: 12/23/22 22:26

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-04,07,09-10 Batch: WG1727281-1					
Naphthalene	ND		mg/kg	0.16	0.020
Benzo(a)pyrene	ND		mg/kg	0.13	0.040

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	115		23-120
2-Fluorobiphenyl	84		30-120
4-Terphenyl-d14	86		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270E
Analytical Date: 12/31/22 11:01
Analyst: CMM

Extraction Method: EPA 3546
Extraction Date: 12/31/22 00:38

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 05-06,08,11 Batch: WG1729046-1					
Naphthalene	ND		mg/kg	0.032	0.020
Benzo(a)pyrene	ND		mg/kg	0.13	0.040

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		23-120
2-Fluorobiphenyl	72		30-120
4-Terphenyl-d14	77		18-120



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2272207

Project Number: P044.001.002

Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-04,07,09-10 Batch: WG1727281-2 WG1727281-3								
Naphthalene	76		64		40-140	17		50
Benzo(a)pyrene	87		75		40-140	15		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	114		95		23-120
2-Fluorobiphenyl	83		70		30-120
4-Terphenyl-d14	81		68		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06,08,11 Batch: WG1729046-2 WG1729046-3								
Naphthalene	56		59		40-140	5		50
Benzo(a)pyrene	67		70		40-140	4		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	77		81		23-120
2-Fluorobiphenyl	60		62		30-120
4-Terphenyl-d14	64		65		18-120



INORGANICS & MISCELLANEOUS

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-01
 Client ID: TG07-MW-03-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.6		%	0.100	NA	1	-	12/23/22 11:31	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-02
 Client ID: TG07-MW-03-3.0-3.5D
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 09:30
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.6		%	0.100	NA	1	-	12/23/22 11:31	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-03
Client ID: TG07-MW-01-0.0-0.5
Sample Location: AST CLOSURE

Date Collected: 12/21/22 11:05
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.5		%	0.100	NA	1	-	12/23/22 11:31	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-04
Client ID: TG07-MW-07-4.0-4.5
Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:45
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.4		%	0.100	NA	1	-	12/23/22 11:31	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-05
Client ID: TG07-MW-07-4.5-5.0
Sample Location: AST CLOSURE

Date Collected: 12/21/22 12:50
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.7		%	0.100	NA	1	-	12/31/22 08:39	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-06
Client ID: TG07-MW-05-4.5-5.0
Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:35
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.6		%	0.100	NA	1	-	12/31/22 08:39	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-07
Client ID: TG07-MW-05-4.0-4.5
Sample Location: AST CLOSURE

Date Collected: 12/21/22 13:40
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	85.8		%	0.100	NA	1	-	12/23/22 11:40	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-08
 Client ID: GPR-799-03R-3.5-4.0
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:45
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	93.1		%	0.100	NA	1	-	12/31/22 08:39	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-09
 Client ID: GPR-799-03R-3.0-3.5
 Sample Location: AST CLOSURE

Date Collected: 12/21/22 14:50
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	82.6		%	0.100	NA	1	-	12/23/22 11:40	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-10
Client ID: TG07-MW-06-4.0-4.5
Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:30
Date Received: 12/22/22
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.0		%	0.100	NA	1	-	12/23/22 11:40	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

SAMPLE RESULTS

Lab ID: L2272207-11
 Client ID: TG07-MW-06-4.5-5.0
 Sample Location: AST CLOSURE

Date Collected: 12/22/22 08:35
 Date Received: 12/22/22
 Field Prep: Not Specified

Sample Depth:
 Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.6		%	0.100	NA	1	-	12/31/22 08:39	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Lab Number: L2272207

Report Date: 01/09/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1727081-1 QC Sample: L2272099-01 Client ID: DUP Sample						
Solids, Total	63.0	60.8	%	4		20
General Chemistry - Westborough Lab Associated sample(s): 07,09-10 QC Batch ID: WG1727086-1 QC Sample: L2272059-01 Client ID: DUP Sample						
Solids, Total	91.8	92.9	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 05-06,08,11 QC Batch ID: WG1729078-1 QC Sample: L2271969-20 Client ID: DUP Sample						
Solids, Total	45.2	44.4	%	2		20

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2272207**Project Number:** P044.001.002**Report Date:** 01/09/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2272207-01A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-01B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-01C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-01D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-01E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-01X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-01Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-01Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-02A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-02B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-02C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-02D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-02E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-02X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-02Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-02Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-03A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-03B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-03C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-03D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-03E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-03X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-03Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2272207**Project Number:** P044.001.002**Report Date:** 01/09/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2272207-03Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-04A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-04B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-04C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-04D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-04E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-04X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-04Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-04Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-05A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-05B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-05C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-05D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-05E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-05X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-05Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-05Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-06A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-06B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-06C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-06D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-06E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-06X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-06Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-06Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-07A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-07B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-07C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2272207**Project Number:** P044.001.002**Report Date:** 01/09/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2272207-07D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-07E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-07X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-07Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-07Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-08A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-08B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-08C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-08D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-08E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-08X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-08Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-08Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-09A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-09B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-09C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-09D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-09E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-09X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-09Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-09Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-10A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-10B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-10C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-10D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-10E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-10X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-10Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2272207**Project Number:** P044.001.002**Report Date:** 01/09/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2272207-10Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-11A	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-11B	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-11C	5 gram Encore Sampler	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-11D	Plastic 2oz unpreserved for TS	A	NA		4.0	Y	Absent		TS(7)
L2272207-11E	Glass 120ml/4oz unpreserved	A	NA		4.0	Y	Absent		PA-PAH(14)
L2272207-11X	Vial MeOH preserved split	A	NA		4.0	Y	Absent		PA-8260HLW(14)
L2272207-11Y	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-11Z	Vial Water preserved split	A	NA		4.0	Y	Absent	23-DEC-22 06:52	PA-8260HLW(14)
L2272207-12A	Vial HCl preserved	A	NA		4.0	Y	Absent		PA-8260(14)
L2272207-12B	Vial HCl preserved	A	NA		4.0	Y	Absent		PA-8260(14)

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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2272207
Report Date: 01/09/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

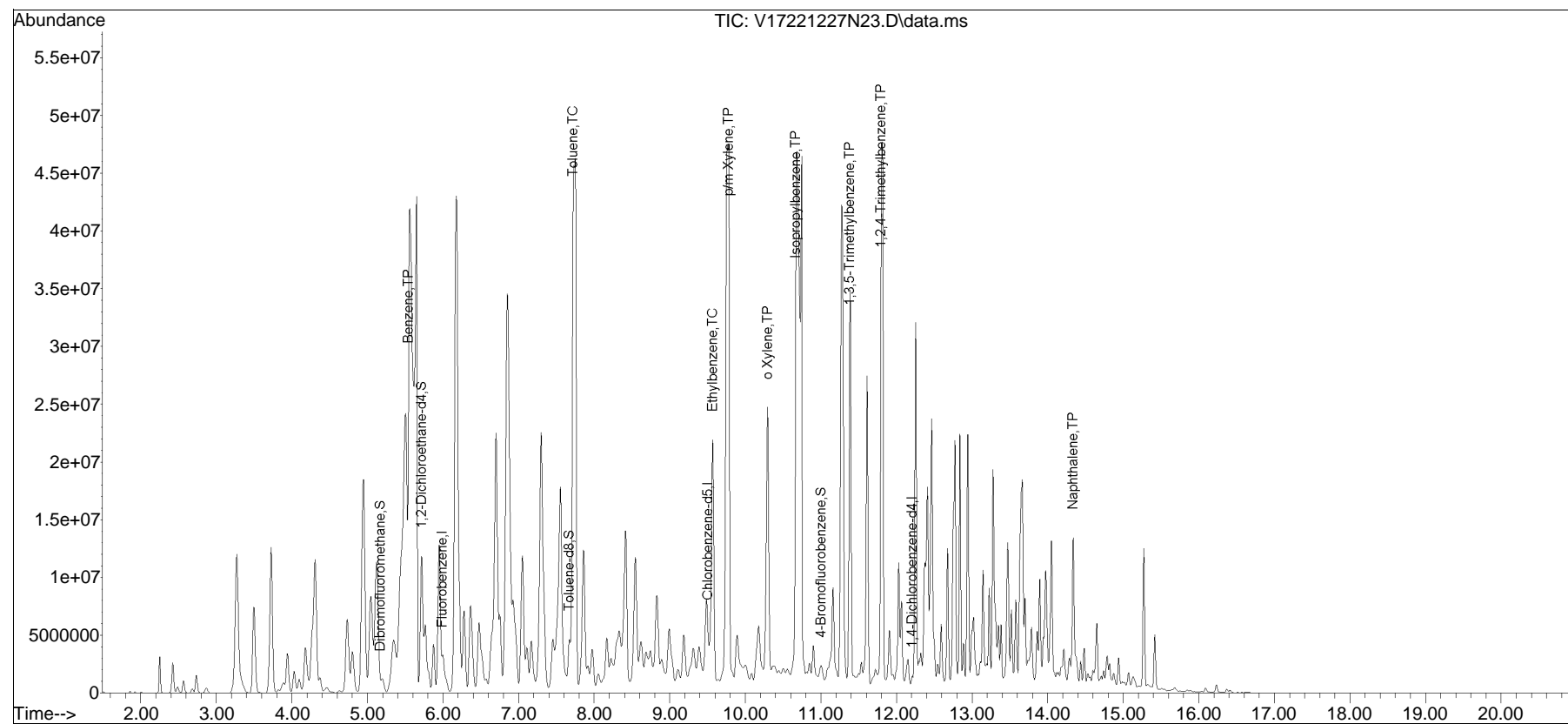
For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA117\2022\221227N\
Data File : V17221227N23.D
Acq On : 28 Dec 2022 03:57 am
Operator : VOA117:NLK
Sample : 12272207-04,31h,6.30,5,0.100,,x,r2f
Misc : WG1728132,ICAL19514
ALS Vial : 23 Sample Multiplier: 1

Quant Time: Dec 28 12:41:56 2022
Quant Method : I:\VOLATILES\VOA117\2022\221227N\V117_221121N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Tue Nov 22 14:12:03 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list27N\V17221227N01.D•

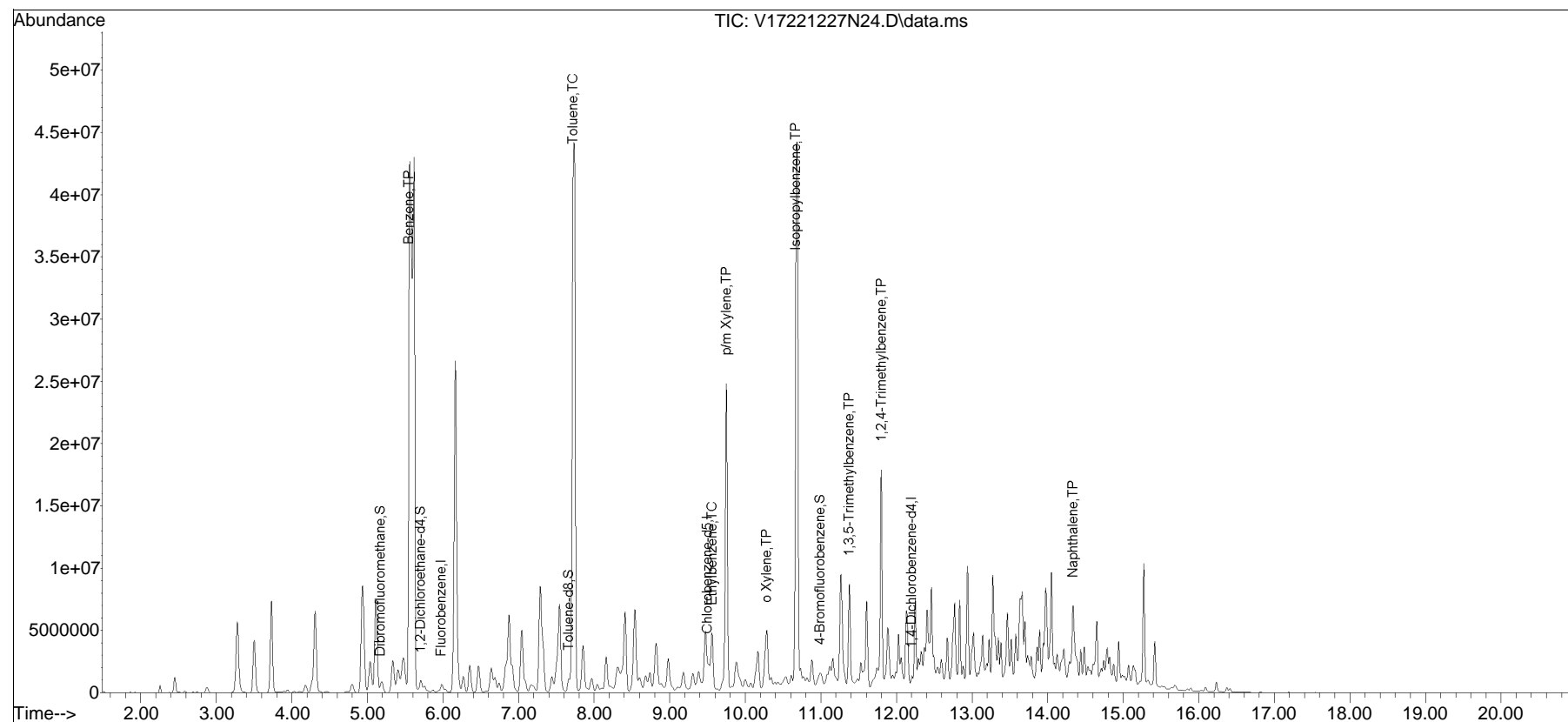


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA117\2022\221227N\
Data File : V17221227N24.D
Acq On : 28 Dec 2022 04:23 am
Operator : VOA117:NLK
Sample : 12272207-07D,31h,5.76,5,0.050,,x,r2f
Misc : WG1728132,ICAL19514
ALS Vial : 24 Sample Multiplier: 1

Quant Time: Dec 28 12:43:29 2022
Quant Method : I:\VOLATILES\VOA117\2022\221227N\V117_221121N_8260.m
Quant Title : VOLATILES BY GC/MS
QLast Update : Tue Nov 22 14:12:03 2022
Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list27N\V17221227N01.D•

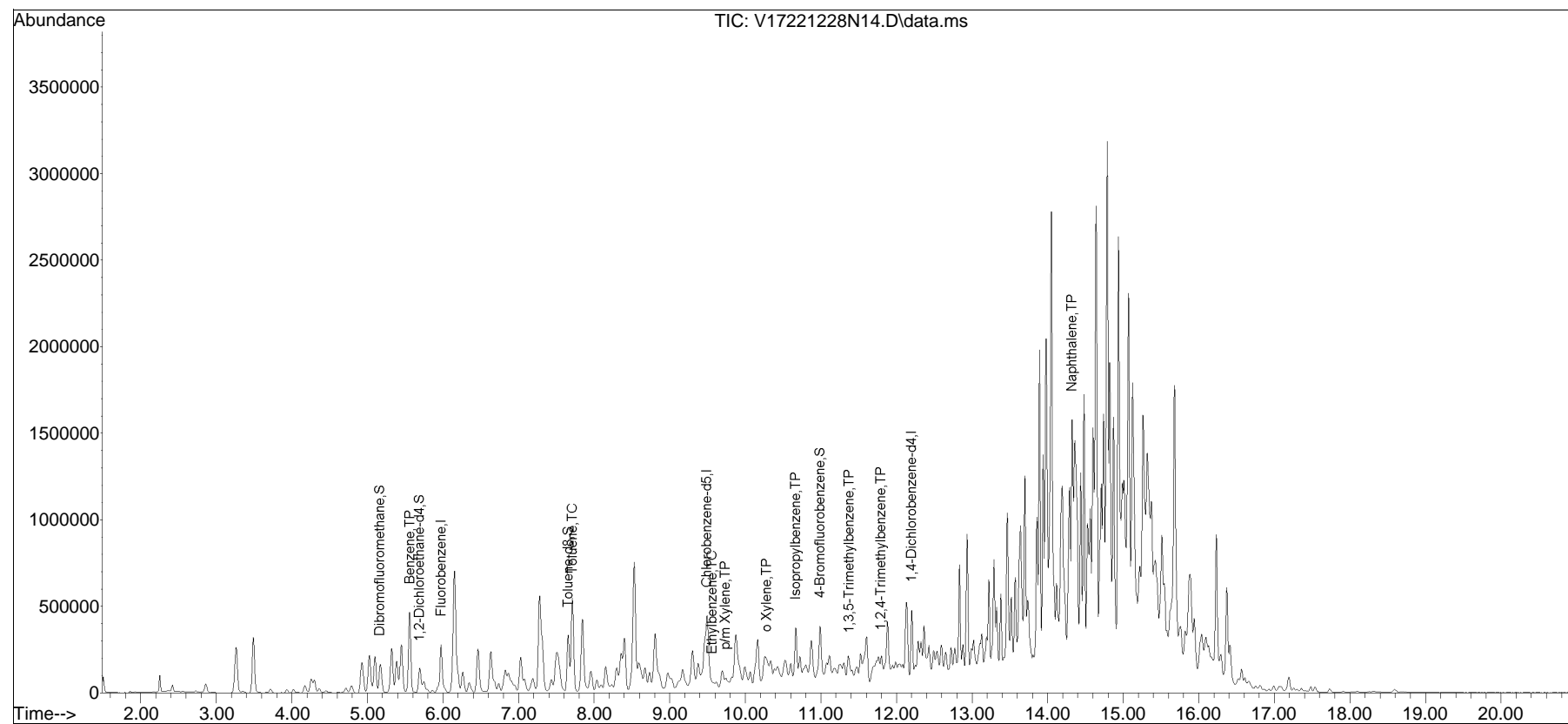


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA117\2022\221228N\
 Data File : V17221228N14.D
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 Operator : VOA117:NLK
 Sample : 12272207-09,31h,5.86,5,0.100,,x,r2f
 Misc : WG1728506,ICAL19514
 ALS Vial : 14 Sample Multiplier: 1

Quant Time: Dec 29 10:54:02 2022
 Quant Method : I:\VOLATILES\VOA117\2022\221228N\V117_221121N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Tue Nov 22 14:12:03 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list28N\V17221228N01.D•

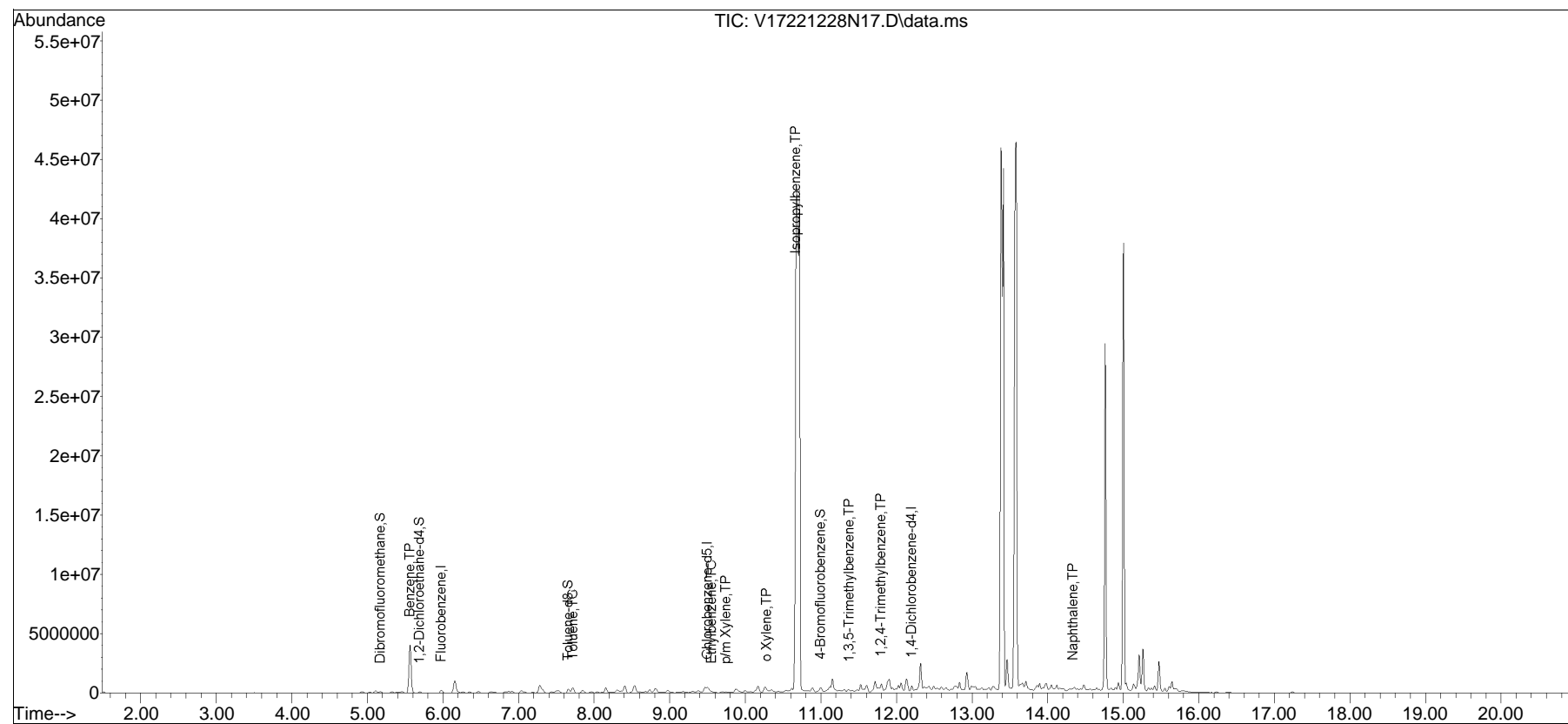


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA117\2022\221228N\
 Data File : V17221228N17.D
 Acq On : 28 Dec 2022 10:34 pm
 Operator : VOA117:NLK
 Sample : 12272207-10d,31h,4.96,5,0.01,,x,r2f
 Misc : WG1728506,ICAL19514
 ALS Vial : 17 Sample Multiplier: 1

Quant Time: Dec 29 10:58:13 2022
 Quant Method : I:\VOLATILES\VOA117\2022\221228N\V117_221121N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Tue Nov 22 14:12:03 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list28N\V17221228N01.D•





ANALYTICAL REPORT

Lab Number:	L2300364
Client:	Terraphase Engineering Inc. 1100 East Hector Street Suite 416 Conshohocken, PA 19428
ATTN:	Nick Scala
Phone:	(215) 297-3502
Project Name:	FORMER PHILADELPHIA REFINERY
Project Number:	P044.001.002
Report Date:	01/06/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2300364-01	TG04-MW-03-230104	WATER	3144 W PASSYUNK AVE.	01/04/23 09:40	01/04/23
L2300364-02	TG04-MW-03-230104D	WATER	3144 W PASSYUNK AVE.	01/04/23 09:40	01/04/23
L2300364-03	TG07-MW-02-230104	WATER	3144 W PASSYUNK AVE.	01/04/23 13:20	01/04/23
L2300364-04	TB-230104-2	WATER	3144 W PASSYUNK AVE.	01/04/23 00:00	01/04/23
L2300364-05	FB-230104-2	WATER	3144 W PASSYUNK AVE.	01/04/23 11:10	01/04/23
L2300364-06	TG07-MW-03-230104	WATER	3144 W PASSYUNK AVE.	01/04/23 14:05	01/04/23

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

The analyses performed were specified by the client.

Volatile Organics

L2300364-03 and WG1730461-6/-7: The pH was greater than two; however, the sample was analyzed within the method required holding time.

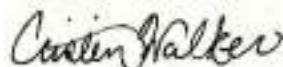
Microextractables

The WG1730299-2 LCS recovery for 1,2-dibromoethane (130%), associated with L2300364-01 through -06, is outside Alpha's acceptance criteria, but within the acceptance criteria specified in the method.

The WG1730299-4 MSD recovery for 1,2-dibromoethane (125%), performed on L2300364-03, is outside Alpha's acceptance criteria, but within the acceptance criteria specified in the method.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Cristin Walker

Title: Technical Director/Representative

Date: 01/06/23

ORGANICS

VOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-01
 Client ID: TG04-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 12:32
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-01
 Client ID: TG04-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 11:27
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-02
 Client ID: TG04-MW-03-230104D
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 12:40
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-02
 Client ID: TG04-MW-03-230104D
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 11:53
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	99		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-03
 Client ID: TG07-MW-02-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 13:20
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 12:49
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-03
 Client ID: TG07-MW-02-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 13:20
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 12:18
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	0.36	J	ug/l	1.0	0.17	1
Benzene	17		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	1.4		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	0.42	J	ug/l	0.50	0.17	1
p/m-Xylene	0.73	J	ug/l	1.0	0.33	1
o-Xylene	0.80	J	ug/l	1.0	0.39	1
Xylenes, Total	1.5	J	ug/l	1.0	0.33	1
Isopropylbenzene	67		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	0.24	J	ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	0.50	J	ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	94		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-04
 Client ID: TB-230104-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 00:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 12:57
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-04
 Client ID: TB-230104-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 00:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 10:35
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-05
 Client ID: FB-230104-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 11:10
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:
 Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 13:05
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-05
 Client ID: FB-230104-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 11:10
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 11:01
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-06
 Client ID: TG07-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 14:05
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/05/23 13:13
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-06
 Client ID: TG07-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 14:05
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 12:45
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	0.36	J	ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	0.23	J	ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	0.67	J	ug/l	1.0	0.33	1
o-Xylene	0.55	J	ug/l	1.0	0.39	1
Xylenes, Total	1.2	J	ug/l	1.0	0.33	1
Isopropylbenzene	4.0		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	3.4		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	95		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 01/05/23 11:42
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 01/05/23 10:44

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01-06 Batch: WG1730299-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/05/23 09:43
Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-06 Batch: WG1730461-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
1,2-Dibromoethane	ND		ug/l	2.0	0.19
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	97		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 01-06 Batch: WG1730299-2									
1,2-Dibromoethane	130	Q	-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 Batch: WG1730461-3 WG1730461-4								
Methyl tert butyl ether	97		95		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	110		100		70-130	10		20
1,2-Dibromoethane	100		100		70-130	0		20
Ethylbenzene	110		100		70-130	10		20
p/m-Xylene	110		105		70-130	5		20
o-Xylene	105		105		70-130	0		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		100		70-130	10		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	96		96		70-130
Dibromofluoromethane	98		96		70-130

Matrix Spike Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab TG07-MW-02-230104 Associated sample(s): 01-06 QC Batch ID: WG1730299-3 WG1730299-4 QC Sample: L2300364-03 Client ID:													
1,2-Dibromoethane	ND	0.247	0.276	112		0.314	125	Q	80-120	13		20	A



Matrix Spike Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG1730461-6 WG1730461-7 QC Sample: L2300364-03 Client ID: TG07-MW-02-230104												
Methyl tert butyl ether	0.36J	10	9.7	97		9.8	98		63-130	1		20
Benzene	17	10	27	100		27	100		70-130	0		20
1,2-Dichloroethane	ND	10	10	100		10	100		70-130	0		20
Toluene	1.4	10	12	106		12	106		70-130	0		20
1,2-Dibromoethane	ND	10	10	100		10	100		70-130	0		20
Ethylbenzene	0.42J	10	11	110		11	110		70-130	0		20
p/m-Xylene	0.73J	20	22	110		22	110		70-130	0		20
o-Xylene	0.80J	20	22	110		22	110		70-130	0		20
Isopropylbenzene	67	10	72	50	Q	72	50	Q	70-130	0		20
1,3,5-Trimethylbenzene	0.24J	10	11	110		11	110		64-130	0		20
1,2,4-Trimethylbenzene	0.50J	10	11	110		11	110		70-130	0		20

<i>Surrogate</i>	<i>MS</i>		<i>MSD</i>		<i>Acceptance Criteria</i>
	<i>% Recovery</i>	<i>Qualifier</i>	<i>% Recovery</i>	<i>Qualifier</i>	
1,2-Dichloroethane-d4	98		97		70-130
4-Bromofluorobenzene	112		113		70-130
Dibromofluoromethane	95		94		70-130
Toluene-d8	102		102		70-130

SEMIVOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-01
 Client ID: TG04-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/05/23 15:25
 Analyst: DV

Extraction Method: EPA 3510C
 Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	ND		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	69		15-120
4-Terphenyl-d14	74		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-02
 Client ID: TG04-MW-03-230104D
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/05/23 15:42
 Analyst: DV

Extraction Method: EPA 3510C
 Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.03	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	100		23-120
2-Fluorobiphenyl	76		15-120
4-Terphenyl-d14	78		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-03
 Client ID: TG07-MW-02-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 13:20
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/05/23 15:09
 Analyst: DV

Extraction Method: EPA 3510C
 Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	0.90		ug/l	0.10	0.05	1
Fluorene	2.2		ug/l	0.10	0.01	1
Phenanthrene	1.8		ug/l	0.05	0.02	1
Anthracene	0.24		ug/l	0.10	0.01	1
Pyrene	0.36		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.11		ug/l	0.05	0.02	1
Chrysene	0.07	J	ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.07		ug/l	0.05	0.01	1
Benzo(a)pyrene	0.07	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.04	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	0.04	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	89		23-120
2-Fluorobiphenyl	68		15-120
4-Terphenyl-d14	60		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-05
 Client ID: FB-230104-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 11:10
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:
 Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/05/23 15:58
 Analyst: DV

Extraction Method: EPA 3510C
 Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	0.09	J	ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.04	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	92		23-120
2-Fluorobiphenyl	71		15-120
4-Terphenyl-d14	79		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-06
 Client ID: TG07-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 14:05
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/05/23 16:14
 Analyst: DV

Extraction Method: EPA 3510C
 Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	0.13		ug/l	0.10	0.05	1
Fluorene	0.58		ug/l	0.10	0.01	1
Phenanthrene	0.63		ug/l	0.05	0.02	1
Anthracene	0.10		ug/l	0.10	0.01	1
Pyrene	0.11		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.04	J	ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	82		23-120
2-Fluorobiphenyl	62		15-120
4-Terphenyl-d14	60		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270E-SIM
Analytical Date: 01/05/23 14:20
Analyst: DV

Extraction Method: EPA 3510C
Extraction Date: 01/05/23 05:54

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-03,05-06 Batch: WG1730130-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	0.03	J	ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	62		15-120
4-Terphenyl-d14	67		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03,05-06 Batch: WG1730130-2 WG1730130-3								
Naphthalene	67		67		40-140	0		40
Fluorene	68		70		40-140	3		40
Phenanthrene	63		66		40-140	5		40
Anthracene	70		72		40-140	3		40
Pyrene	75		78		26-127	4		40
Benzo(a)anthracene	70		78		40-140	11		40
Chrysene	66		66		40-140	0		40
Benzo(b)fluoranthene	73		77		40-140	5		40
Benzo(a)pyrene	75		80		40-140	6		40
Indeno(1,2,3-cd)pyrene	77		80		40-140	4		40
Benzo(ghi)perylene	67		71		40-140	6		40

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
Nitrobenzene-d5	92		91		23-120
2-Fluorobiphenyl	68		69		15-120
4-Terphenyl-d14	73		78		41-149

Matrix Spike Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-03,05-06 QC Batch ID: WG1730130-4 WG1730130-5 QC Sample: L2300364-03 Client ID: TG07-MW-02-230104												
Naphthalene	0.90	3.64	3.0	58		3.5	72		40-140	15		40
Fluorene	2.2	3.64	4.4	61		4.3	58		40-140	2		40
Phenanthrene	1.8	3.64	4.0	61		3.8	55		40-140	5		40
Anthracene	0.24	3.64	2.6	65		2.6	65		40-140	0		40
Pyrene	0.36	3.64	3.0	73		2.9	70		26-127	3		40
Benzo(a)anthracene	0.11	3.64	2.5	66		2.5	66		40-140	0		40
Chrysene	0.07J	3.64	2.3	63		2.2	61		40-140	4		40
Benzo(b)fluoranthene	0.07	3.64	2.5	67		2.6	70		40-140	4		40
Benzo(a)pyrene	0.07J	3.64	2.5	69		2.5	69		40-140	0		40
Indeno(1,2,3-cd)pyrene	0.04J	3.64	2.3	63		2.3	63		40-140	0		40
Benzo(ghi)perylene	0.04J	3.64	2.1	58		2.0	55		40-140	5		40

<i>Surrogate</i>	<i>MS</i>		<i>MSD</i>		<i>Acceptance Criteria</i>
	<i>% Recovery</i>	<i>Qualifier</i>	<i>% Recovery</i>	<i>Qualifier</i>	
2-Fluorobiphenyl	66		67		15-120
4-Terphenyl-d14	66		64		41-149
Nitrobenzene-d5	87		89		23-120

METALS



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**SAMPLE RESULTS**

Lab ID: L2300364-01

Date Collected: 01/04/23 09:40

Client ID: TG04-MW-03-230104

Date Received: 01/04/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 16:09	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-02
 Client ID: TG04-MW-03-230104D
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 09:40
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 17:06	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**SAMPLE RESULTS**

Lab ID: L2300364-03

Date Collected: 01/04/23 13:20

Client ID: TG07-MW-02-230104

Date Received: 01/04/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	7.913		ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 17:01	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**SAMPLE RESULTS**

Lab ID: L2300364-05

Date Collected: 01/04/23 11:10

Client ID: FB-230104-2

Date Received: 01/04/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 15:25	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

SAMPLE RESULTS

Lab ID: L2300364-06
 Client ID: TG07-MW-03-230104
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/04/23 14:05
 Date Received: 01/04/23
 Field Prep: Refer to COC

Sample Depth:
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 17:11	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-03,05-06 Batch: WG1730153-1									
Lead, Dissolved	ND	ug/l	1.000	0.3430	1	01/05/23 08:56	01/05/23 14:24	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03,05-06 Batch: WG1730153-2								
Lead, Dissolved	97		-		80-120	-		



Matrix Spike Analysis
Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-03,05-06 QC Batch ID: WG1730153-3 WG1730153-4 QC Sample: L2300364-03 Client ID: TG07-MW-02-230104												
Lead, Dissolved	7.913	530	528.9	98		518.5	96		75-125	2		20

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300364-01A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-01B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-01C	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-01D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-01E	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-01F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-01G	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-01H	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-02A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-02B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-02C	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-02D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-02E	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-02F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-02G	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-02H	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03A1	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03A2	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03B1	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03B2	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03C	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300364-03C1	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03C2	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-03D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03D1	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03D2	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03E	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03E1	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03E2	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-03F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-03F1	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-03F2	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-03G	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03G1	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03G2	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03H	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03H1	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-03H2	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-04A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-04B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-04C	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-04D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-05A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-05B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-05C	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-05D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-05E	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-05F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-05G	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300364**Project Number:** P044.001.002**Report Date:** 01/06/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300364-05H	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-06A	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-06B	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-06C	Vial HCl preserved	A	NA		3.9	Y	Absent		PA-8260(14)
L2300364-06D	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-06E	Vial Na2S2O3 preserved	A	NA		3.9	Y	Absent		8011(14)
L2300364-06F	Plastic 500ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		PB-6020S-PPB(180)
L2300364-06G	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)
L2300364-06H	Amber 250ml unpreserved	A	7	7	3.9	Y	Absent		PA-PAHSIM-LVI(7)

Container Comments

L2300364-02H Cap cracked, sample intact.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



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Lab Number: L2300364
Report Date: 01/06/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300364
Report Date: 01/06/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

PAGE _____ OF _____

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9163

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Terraprise Engineering
Address: 100 Canal Pointe Blvd
Princeton NJ 08540 Suite 108
Phone: 215 297 3502
Fax:
Email: mick.scala@terraprise.com
 These samples have been previously analyzed by Alpha

Project Information

Project Name: Former Philadelphia Refinery
Project Location: 3144 W Passyunk Ave.
Project #: P044.001.002
Project Manager: Nick Scudera
ALPHA Quote #:

Turn-Around Time

Standard RUSH (only confirmed if pre-approved)
Date Due: 48 hour
Time:

Date Rec'd in Lab: 1/5/23

ALPHA Job #: L2300364

Report Information - Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program Criteria

Other Project Specific Requirements/Comments/Detection Limits:

EDD @ terraprise.com
Equip EDD

ANALYSIS										TOTAL # BOTTLES
<p><i>5240 - Benzene, Ethylbenzene, m-xylol, p-xylol, toluene, 1,2,4/1,3,5 Triad</i></p> <p><i>5242 - Dibromooxetane</i></p> <p><i>5270 (Sim) - Dibromooxetane</i></p> <p><i>6030 - Lead</i></p>										<p>SAMPLE HANDLING</p> <p>Filtration _____</p> <p><input type="checkbox"/> Done</p> <p><input checked="" type="checkbox"/> Not needed all lead samples</p> <p>Preservation <u>iced</u></p> <p><input type="checkbox"/> Lab to do <u>Billed</u></p> <p>(Please specify below)</p>

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	ANALYSIS										Sample Specific Comments	TOTAL # BOTTLES				
		Date	Time			5240	5242	5270	6030	5240	5242	5270	6030	5240	5242			5270	6030		
00364-01	T604-MW-03-230104	1/4/22	9:40	GW	LSO	X	X	X	X	X										48 hour TAT	5
-02	T604-MW-03-230104D	1/4/22	9:40	GW	LSO	X	X	X	X	X										48 hour TAT	8
-03	T607-MW-02-230104	1/4/22	13:20	GW	LSO	X	X	X	X	X										48 hour TAT	8
	T607-MW-02-230104				LSO																
-03	T607-MW-02-230104MS	1/4/22	13:20	GW	LSO	X	X	X	X	X										48 hour TAT	8
-03	T607-MW-02-230104MSD	1/4/22	13:20	GW	LSO	X	X	X	X	X										48 hour TAT	8
-04	TB-230104-2	1/4/22	13:04	TB	LSO	X	X	X												48 hour TAT	4
-05	FB-230104-2	1/4/22	11:10	FB	LSO	X	X	X	X	X										48 hour TAT	8
-06	T607-MW-03-230104	1/4/22	14:05	GW	ASS	X	X	X	X	X										48 hour TAT	8

Container Type

Preservative

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time
<u>Thom O'Neil</u>	<u>1/4/23 15:10</u>	<u>ST - AAC</u>	<u>1/4/23 15:10</u>
<u>[Signature]</u>	<u>1/4/23 18:05</u>	<u>[Signature]</u>	<u>1/4/23 18:05</u>
<u>[Signature]</u>	<u>1/4/23 2:00</u>	<u>[Signature]</u>	<u>1-4-23 2:00</u>



ANALYTICAL REPORT

Lab Number:	L2300373
Client:	Terraphase Engineering Inc. 1100 East Hector Street Suite 416 Conshohocken, PA 19428
ATTN:	Nick Scala
Phone:	(215) 297-3502
Project Name:	FORMER PHILADELPHIA REFINERY
Project Number:	P044.001.002
Report Date:	01/13/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2300373-01	GPR794-09-1.5-2.0	SOIL	Not Specified	01/03/23 08:45	01/04/23
L2300373-02	GPR794-09-2.0-2.5	SOIL	Not Specified	01/03/23 08:55	01/04/23
L2300373-03	GPR794-09-2.0-2.5D	SOIL	Not Specified	01/03/23 08:55	01/04/23
L2300373-04	GPR794-09-3.0-3.5	SOIL	Not Specified	01/03/23 09:05	01/04/23
L2300373-05	GPR794-10-1.5-2.0	SOIL	Not Specified	01/03/23 09:45	01/04/23
L2300373-06	GPR794-10-2.0-2.5	SOIL	Not Specified	01/03/23 09:50	01/04/23
L2300373-07	GPR790-08-0.0-0.5	SOIL	Not Specified	01/03/23 10:20	01/04/23
L2300373-08	TG07-MW-04-1.5-2.0	SOIL	Not Specified	01/03/23 11:00	01/04/23
L2300373-09	TG07-MW-04-2.0-2.5	SOIL	Not Specified	01/03/23 11:10	01/04/23
L2300373-10	GPR799-08-1.0-1.5	SOIL	Not Specified	01/03/23 11:30	01/04/23
L2300373-11	GPR799-08-3.0-3.5	SOIL	Not Specified	01/03/23 11:40	01/04/23
L2300373-12	GPR791-09-0.0-0.5	SOIL	Not Specified	01/03/23 12:05	01/04/23
L2300373-13	GPR791-09-2.0-2.5	SOIL	Not Specified	01/03/23 12:10	01/04/23
L2300373-14	GPR791-09-2.5-3.0	SOIL	Not Specified	01/03/23 12:15	01/04/23
L2300373-15	GPR793-03R-2.5-3.0	SOIL	Not Specified	01/03/23 12:45	01/04/23
L2300373-16	GPR793-03R-3.0-3.5	SOIL	Not Specified	01/03/23 13:00	01/04/23
L2300373-17	GPR792-03R-1.5-2.0	SOIL	Not Specified	01/03/23 13:20	01/04/23
L2300373-18	GPR792-03R-2.0-2.5	SOIL	Not Specified	01/03/23 13:30	01/04/23
L2300373-19	GPR1117-03R-0.0-0.5	SOIL	Not Specified	01/03/23 14:40	01/04/23
L2300373-20	PB-847-15R-6.0-6.5	SOIL	Not Specified	01/04/23 09:00	01/04/23
L2300373-21	PB-847-15R-17.0-17.5	SOIL	Not Specified	01/04/23 09:10	01/04/23
L2300373-22	TG02-MW-18-15.5-16.0	SOIL	Not Specified	01/04/23 10:15	01/04/23
L2300373-23	TG01-MW-02-6.5-7.0	SOIL	Not Specified	01/04/23 12:40	01/04/23
L2300373-24	TG01-MW-02-7.0-7.5	SOIL	Not Specified	01/04/23 12:55	01/04/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2300373-25	TB-230104-1	WATER	Not Specified	01/04/23 00:00	01/04/23



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Case Narrative (continued)

Report Submission

January 13, 2023: This final report includes the results of all requested analyses.

January 10, 2023: This preliminary report includes the results of the Volatile Organics and Semivolatile Organics analyses performed on L2300373-22.

January 10, 2023: This preliminary report includes the results of the Volatile Organics and Semivolatile Organics analyses performed on L2300373-09, -16, -18, and -21 and the Total Metals analysis performed on L2300373-21.

January 06, 2023: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics

L2300373-20: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (148%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

L2300373-21: The internal standard (IS) response for fluorobenzene (479%) and the surrogate recoveries for dibromofluoromethane (35%) and 4-bromofluorobenzene (675%) were outside the acceptance criteria due to obvious interferences. A copy of the chromatogram is included as an attachment to this report. Since the IS response was above method criteria, all associated compounds are considered to have a potentially low bias. A high-level analysis was performed, and those results are also reported. Differences were noted between the results of the Volatile Organics by EPA Method 5035/8260 High and Low Level analyses which have been attributed to sample non-homogeneity.

L2300373-21: The surrogate recovery is outside the acceptance criteria for 4-bromofluorobenzene (169%); however, the sample was not re-analyzed due to coelution with an obvious interference. A copy of the chromatogram is included as an attachment to this report.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Case Narrative (continued)

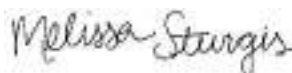
Semivolatile Organics

L2300373-15D, -16D, -17D, and -18D: The sample has elevated detection limits due to the dilution required by the sample matrix.

L2300373-16D and -18D: The surrogate recoveries are below the acceptance criteria for nitrobenzene-d5 (0%), 2-fluorobiphenyl (0%) and 4-terphenyl-d14 (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Melissa Sturgis

Title: Technical Director/Representative

Date: 01/13/23

ORGANICS

VOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-01
 Client ID: GPR794-09-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 08:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 13:42
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.098	0.0099	1
Benzene	1.0		mg/kg	0.024	0.0082	1
Toluene	0.42		mg/kg	0.049	0.027	1
Ethylbenzene	0.11		mg/kg	0.049	0.0069	1
p/m-Xylene	0.32		mg/kg	0.098	0.028	1
o-Xylene	ND		mg/kg	0.049	0.014	1
Xylenes, Total	0.32		mg/kg	0.049	0.014	1
Isopropylbenzene	17.	E	mg/kg	0.049	0.0054	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.098	0.0095	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.098	0.016	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-01 D
 Client ID: GPR794-09-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 08:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 01:19
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	18.		mg/kg	0.098	0.011	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	116		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-02
 Client ID: GPR794-09-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 14:02
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.097	0.0098	1
Benzene	2.6		mg/kg	0.024	0.0081	1
Toluene	1.7		mg/kg	0.049	0.026	1
Ethylbenzene	0.32		mg/kg	0.049	0.0069	1
p/m-Xylene	1.0		mg/kg	0.097	0.027	1
o-Xylene	0.11		mg/kg	0.049	0.014	1
Xylenes, Total	1.1		mg/kg	0.049	0.014	1
Isopropylbenzene	20.	E	mg/kg	0.049	0.0053	1
1,3,5-Trimethylbenzene	0.016	J	mg/kg	0.097	0.0094	1
1,2,4-Trimethylbenzene	0.047	J	mg/kg	0.097	0.016	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	97		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-02 D
 Client ID: GPR794-09-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 01:47
 Analyst: JIC
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
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Isopropylbenzene	20.		mg/kg	0.12	0.013	2.5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	86		70-130
Dibromofluoromethane	114		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-03
 Client ID: GPR794-09-2.0-2.5D
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 14:22
 Analyst: NLK
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.093	0.0094	1
Benzene	1.1		mg/kg	0.023	0.0077	1
Toluene	0.83		mg/kg	0.046	0.025	1
Ethylbenzene	0.21		mg/kg	0.046	0.0066	1
p/m-Xylene	0.72		mg/kg	0.093	0.026	1
o-Xylene	0.092		mg/kg	0.046	0.014	1
Xylenes, Total	0.81		mg/kg	0.046	0.014	1
Isopropylbenzene	14.	E	mg/kg	0.046	0.0051	1
1,3,5-Trimethylbenzene	0.017	J	mg/kg	0.093	0.0090	1
1,2,4-Trimethylbenzene	0.042	J	mg/kg	0.093	0.016	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	108		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	103		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-03 D
 Client ID: GPR794-09-2.0-2.5D
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 02:14
 Analyst: JIC
 Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	14.		mg/kg	0.093	0.010	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	117		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-05 D2
 Client ID: GPR794-10-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 09:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 02:41
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	42.		mg/kg	0.47	0.051	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	117		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-05 D
 Client ID: GPR794-10-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 09:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 14:41
 Analyst: NLK
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.19	0.019	2
Benzene	0.35		mg/kg	0.047	0.016	2
Toluene	0.27		mg/kg	0.094	0.051	2
Ethylbenzene	0.020	J	mg/kg	0.094	0.013	2
p/m-Xylene	0.076	J	mg/kg	0.19	0.052	2
o-Xylene	ND		mg/kg	0.094	0.027	2
Xylenes, Total	0.076	J	mg/kg	0.094	0.027	2
Isopropylbenzene	37.	E	mg/kg	0.094	0.010	2
1,3,5-Trimethylbenzene	ND		mg/kg	0.19	0.018	2
1,2,4-Trimethylbenzene	ND		mg/kg	0.19	0.031	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	111		70-130
Dibromofluoromethane	102		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-07
 Client ID: GPR790-08-0.0-0.5
 Sample Location: Not Specified

Date Collected: 01/03/23 10:20
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 12:24
 Analyst: JIC
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00021	1
Benzene	0.00076		mg/kg	0.00051	0.00017	1
Toluene	0.00074	J	mg/kg	0.0010	0.00056	1
Ethylbenzene	0.00019	J	mg/kg	0.0010	0.00014	1
p/m-Xylene	0.00068	J	mg/kg	0.0020	0.00057	1
o-Xylene	ND		mg/kg	0.0010	0.00030	1
Xylenes, Total	0.00068	J	mg/kg	0.0010	0.00030	1
Isopropylbenzene	0.0063		mg/kg	0.0010	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00020	1
1,2,4-Trimethylbenzene	0.00039	J	mg/kg	0.0020	0.00034	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	109		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-08 D2
 Client ID: TG07-MW-04-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 11:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 09:59
 Analyst: JIC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	440		mg/kg	3.0	1.0	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	106		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-08 D
 Client ID: TG07-MW-04-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 11:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 15:01
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	2.4	0.24	20
Benzene	420	E	mg/kg	0.60	0.20	20
Toluene	ND		mg/kg	1.2	0.65	20
Ethylbenzene	ND		mg/kg	1.2	0.17	20
p/m-Xylene	ND		mg/kg	2.4	0.67	20
o-Xylene	ND		mg/kg	1.2	0.35	20
Xylenes, Total	ND		mg/kg	1.2	0.35	20
Isopropylbenzene	41.		mg/kg	1.2	0.13	20
1,3,5-Trimethylbenzene	ND		mg/kg	2.4	0.23	20
1,2,4-Trimethylbenzene	ND		mg/kg	2.4	0.40	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-09 D2
 Client ID: TG07-MW-04-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 20:37
 Analyst: JIC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.72	0.072	5
Benzene	160	E	mg/kg	0.18	0.059	5
Toluene	0.28	J	mg/kg	0.36	0.19	5
Ethylbenzene	0.081	J	mg/kg	0.36	0.050	5
p/m-Xylene	ND		mg/kg	0.72	0.20	5
o-Xylene	0.17	J	mg/kg	0.36	0.10	5
Xylenes, Total	0.17	J	mg/kg	0.36	0.10	5
Isopropylbenzene	42.		mg/kg	0.36	0.039	5
1,3,5-Trimethylbenzene	0.24	J	mg/kg	0.72	0.069	5
1,2,4-Trimethylbenzene	0.51	J	mg/kg	0.72	0.12	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	104		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-09 D
 Client ID: TG07-MW-04-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/08/23 20:26
 Analyst: JIC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	170		mg/kg	0.72	0.24	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	118		70-130
Dibromofluoromethane	92		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-10
 Client ID: GPR799-08-1.0-1.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:30
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 12:44
 Analyst: JIC
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0019	0.00019	1
Benzene	0.20		mg/kg	0.00047	0.00016	1
Toluene	0.0048		mg/kg	0.00094	0.00051	1
Ethylbenzene	ND		mg/kg	0.00094	0.00013	1
p/m-Xylene	ND		mg/kg	0.0019	0.00052	1
o-Xylene	ND		mg/kg	0.00094	0.00027	1
Xylenes, Total	ND		mg/kg	0.00094	0.00027	1
Isopropylbenzene	0.0044		mg/kg	0.00094	0.00010	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0019	0.00018	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0019	0.00031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	102		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-11 D2
 Client ID: GPR799-08-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:40
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 03:08
 Analyst: JIC
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	700		mg/kg	4.0	0.43	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	94		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	114		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-11 D
 Client ID: GPR799-08-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:40
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 15:20
 Analyst: NLK
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	1.6	0.16	10
Benzene	0.77		mg/kg	0.40	0.13	10
Toluene	ND		mg/kg	0.80	0.43	10
Ethylbenzene	0.13	J	mg/kg	0.80	0.11	10
p/m-Xylene	0.46	J	mg/kg	1.6	0.44	10
o-Xylene	ND		mg/kg	0.80	0.23	10
Xylenes, Total	0.46	J	mg/kg	0.80	0.23	10
Isopropylbenzene	460	E	mg/kg	0.80	0.087	10
1,3,5-Trimethylbenzene	ND		mg/kg	1.6	0.15	10
1,2,4-Trimethylbenzene	ND		mg/kg	1.6	0.26	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	95		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-12
Client ID: GPR791-09-0.0-0.5
Sample Location: Not Specified

Date Collected: 01/03/23 12:05
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 1,8260D
Analytical Date: 01/05/23 13:03
Analyst: JIC
Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0016	0.00016	1
Benzene	0.0046		mg/kg	0.00041	0.00014	1
Toluene	0.0045		mg/kg	0.00081	0.00044	1
Ethylbenzene	0.00061	J	mg/kg	0.00081	0.00011	1
p/m-Xylene	0.0021		mg/kg	0.0016	0.00046	1
o-Xylene	0.00045	J	mg/kg	0.00081	0.00024	1
Xylenes, Total	0.0026	J	mg/kg	0.00081	0.00024	1
Isopropylbenzene	0.14		mg/kg	0.00081	0.00008	1
1,3,5-Trimethylbenzene	0.00028	J	mg/kg	0.0016	0.00016	1
1,2,4-Trimethylbenzene	0.00067	J	mg/kg	0.0016	0.00027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	127		70-130
Dibromofluoromethane	99		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-13
 Client ID: GPR791-09-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 12:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 13:23
 Analyst: JIC
 Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	0.0035		mg/kg	0.00049	0.00016	1
Toluene	0.00064	J	mg/kg	0.00099	0.00054	1
Ethylbenzene	ND		mg/kg	0.00099	0.00014	1
p/m-Xylene	ND		mg/kg	0.0020	0.00055	1
o-Xylene	ND		mg/kg	0.00099	0.00029	1
Xylenes, Total	ND		mg/kg	0.00099	0.00029	1
Isopropylbenzene	0.0043		mg/kg	0.00099	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	99		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-15 D2
 Client ID: GPR793-03R-2.5-3.0
 Sample Location: Not Specified

Date Collected: 01/03/23 12:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 10:19
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	1500		mg/kg	50	5.4	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	107		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-15 D
 Client ID: GPR793-03R-2.5-3.0
 Sample Location: Not Specified

Date Collected: 01/03/23 12:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 03:35
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	10	1.0	100
Benzene	ND		mg/kg	2.5	0.83	100
Toluene	ND		mg/kg	5.0	2.7	100
Ethylbenzene	ND		mg/kg	5.0	0.70	100
p/m-Xylene	ND		mg/kg	10	2.8	100
o-Xylene	ND		mg/kg	5.0	1.4	100
Xylenes, Total	ND		mg/kg	5.0	1.4	100
Isopropylbenzene	2700	E	mg/kg	5.0	0.54	100
1,3,5-Trimethylbenzene	ND		mg/kg	10	0.96	100
1,2,4-Trimethylbenzene	ND		mg/kg	10	1.7	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	114		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-16 D2
 Client ID: GPR793-03R-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 21:32
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	2200		mg/kg	22	2.4	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	109		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-16 D
 Client ID: GPR793-03R-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/08/23 20:52
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	11	1.1	100
Benzene	ND		mg/kg	2.8	0.93	100
Toluene	ND		mg/kg	5.6	3.0	100
Ethylbenzene	ND		mg/kg	5.6	0.79	100
p/m-Xylene	ND		mg/kg	11	3.1	100
o-Xylene	ND		mg/kg	5.6	1.6	100
Xylenes, Total	ND		mg/kg	5.6	1.6	100
Isopropylbenzene	2300	E	mg/kg	5.6	0.61	100
1,3,5-Trimethylbenzene	ND		mg/kg	11	1.1	100
1,2,4-Trimethylbenzene	ND		mg/kg	11	1.9	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	93		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-17 D2
 Client ID: GPR792-03R-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 13:20
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 04:02
 Analyst: JIC
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.56	0.056	5
Benzene	0.32		mg/kg	0.14	0.047	5
Toluene	ND		mg/kg	0.28	0.15	5
Ethylbenzene	0.060	J	mg/kg	0.28	0.040	5
p/m-Xylene	ND		mg/kg	0.56	0.16	5
o-Xylene	ND		mg/kg	0.28	0.082	5
Xylenes, Total	ND		mg/kg	0.28	0.082	5
Isopropylbenzene	200	E	mg/kg	0.28	0.031	5
1,3,5-Trimethylbenzene	0.067	J	mg/kg	0.56	0.054	5
1,2,4-Trimethylbenzene	0.12	J	mg/kg	0.56	0.094	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	112		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-17 D
 Client ID: GPR792-03R-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 13:20
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 15:59
 Analyst: NLK
 Percent Solids: 86%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	160		mg/kg	0.56	0.061	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	102		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-18 D2
 Client ID: GPR792-03R-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:30
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 21:59
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.50	0.050	5
Benzene	0.46		mg/kg	0.12	0.041	5
Toluene	ND		mg/kg	0.25	0.14	5
Ethylbenzene	0.052	J	mg/kg	0.25	0.035	5
p/m-Xylene	ND		mg/kg	0.50	0.14	5
o-Xylene	ND		mg/kg	0.25	0.073	5
Xylenes, Total	ND		mg/kg	0.25	0.073	5
Isopropylbenzene	190	E	mg/kg	0.25	0.027	5
1,3,5-Trimethylbenzene	0.074	J	mg/kg	0.50	0.048	5
1,2,4-Trimethylbenzene	0.14	J	mg/kg	0.50	0.083	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	94		70-130
Dibromofluoromethane	106		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-18 D
 Client ID: GPR792-03R-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:30
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/08/23 21:18
 Analyst: JIC
 Percent Solids: 91%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Volatile Organics by EPA 5035 High - Westborough Lab						
Isopropylbenzene	160		mg/kg	1.0	0.11	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	92		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-19
 Client ID: GPR1117-03R-0.0-0.5
 Sample Location: Not Specified

Date Collected: 01/03/23 14:40
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 09:20
 Analyst: JIC
 Percent Solids: 84%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020	1
Benzene	0.00032	J	mg/kg	0.00050	0.00016	1
Toluene	ND		mg/kg	0.00099	0.00054	1
Ethylbenzene	ND		mg/kg	0.00099	0.00014	1
p/m-Xylene	ND		mg/kg	0.0020	0.00055	1
o-Xylene	ND		mg/kg	0.00099	0.00029	1
Xylenes, Total	ND		mg/kg	0.00099	0.00029	1
Isopropylbenzene	0.11		mg/kg	0.00099	0.00011	1
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	112		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-20
 Client ID: PB-847-15R-6.0-6.5
 Sample Location: Not Specified

Date Collected: 01/04/23 09:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 09:40
 Analyst: JIC
 Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.13	0.013	1
Benzene	ND		mg/kg	0.032	0.011	1
Ethylbenzene	5.4		mg/kg	0.064	0.0090	1
p/m-Xylene	2.3		mg/kg	0.13	0.036	1
o-Xylene	0.23		mg/kg	0.064	0.019	1
Xylenes, Total	2.5		mg/kg	0.064	0.019	1
Isopropylbenzene	3.2		mg/kg	0.064	0.0070	1
1,3,5-Trimethylbenzene	3.2		mg/kg	0.13	0.012	1
1,2,4-Trimethylbenzene	5.1		mg/kg	0.13	0.021	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	148	Q	70-130
Dibromofluoromethane	97		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-21
 Client ID: PB-847-15R-17.0-17.5
 Sample Location: Not Specified

Date Collected: 01/04/23 09:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 21:05
 Analyst: JIC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.10	0.010	1
Benzene	0.16		mg/kg	0.026	0.0085	1
Ethylbenzene	0.018	J	mg/kg	0.051	0.0073	1
p/m-Xylene	ND		mg/kg	0.10	0.029	1
o-Xylene	ND		mg/kg	0.051	0.015	1
Xylenes, Total	ND		mg/kg	0.051	0.015	1
Isopropylbenzene	1.1		mg/kg	0.051	0.0056	1
1,3,5-Trimethylbenzene	0.016	J	mg/kg	0.10	0.0099	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	116		70-130
4-Bromofluorobenzene	169	Q	70-130
Dibromofluoromethane	85		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-21
 Client ID: PB-847-15R-17.0-17.5
 Sample Location: Not Specified

Date Collected: 01/04/23 09:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 22:53
 Analyst: JIC
 Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatiles Organics by EPA 5035 Low - Westborough Lab						
Methyl tert butyl ether	ND		mg/kg	0.0018	0.00019	1
Benzene	0.0076		mg/kg	0.00046	0.00015	1
Ethylbenzene	0.0024		mg/kg	0.00093	0.00013	1
p/m-Xylene	0.00070	J	mg/kg	0.0018	0.00052	1
o-Xylene	0.0014		mg/kg	0.00093	0.00027	1
Xylenes, Total	0.0021	J	mg/kg	0.00093	0.00027	1
Isopropylbenzene	0.11		mg/kg	0.00093	0.00010	1
1,3,5-Trimethylbenzene	0.0011	J	mg/kg	0.0018	0.00018	1
1,2,4-Trimethylbenzene	ND		mg/kg	0.0018	0.00031	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	117		70-130
4-Bromofluorobenzene	675	Q	70-130
Dibromofluoromethane	35	Q	70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-22
 Client ID: TG02-MW-18-15.5-16.0
 Sample Location: Not Specified

Date Collected: 01/04/23 10:15
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8260D
 Analytical Date: 01/06/23 15:32
 Analyst: LAC
 Percent Solids: 72%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by EPA 5035 High - Westborough Lab						
Benzene	0.034	J	mg/kg	0.037	0.012	1
Toluene	0.30		mg/kg	0.074	0.040	1
1,2-Dibromoethane	ND		mg/kg	0.037	0.022	1
Ethylbenzene	3.4		mg/kg	0.074	0.010	1
p/m-Xylene	14.		mg/kg	0.15	0.041	1
o-Xylene	5.3		mg/kg	0.074	0.022	1
Xylenes, Total	19.		mg/kg	0.074	0.022	1
Isopropylbenzene	0.42		mg/kg	0.074	0.0081	1
1,3,5-Trimethylbenzene	3.8		mg/kg	0.15	0.014	1
1,2,4-Trimethylbenzene	11.		mg/kg	0.15	0.025	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	102		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-25
 Client ID: TB-230104-1
 Sample Location: Not Specified

Date Collected: 01/04/23 00:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/05/23 10:09
 Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/05/23 09:19
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 07,10,12-13 Batch: WG1730307-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
Toluene	ND		mg/kg	0.0010	0.00054
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	107		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/05/23 09:19
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-03,05,08,11,17 Batch: WG1730426-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	107		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/05/23 09:43
Analyst: PID

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 25 Batch: WG1730461-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
1,2-Dibromoethane	ND		ug/l	2.0	0.19
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	97		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
 Analytical Date: 01/05/23 18:31
 Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01-03,05,11,15,17 Batch: WG1730645-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	92		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	115		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 01/06/23 08:35
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 19 Batch: WG1730716-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
Toluene	ND		mg/kg	0.0010	0.00054
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	107		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/06/23 08:35
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 08,15,20,22 Batch: WG1730717-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
1,2-Dibromoethane	ND		mg/kg	0.025	0.015
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	107		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/08/23 14:47
Analyst: AJK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 09,16,18 Batch: WG1731730-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	90		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 01/09/23 14:43
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 Low - Westborough Lab for sample(s): 21 Batch: WG1731733-5					
Methyl tert butyl ether	ND		mg/kg	0.0020	0.00020
Benzene	ND		mg/kg	0.00050	0.00017
Ethylbenzene	ND		mg/kg	0.0010	0.00014
p/m-Xylene	ND		mg/kg	0.0020	0.00056
o-Xylene	ND		mg/kg	0.0010	0.00029
Xylenes, Total	ND		mg/kg	0.0010	0.00029
Isopropylbenzene	ND		mg/kg	0.0010	0.00011
1,3,5-Trimethylbenzene	ND		mg/kg	0.0020	0.00019
1,2,4-Trimethylbenzene	ND		mg/kg	0.0020	0.00033

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	116		70-130



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/09/23 14:43
Analyst: JIC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 09,16,18,21 Batch: WG1731736-5					
Methyl tert butyl ether	ND		mg/kg	0.10	0.010
Benzene	ND		mg/kg	0.025	0.0083
Toluene	ND		mg/kg	0.050	0.027
Ethylbenzene	ND		mg/kg	0.050	0.0070
p/m-Xylene	ND		mg/kg	0.10	0.028
o-Xylene	ND		mg/kg	0.050	0.014
Xylenes, Total	ND		mg/kg	0.050	0.014
Isopropylbenzene	ND		mg/kg	0.050	0.0054
1,3,5-Trimethylbenzene	ND		mg/kg	0.10	0.0096
1,2,4-Trimethylbenzene	ND		mg/kg	0.10	0.017

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	91		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	116		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 07,10,12-13 Batch: WG1730307-3 WG1730307-4								
Methyl tert butyl ether	107		107		66-130	0		30
Benzene	108		110		70-130	2		30
Toluene	104		108		70-130	4		30
Ethylbenzene	107		110		70-130	3		30
p/m-Xylene	108		112		70-130	4		30
o-Xylene	108		112		70-130	4		30
Isopropylbenzene	106		108		70-130	2		30
1,3,5-Trimethylbenzene	108		109		70-130	1		30
1,2,4-Trimethylbenzene	107		108		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	98		99		70-130
4-Bromofluorobenzene	100		97		70-130
Dibromofluoromethane	97		98		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-03,05,08,11,17 Batch: WG1730426-3 WG1730426-4								
Methyl tert butyl ether	107		107		66-130	0		30
Benzene	108		110		70-130	2		30
Toluene	104		108		70-130	4		30
Ethylbenzene	107		110		70-130	3		30
p/m-Xylene	108		112		70-130	4		30
o-Xylene	108		112		70-130	4		30
Isopropylbenzene	106		108		70-130	2		30
1,3,5-Trimethylbenzene	108		109		70-130	1		30
1,2,4-Trimethylbenzene	107		108		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	98		99		70-130
4-Bromofluorobenzene	100		97		70-130
Dibromofluoromethane	97		98		70-130

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 25 Batch: WG1730461-3 WG1730461-4								
Methyl tert butyl ether	97		95		63-130	2		20
Benzene	110		110		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
Toluene	110		100		70-130	10		20
1,2-Dibromoethane	100		100		70-130	0		20
Ethylbenzene	110		100		70-130	10		20
p/m-Xylene	110		105		70-130	5		20
o-Xylene	105		105		70-130	0		20
Isopropylbenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		100		70-130	10		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	96		96		70-130
Dibromofluoromethane	98		96		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01-03,05,11,15,17 Batch: WG1730645-3 WG1730645-4								
Methyl tert butyl ether	101		101		66-130	0		30
Benzene	111		111		70-130	0		30
Toluene	102		101		70-130	1		30
Ethylbenzene	105		104		70-130	1		30
p/m-Xylene	110		109		70-130	1		30
o-Xylene	105		106		70-130	1		30
Isopropylbenzene	100		102		70-130	2		30
1,3,5-Trimethylbenzene	100		102		70-130	2		30
1,2,4-Trimethylbenzene	100		102		70-130	2		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	98		98		70-130
Toluene-d8	95		95		70-130
4-Bromofluorobenzene	82		85		70-130
Dibromofluoromethane	113		114		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 19 Batch: WG1730716-3 WG1730716-4								
Methyl tert butyl ether	85		92		66-130	8		30
Benzene	86		91		70-130	6		30
Toluene	84		90		70-130	7		30
Ethylbenzene	86		92		70-130	7		30
p/m-Xylene	88		94		70-130	7		30
o-Xylene	87		93		70-130	7		30
Isopropylbenzene	87		91		70-130	4		30
1,3,5-Trimethylbenzene	87		93		70-130	7		30
1,2,4-Trimethylbenzene	87		92		70-130	6		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	96		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	100		98		70-130
Dibromofluoromethane	98		99		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 08,15,20,22 Batch: WG1730717-3 WG1730717-4								
Methyl tert butyl ether	85		92		66-130	8		30
Benzene	86		91		70-130	6		30
Toluene	84		90		70-130	7		30
1,2-Dibromoethane	86		93		70-130	8		30
Ethylbenzene	86		92		70-130	7		30
p/m-Xylene	88		94		70-130	7		30
o-Xylene	87		93		70-130	7		30
Isopropylbenzene	87		91		70-130	4		30
1,3,5-Trimethylbenzene	87		93		70-130	7		30
1,2,4-Trimethylbenzene	87		92		70-130	6		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	96		97		70-130
Toluene-d8	99		99		70-130
4-Bromofluorobenzene	100		98		70-130
Dibromofluoromethane	98		99		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 09,16,18 Batch: WG1731730-3 WG1731730-4								
Methyl tert butyl ether	100		101		66-130	1		30
Benzene	106		107		70-130	1		30
Toluene	103		103		70-130	0		30
Ethylbenzene	107		107		70-130	0		30
p/m-Xylene	103		103		70-130	0		30
o-Xylene	100		100		70-130	0		30
Isopropylbenzene	112		112		70-130	0		30
1,3,5-Trimethylbenzene	110		110		70-130	0		30
1,2,4-Trimethylbenzene	108		108		70-130	0		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	107		106		70-130
Toluene-d8	108		108		70-130
4-Bromofluorobenzene	116		116		70-130
Dibromofluoromethane	91		91		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Volatile Organics by EPA 5035 Low - Westborough Lab Associated sample(s): 21 Batch: WG1731733-3 WG1731733-4								
Methyl tert butyl ether	92		94		66-130	2		30
Benzene	102		105		70-130	3		30
Ethylbenzene	96		98		70-130	2		30
p/m-Xylene	101		104		70-130	3		30
o-Xylene	99		101		70-130	2		30
Isopropylbenzene	93		95		70-130	2		30
1,3,5-Trimethylbenzene	95		96		70-130	1		30
1,2,4-Trimethylbenzene	95		96		70-130	1		30

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	95		94		70-130
4-Bromofluorobenzene	84		84		70-130
Dibromofluoromethane	109		110		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 09,16,18,21 Batch: WG1731736-3 WG1731736-4								
Methyl tert butyl ether	92		94		66-130	2		30
Benzene	102		105		70-130	3		30
Toluene	94		95		70-130	1		30
Ethylbenzene	96		98		70-130	2		30
p/m-Xylene	101		104		70-130	3		30
o-Xylene	99		101		70-130	2		30
Isopropylbenzene	93		95		70-130	2		30
1,3,5-Trimethylbenzene	95		96		70-130	1		30
1,2,4-Trimethylbenzene	95		96		70-130	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	97		99		70-130
Toluene-d8	95		95		70-130
4-Bromofluorobenzene	84		84		70-130
Dibromofluoromethane	109		110		70-130

SEMIVOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-01
 Client ID: GPR794-09-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 08:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 13:01
 Analyst: MG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.031	J	mg/kg	0.036	0.022	1
Benzo(a)pyrene	0.19		mg/kg	0.14	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	61		30-120
4-Terphenyl-d14	58		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-02
 Client ID: GPR794-09-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 13:26
 Analyst: MG
 Percent Solids: 92%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.27		mg/kg	0.036	0.022	1
Benzo(a)pyrene	0.087	J	mg/kg	0.14	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	95		23-120
2-Fluorobiphenyl	72		30-120
4-Terphenyl-d14	69		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-03
 Client ID: GPR794-09-2.0-2.5D
 Sample Location: Not Specified

Date Collected: 01/03/23 08:55
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 13:50
 Analyst: MG
 Percent Solids: 92%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.20		mg/kg	0.036	0.022	1
Benzo(a)pyrene	0.058	J	mg/kg	0.14	0.043	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	91		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	65		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-05
 Client ID: GPR794-10-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 09:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 14:14
 Analyst: MG
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.30		mg/kg	0.036	0.022	1
Benzo(a)pyrene	0.047	J	mg/kg	0.14	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		23-120
2-Fluorobiphenyl	72		30-120
4-Terphenyl-d14	66		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-07
 Client ID: GPR790-08-0.0-0.5
 Sample Location: Not Specified

Date Collected: 01/03/23 10:20
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 14:38
 Analyst: MG
 Percent Solids: 81%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.036	J	mg/kg	0.040	0.024	1
Benzo(a)pyrene	0.47		mg/kg	0.16	0.049	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	42		30-120
4-Terphenyl-d14	42		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-08
 Client ID: TG07-MW-04-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 11:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 15:02
 Analyst: MG
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	1.0		mg/kg	0.038	0.023	1
Benzo(a)pyrene	0.076	J	mg/kg	0.15	0.046	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	69		30-120
4-Terphenyl-d14	61		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-09
 Client ID: TG07-MW-04-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/08/23 19:06
 Analyst: CMM
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 01/07/23 09:51

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.23		mg/kg	0.043	0.026	1
Benzo(a)pyrene	ND		mg/kg	0.17	0.052	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	37		23-120
2-Fluorobiphenyl	48		30-120
4-Terphenyl-d14	33		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-10
 Client ID: GPR799-08-1.0-1.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:30
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 15:26
 Analyst: MG
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab

Naphthalene	0.032	J	mg/kg	0.037	0.022	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	90		23-120
2-Fluorobiphenyl	69		30-120
4-Terphenyl-d14	67		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-11
 Client ID: GPR799-08-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 11:40
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 15:50
 Analyst: MG
 Percent Solids: 77%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.6		mg/kg	0.042	0.026	1
Benzo(a)pyrene	0.83		mg/kg	0.17	0.052	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	78		23-120
2-Fluorobiphenyl	66		30-120
4-Terphenyl-d14	60		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-12
 Client ID: GPR791-09-0.0-0.5
 Sample Location: Not Specified

Date Collected: 01/03/23 12:05
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 16:14
 Analyst: MG
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.12		mg/kg	0.036	0.022	1
Benzo(a)pyrene	0.51		mg/kg	0.14	0.044	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	84		23-120
2-Fluorobiphenyl	65		30-120
4-Terphenyl-d14	60		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-13
 Client ID: GPR791-09-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 12:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 16:38
 Analyst: MG
 Percent Solids: 90%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.037	0.022	1
Benzo(a)pyrene	ND		mg/kg	0.15	0.045	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	68		30-120
4-Terphenyl-d14	61		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-15 D
 Client ID: GPR793-03R-2.5-3.0
 Sample Location: Not Specified

Date Collected: 01/03/23 12:45
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/06/23 01:54
 Analyst: CMM
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.18	0.11	5
Benzo(a)pyrene	ND		mg/kg	0.72	0.22	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	95		23-120
2-Fluorobiphenyl	58		30-120
4-Terphenyl-d14	79		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-16 D
 Client ID: GPR793-03R-3.0-3.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/10/23 06:07
 Analyst: SLR
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 01/07/23 09:51

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.73	0.45	20
Benzo(a)pyrene	ND		mg/kg	2.9	0.89	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-17 D
 Client ID: GPR792-03R-1.5-2.0
 Sample Location: Not Specified

Date Collected: 01/03/23 13:20
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/06/23 03:31
 Analyst: CMM
 Percent Solids: 86%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
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Naphthalene	ND		mg/kg	0.19	0.11	5
Benzo(a)pyrene	ND		mg/kg	0.75	0.23	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	78		23-120
2-Fluorobiphenyl	49		30-120
4-Terphenyl-d14	62		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-18 D
 Client ID: GPR792-03R-2.0-2.5
 Sample Location: Not Specified

Date Collected: 01/03/23 13:30
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/10/23 06:31
 Analyst: SLR
 Percent Solids: 91%

Extraction Method: EPA 3546
 Extraction Date: 01/07/23 09:51

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	ND		mg/kg	0.71	0.44	20
Benzo(a)pyrene	ND		mg/kg	2.8	0.87	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	0	Q	23-120
2-Fluorobiphenyl	0	Q	30-120
4-Terphenyl-d14	0	Q	18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-19
 Client ID: GPR1117-03R-0.0-0.5
 Sample Location: Not Specified

Date Collected: 01/03/23 14:40
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 17:50
 Analyst: MG
 Percent Solids: 84%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	0.46		mg/kg	0.039	0.024	1
Benzo(a)pyrene	0.76		mg/kg	0.16	0.048	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	77		23-120
2-Fluorobiphenyl	70		30-120
4-Terphenyl-d14	67		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-20
 Client ID: PB-847-15R-6.0-6.5
 Sample Location: Not Specified

Date Collected: 01/04/23 09:00
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 18:14
 Analyst: MG
 Percent Solids: 82%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
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Naphthalene	7.5		mg/kg	0.040	0.024	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	63		30-120
4-Terphenyl-d14	56		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-21
 Client ID: PB-847-15R-17.0-17.5
 Sample Location: Not Specified

Date Collected: 01/04/23 09:10
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/08/23 20:17
 Analyst: CMM
 Percent Solids: 87%

Extraction Method: EPA 3546
 Extraction Date: 01/07/23 09:51

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Semivolatile Organics by GC/MS - Westborough Lab						
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Naphthalene	1.6		mg/kg	0.038	0.023	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	44		23-120
2-Fluorobiphenyl	62		30-120
4-Terphenyl-d14	50		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-22
 Client ID: TG02-MW-18-15.5-16.0
 Sample Location: Not Specified

Date Collected: 01/04/23 10:15
 Date Received: 01/04/23
 Field Prep: Not Specified

Sample Depth:

Matrix: Soil
 Analytical Method: 1,8270E
 Analytical Date: 01/05/23 18:38
 Analyst: JG
 Percent Solids: 72%

Extraction Method: EPA 3546
 Extraction Date: 01/05/23 06:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Naphthalene	1.4		mg/kg	0.045	0.027	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	68		23-120
2-Fluorobiphenyl	62		30-120
4-Terphenyl-d14	59		18-120

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E
Analytical Date: 01/04/23 22:58
Analyst: IM

Extraction Method: EPA 3546
Extraction Date: 01/04/23 17:12

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-03,05,07-08,10-13,15,17,19-20,22 Batch: WG1730021-1					
Naphthalene	ND		mg/kg	0.033	0.020
Benzo(a)pyrene	ND		mg/kg	0.13	0.040

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	75		25-120
Phenol-d6	74		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	79		30-120
2,4,6-Tribromophenol	76		10-136
4-Terphenyl-d14	90		18-120



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

**Method Blank Analysis
 Batch Quality Control**

Analytical Method: 1,8270E
 Analytical Date: 01/06/23 22:06
 Analyst: CMM

Extraction Method: EPA 3546
 Extraction Date: 01/06/23 13:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 09,16,18,21 Batch: WG1730747-1					
Naphthalene	ND		mg/kg	0.033	0.020
Benzo(a)pyrene	ND		mg/kg	0.13	0.040

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	67		23-120
2-Fluorobiphenyl	58		30-120
4-Terphenyl-d14	67		18-120



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-03,05,07-08,10-13,15,17,19-20,22 Batch: WG1730021-2 WG1730021-3								
Naphthalene	66		66		40-140	0		50
Benzo(a)pyrene	77		78		40-140	1		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
2-Fluorophenol	67		67		25-120
Phenol-d6	66		65		10-120
Nitrobenzene-d5	58		58		23-120
2-Fluorobiphenyl	70		68		30-120
2,4,6-Tribromophenol	70		68		10-136
4-Terphenyl-d14	76		76		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 09,16,18,21 Batch: WG1730747-2 WG1730747-3								
Naphthalene	57		57		40-140	0		50
Benzo(a)pyrene	57		56		40-140	2		50

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	69		68		23-120
2-Fluorobiphenyl	58		59		30-120
4-Terphenyl-d14	65		64		18-120



METALS



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-20

Date Collected: 01/04/23 09:00

Client ID: PB-847-15R-6.0-6.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	6.75		mg/kg	2.37	0.127	1	01/05/23 07:30	01/05/23 11:04	EPA 3050B	1,6010D	EGW



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-21

Date Collected: 01/04/23 09:10

Client ID: PB-847-15R-17.0-17.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	5.90		mg/kg	2.26	0.121	1	01/09/23 22:00	01/10/23 08:24	EPA 3050B	1,6010D	EGW



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300373

Project Number: P044.001.002

Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-22

Date Collected: 01/04/23 10:15

Client ID: TG02-MW-18-15.5-16.0

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Percent Solids: 72%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Lead, Total	83.5		mg/kg	2.63	0.141	1	01/05/23 07:30	01/05/23 11:09	EPA 3050B	1,6010D	EGW



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 20,22 Batch: WG1730143-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	01/05/23 07:30	01/05/23 10:32	1,6010D	EGW

Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21 Batch: WG1731076-1									
Lead, Total	ND	mg/kg	2.00	0.107	1	01/09/23 22:00	01/10/23 08:02	1,6010D	EGW

Prep Information

Digestion Method: EPA 3050B



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 20,22 Batch: WG1730143-2 SRM Lot Number: D116-540								
Lead, Total	104		-		83-117	-		
Total Metals - Mansfield Lab Associated sample(s): 21 Batch: WG1731076-2 SRM Lot Number: D116-540								
Lead, Total	101		-		83-117	-		



Matrix Spike Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 20,22 QC Batch ID: WG1730143-3 QC Sample: L2300289-01 Client ID: MS Sample												
Lead, Total	26.7	47.8	63.5	77		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 21 QC Batch ID: WG1731076-3 QC Sample: L2300989-03 Client ID: MS Sample												
Lead, Total	12.6	45.2	56.6	97		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Lab Number: L2300373

Report Date: 01/13/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 20,22 QC Batch ID: WG1730143-4 QC Sample: L2300289-01 Client ID: DUP Sample						
Lead, Total	26.7	24.3	mg/kg	9		20
Total Metals - Mansfield Lab Associated sample(s): 21 QC Batch ID: WG1731076-4 QC Sample: L2300989-03 Client ID: DUP Sample						
Lead, Total	12.6	10.6	mg/kg	17		20

INORGANICS & MISCELLANEOUS

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-01
Client ID: GPR794-09-1.5-2.0
Sample Location: Not Specified

Date Collected: 01/03/23 08:45
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.4		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-02
Client ID: GPR794-09-2.0-2.5
Sample Location: Not Specified

Date Collected: 01/03/23 08:55
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.2		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-03
Client ID: GPR794-09-2.0-2.5D
Sample Location: Not Specified

Date Collected: 01/03/23 08:55
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	92.0		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-05
Client ID: GPR794-10-1.5-2.0
Sample Location: Not Specified

Date Collected: 01/03/23 09:45
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.7		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-07

Date Collected: 01/03/23 10:20

Client ID: GPR790-08-0.0-0.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.3		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-08
Client ID: TG07-MW-04-1.5-2.0
Sample Location: Not Specified

Date Collected: 01/03/23 11:00
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.2		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-09
Client ID: TG07-MW-04-2.0-2.5
Sample Location: Not Specified

Date Collected: 01/03/23 11:10
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	76.8		%	0.100	NA	1	-	01/06/23 17:00	121,2540G	MF



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-10

Date Collected: 01/03/23 11:30

Client ID: GPR799-08-1.0-1.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.4		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-11
Client ID: GPR799-08-3.0-3.5
Sample Location: Not Specified

Date Collected: 01/03/23 11:40
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	77.2		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-12

Date Collected: 01/03/23 12:05

Client ID: GPR791-09-0.0-0.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.6		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-13

Date Collected: 01/03/23 12:10

Client ID: GPR791-09-2.0-2.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.0		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-15

Date Collected: 01/03/23 12:45

Client ID: GPR793-03R-2.5-3.0

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.8		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-16

Date Collected: 01/03/23 13:00

Client ID: GPR793-03R-3.0-3.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.5		%	0.100	NA	1	-	01/06/23 17:00	121,2540G	MF



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-17
Client ID: GPR792-03R-1.5-2.0
Sample Location: Not Specified

Date Collected: 01/03/23 13:20
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.1		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-18
Client ID: GPR792-03R-2.0-2.5
Sample Location: Not Specified

Date Collected: 01/03/23 13:30
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.1		%	0.100	NA	1	-	01/06/23 17:00	121,2540G	MF



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-19
Client ID: GPR1117-03R-0.0-0.5
Sample Location: Not Specified

Date Collected: 01/03/23 14:40
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.6		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**SAMPLE RESULTS**

Lab ID: L2300373-20

Date Collected: 01/04/23 09:00

Client ID: PB-847-15R-6.0-6.5

Date Received: 01/04/23

Sample Location: Not Specified

Field Prep: Not Specified

Sample Depth:

Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	01/05/23 08:02	121,2540G	RI



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-21
Client ID: PB-847-15R-17.0-17.5
Sample Location: Not Specified

Date Collected: 01/04/23 09:10
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.7		%	0.100	NA	1	-	01/06/23 17:00	121,2540G	MF



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

SAMPLE RESULTS

Lab ID: L2300373-22
Client ID: TG02-MW-18-15.5-16.0
Sample Location: Not Specified

Date Collected: 01/04/23 10:15
Date Received: 01/04/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	72.2		%	0.100	NA	1	-	01/05/23 08:16	121,2540G	RI



Lab Duplicate Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Lab Number: L2300373

Report Date: 01/13/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03,05,07-08,10-13,15,17,19-20 QC Batch ID: WG1730150-1 QC Sample: L2300262-01 Client ID: DUP Sample						
Solids, Total	91.4	92.1	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 22 QC Batch ID: WG1730152-1 QC Sample: L2300472-01 Client ID: DUP Sample						
Solids, Total	78.1	76.4	%	2		20
General Chemistry - Westborough Lab Associated sample(s): 09,16,18,21 QC Batch ID: WG1730839-1 QC Sample: L2300373-09 Client ID: TG07-MW-04-2.0-2.5						
Solids, Total	76.8	78.0	%	2		20

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-01A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-01B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-01C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-01D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-01E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-01X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-01Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-01Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-02A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-02B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-02C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-02D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-02E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-02X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-02Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-02Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-03A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-03B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-03C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-03D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-03E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-03X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-03Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-03Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-04A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-04B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-04C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-04D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		HOLD-WETCHEM()
L2300373-04E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		HOLD-8270(14)
L2300373-04X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-04Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-04Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-05A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-05B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-05C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-05D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-05E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-05X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-05Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-05Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-06A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-06B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-06C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-06D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		HOLD-WETCHEM()
L2300373-06E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		HOLD-8270(14)
L2300373-06X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-06Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-06Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-07A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-07B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-07C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-07D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-07E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-07X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-07Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-07Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-08A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-08B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-08C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-08D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-08E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-08X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-08Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-08Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-09A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-09B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-09C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-09D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-09E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-09X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-09Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-09Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-10A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-10B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-10C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-10D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-10E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-10X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-10Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-10Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-11A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-11B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-11C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-11D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-11E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-11X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-11Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-11Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-12A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-12B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-12C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-12D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-12E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-12X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-12Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-12Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-13A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-13B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-13C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-13D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-13E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-13X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-13Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-13Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-14A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-14B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-14C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-14D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		HOLD-WETCHEM()
L2300373-14E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		HOLD-8270(14)
L2300373-14X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-14Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-14Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	HOLD-8260HLW(14)
L2300373-15A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-15B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-15C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-15D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-15E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-15X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-15Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-15Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-16A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-16B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-16C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-16D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-16E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-16X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-16Y	Vial Water preserved split	A	NA		5.2	Y	Absent	06-JAN-23 13:16	PA-8260HLW(14)
L2300373-16Z	Vial Water preserved split	A	NA		5.2	Y	Absent	06-JAN-23 13:16	PA-8260HLW(14)
L2300373-17A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-17B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-17C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-17D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-17E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-17X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-17Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-17Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-18A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-18B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-18C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-18D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-18E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-18X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-18Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-18Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-19A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-19B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-19C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-19D	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-19E	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-19X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-19Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-19Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-20A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-20B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-20C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-20D	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		PB-TI(180)
L2300373-20E	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-20F	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-20X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-20Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-20Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:03	PA-8260HLW(14)
L2300373-21A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2300373-21B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300373**Project Number:** P044.001.002**Report Date:** 01/13/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-21C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2300373-21D	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		PB-TI(180)
L2300373-21E	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-21F	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-21X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260H(14),PA-8260HLW(14)
L2300373-21Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	PA-8260H(14),PA-8260HLW(14)
L2300373-21Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	PA-8260H(14),PA-8260HLW(14)
L2300373-22A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-22B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-22C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-22D	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		PB-TI(180)
L2300373-22E	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		TS(7)
L2300373-22F	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		PA-PAH(14)
L2300373-22X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		PA-8260HLW(14)
L2300373-22Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	PA-8260HLW(14)
L2300373-22Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	PA-8260HLW(14)
L2300373-23A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-23B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-23C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-23D	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		HOLD-METAL(180)
L2300373-23E	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		HOLD-WETCHEM()
L2300373-23F	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		HOLD-8270(14)
L2300373-23X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-23Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	HOLD-8260HLW(14)
L2300373-23Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	HOLD-8260HLW(14)
L2300373-24A	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-24B	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-24C	5 gram Encore Sampler	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Serial_No:01132308:58
Lab Number: L2300373
Report Date: 01/13/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300373-24D	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		HOLD-METAL(180)
L2300373-24E	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		HOLD-WETCHEM()
L2300373-24F	Glass 120ml/4oz unpreserved	A	NA		5.2	Y	Absent		HOLD-8270(14)
L2300373-24X	Vial MeOH preserved split	A	NA		5.2	Y	Absent		HOLD-8260HLW(14)
L2300373-24Y	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	HOLD-8260HLW(14)
L2300373-24Z	Vial Water preserved split	A	NA		5.2	Y	Absent	05-JAN-23 07:05	HOLD-8260HLW(14)
L2300373-25A	Vial HCl preserved	A	NA		5.2	Y	Absent		PA-8260(14)
L2300373-25B	Vial HCl preserved	A	NA		5.2	Y	Absent		PA-8260(14)

*Values in parentheses indicate holding time in days



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
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Lab Number: L2300373
Report Date: 01/13/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300373
Report Date: 01/13/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: **1/5/23**

ALPHA Job #: **L2300373**

Client Information

Client: *TerraPhase Engineering*

Address: *1100 E Hector St
Conshohocken, Pa*

Phone: *215-297-3502*

Fax:

Email: *nick.seala@terraphase.com*

These samples have been previously analyzed by Alpha

Project Information

Project Name: *Former Phik Refinery*

Project Location:

Project #: *PO4/001.002*

Project Manager:

ALPHA Quote #:

Turn-Around Time

Standard RUSH (only confirmed if pre-approved)

Date Due: _____ Time: _____

Report Information - Data Deliverables

FAX EMAIL

ADEX Add'l Deliverables

Billing Information

Same as Client info PO #:

Other Project Specific Requirements/Comments/Detection Limits:

EDD@terraphase.com

EDD Format Equiv

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	ANALYSIS		Sample Specific Comments
		Date	Time					
00373-01	GPR794-09-1.5-2.0	1/3/23	845	50	SMM	X	X	Rush/Analyze
02	GPR794-09-2.0-2.5	1/3/23	855	50	SMM	X	X	Rush/Analyze
03	GPR794-09-2.0-2.5D	1/3/23	855	50	SMM	X	X	Rush/analyze
04	GPR794-09-3.0-3.5	1/3/23	905	50	SMM	H	H	Rush/hold
05	GPR794-10-1.5-2.0	1/3/23	945	50	SMM	X	X	Rush/Analyze
06	GPR794-10-2.0-2.5	1/3/23	950	50	SMM	H	H	Rush/hold
07	GPR790-08-0.0-0.5	1/3/23	1020	50	SMM	X	X	Rush/analyze
08	T607-MW-04-1.5-2.0	1/5/23	1100	30	SMM	X	X	Rush/Analyze
09	T607-MW-04-2.0-2.5	1/3/23	1110	50	SMM	H	H	Rush/hold
10	GPR799-08-1.0-1.5	1/3/23	1130	10	SMM	X	X	Rush/Analyze

ANALYSIS

B260 - Benzene, Toluene, Ethyl Benzene, Xylene, 1,2,4-TMB, 1,3,5-TMB, 1,2,3,6-TMB, 1,2,4,6-TMB, 1,2,3,5-TMB, 1,2,3,4-TMB, 1,2,3,6-TMB, 1,2,4,5-TMB, 1,2,4,6-TMB, 1,2,3,4,6-TMB, 1,2,3,5,6-TMB, 1,2,3,4,5-TMB, 1,2,3,4,6-TMB, 1,2,3,5,6-TMB, 1,2,3,4,5,6-TMB

SAMPLE HANDLING

Filtration _____

Done

Not needed

Lab to do

Lab to do

(Please specify below)

TOTAL # BOTTLES

Container Type _____

Preservative _____

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	1/4/23 1510	<i>[Signature]</i>	1/4/23 1510
<i>[Signature]</i>	1/4/23 1830	<i>[Signature]</i>	1/4/23 1510
<i>[Signature]</i>	1/4/23 2000	<i>[Signature]</i>	1-4-23 2100

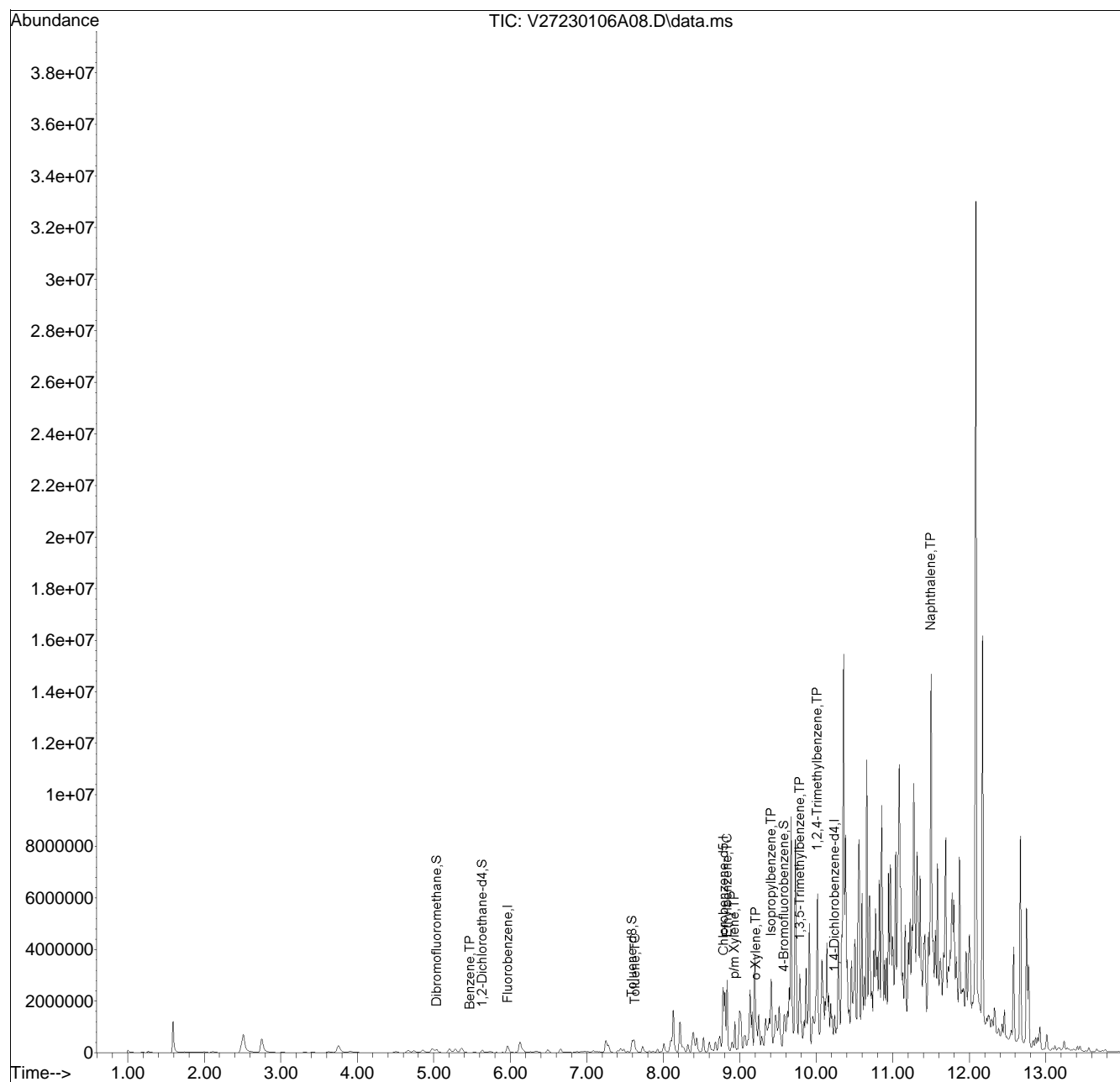
Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA127\2023\230106A\
 Data File : V27230106A08.D
 Acq On : 06 Jan 2023 09:40 am
 Operator : VOA127:JIC
 Sample : L2300373-20,31H,5.78,5,0.100,,X,R3B
 Misc : WG1730717,ICAL19627
 ALS Vial : 8 Sample Multiplier: 1

Quant Time: Jan 06 10:20:59 2023
 Quant Method : I:\VOLATILES\VOA127\2023\230106A\V127_221227N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Wed Dec 28 14:42:32 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list06A\V27230106A01.D•

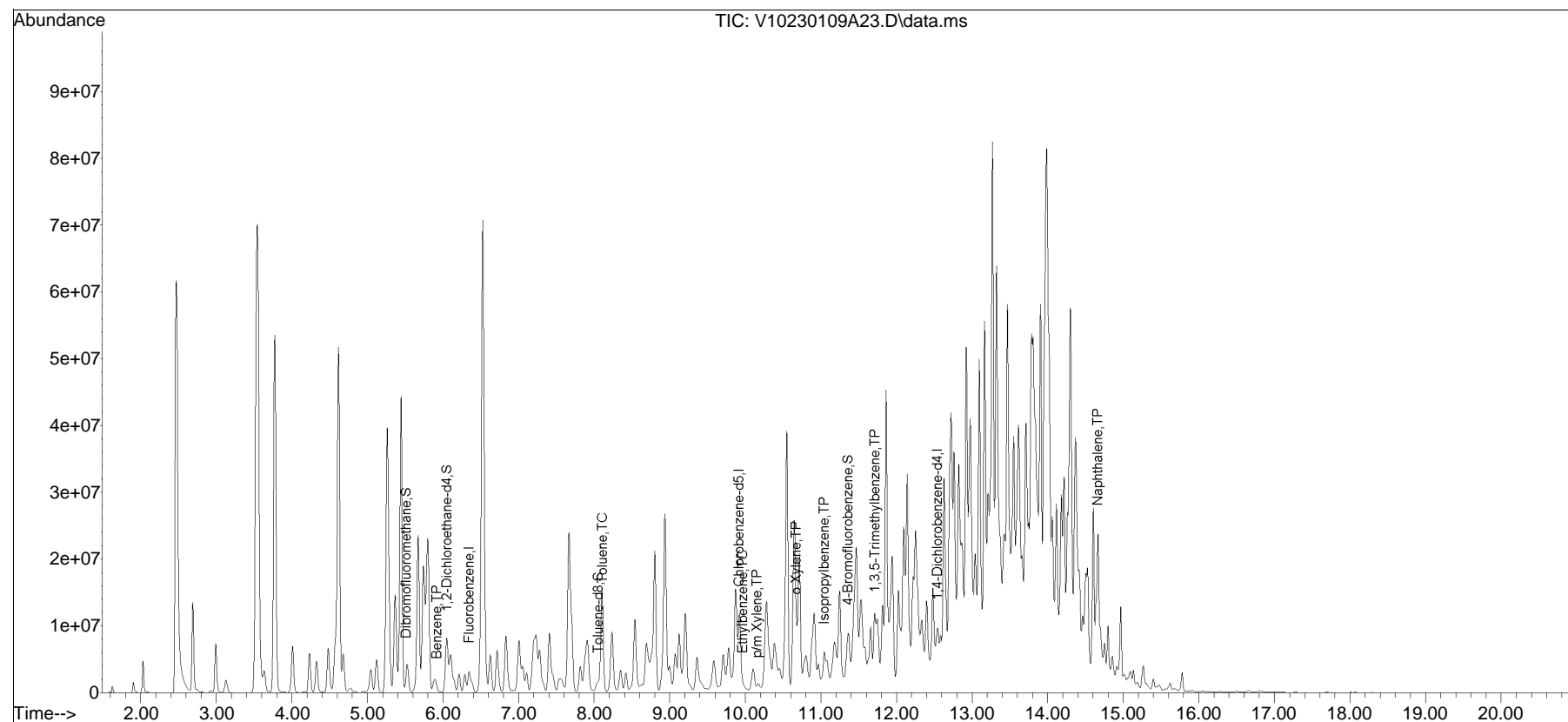


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2023\230109A\
 Data File : V10230109A23.D
 Acq On : 9 Jan 2023 10:53 pm
 Operator : VOA110:JIC
 Sample : 12300373-21,31,6.22,5,,z,r3b
 Misc : WG1731733,ICAL19281
 ALS Vial : 23 Sample Multiplier: 1

Quant Time: Jan 10 08:29:30 2023
 Quant Method : I:\VOLATILES\VOA110\2023\230109A\V110_220822N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Tue Aug 23 09:34:28 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list09A\V10230109A02.D•

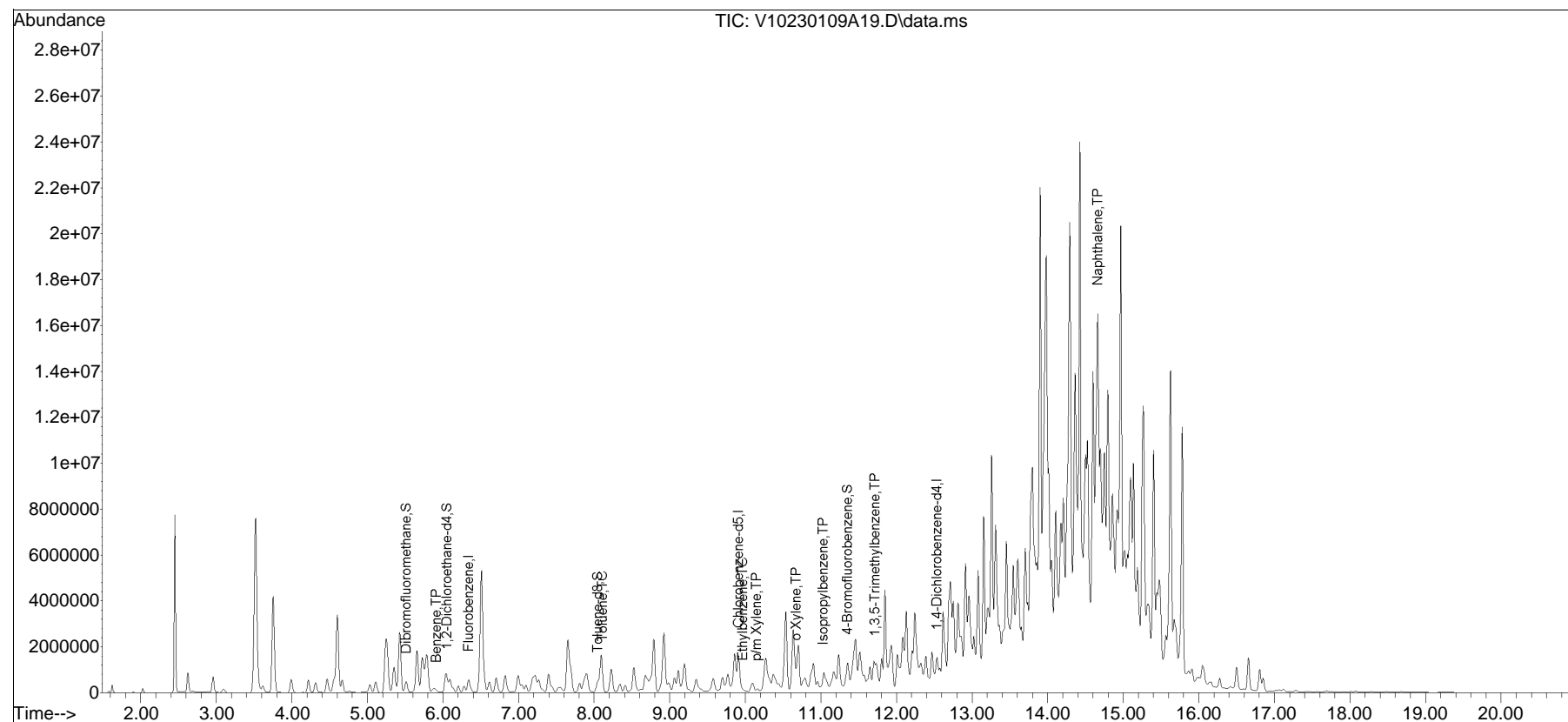


Quantitation Report (QT Reviewed)

Data Path : I:\VOLATILES\VOA110\2023\230109A\
 Data File : V10230109A19.D
 Acq On : 9 Jan 2023 9:05 pm
 Operator : VOA110:JIC
 Sample : 12300373-21,31h,6.58,5,0.100,,x,r3b
 Misc : WG1731736,ICAL19281
 ALS Vial : 19 Sample Multiplier: 1

Quant Time: Jan 10 08:27:54 2023
 Quant Method : I:\VOLATILES\VOA110\2023\230109A\V110_220822N_8260.m
 Quant Title : VOLATILES BY GC/MS
 QLast Update : Tue Aug 23 09:34:28 2022
 Response via : Initial Calibration

Sub List : 8260-PA_ShortList - PA Short list09A\V10230109A02.D•





ANALYTICAL REPORT

Lab Number:	L2300961
Client:	Terraphase Engineering Inc. 100 Canal Pointe Boulevard Suite 108 Princeton, NJ 08540
ATTN:	Nick Scala
Phone:	(609) 236-8171
Project Name:	FORMER PHILADELPHIA REFINERY
Project Number:	P044.001.002
Report Date:	01/11/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2300961-01	TG07-MW-05-230105	WATER	3144 W PASSYUNK AVE.	01/05/23 09:50	01/06/23
L2300961-02	TG07-MW-04-230105	WATER	3144 W PASSYUNK AVE.	01/05/23 11:05	01/06/23
L2300961-03	TG07-MW-01-230105	WATER	3144 W PASSYUNK AVE.	01/05/23 14:20	01/06/23
L2300961-04	TG07-MW-08-230105	WATER	3144 W PASSYUNK AVE.	01/05/23 15:05	01/06/23
L2300961-05	TG04-MW-01-230106	WATER	3144 W PASSYUNK AVE.	01/06/23 10:30	01/06/23
L2300961-06	S-219-230106	WATER	3144 W PASSYUNK AVE.	01/06/23 09:50	01/06/23
L2300961-07	TB-230106-2	WATER	3144 W PASSYUNK AVE.	01/06/23 00:00	01/06/23

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Case Narrative (continued)

Report Revision

January 11, 2023: This report includes the results of the 1,2-Dibromoethane by Method 8260D performed on L2300961-01 through -07.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Caitlin Walukevich

Title: Technical Director/Representative

Date: 01/11/23

ORGANICS

VOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-01
 Client ID: TG07-MW-05-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 13:59
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-01 D
 Client ID: TG07-MW-05-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 17:50
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	100	17.	100
Benzene	11000		ug/l	50	16.	100
1,2-Dichloroethane	ND		ug/l	50	13.	100
Toluene	200		ug/l	75	20.	100
1,2-Dibromoethane	ND		ug/l	200	19.	100
Ethylbenzene	34	J	ug/l	50	17.	100
p/m-Xylene	41	J	ug/l	100	33.	100
o-Xylene	ND		ug/l	100	39.	100
Xylenes, Total	41	J	ug/l	100	33.	100
Isopropylbenzene	7200		ug/l	50	19.	100
1,3,5-Trimethylbenzene	ND		ug/l	250	22.	100
1,2,4-Trimethylbenzene	30	J	ug/l	250	19.	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	93		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-02
 Client ID: TG07-MW-04-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 11:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:07
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-02 D
 Client ID: TG07-MW-04-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 11:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 17:27
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	2.0	0.33	2
Benzene	36		ug/l	1.0	0.32	2
1,2-Dichloroethane	ND		ug/l	1.0	0.26	2
Toluene	3.8		ug/l	1.5	0.41	2
1,2-Dibromoethane	ND		ug/l	4.0	0.39	2
Ethylbenzene	1.9		ug/l	1.0	0.33	2
p/m-Xylene	4.7		ug/l	2.0	0.66	2
o-Xylene	2.0		ug/l	2.0	0.78	2
Xylenes, Total	6.7		ug/l	2.0	0.66	2
Isopropylbenzene	290		ug/l	1.0	0.37	2
1,3,5-Trimethylbenzene	0.72	J	ug/l	5.0	0.43	2
1,2,4-Trimethylbenzene	1.4	J	ug/l	5.0	0.38	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	83		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-03
 Client ID: TG07-MW-01-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 14:20
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:16
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-03
 Client ID: TG07-MW-01-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 14:20
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 17:04
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	0.34	J	ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	0.25	J	ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	99		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-04
 Client ID: TG07-MW-08-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 15:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:24
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-04 D
 Client ID: TG07-MW-08-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 15:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 16:41
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	25	4.2	25
Benzene	ND		ug/l	12	4.0	25
1,2-Dichloroethane	ND		ug/l	12	3.3	25
Toluene	ND		ug/l	19	5.1	25
1,2-Dibromoethane	ND		ug/l	50	4.8	25
Ethylbenzene	ND		ug/l	12	4.2	25
p/m-Xylene	ND		ug/l	25	8.3	25
o-Xylene	ND		ug/l	25	9.8	25
Xylenes, Total	ND		ug/l	25	8.3	25
Isopropylbenzene	4400		ug/l	12	4.7	25
1,3,5-Trimethylbenzene	ND		ug/l	62	5.4	25
1,2,4-Trimethylbenzene	ND		ug/l	62	4.8	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	96		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-05
 Client ID: TG04-MW-01-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 10:30
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:33
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-05 D
 Client ID: TG04-MW-01-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 10:30
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 16:18
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	5.0	0.83	5
Benzene	580		ug/l	2.5	0.80	5
1,2-Dichloroethane	ND		ug/l	2.5	0.66	5
Toluene	11		ug/l	3.8	1.0	5
1,2-Dibromoethane	ND		ug/l	10	0.96	5
Ethylbenzene	110		ug/l	2.5	0.84	5
p/m-Xylene	170		ug/l	5.0	1.7	5
o-Xylene	16		ug/l	5.0	2.0	5
Xylenes, Total	190		ug/l	5.0	1.7	5
Isopropylbenzene	75		ug/l	2.5	0.94	5
1,3,5-Trimethylbenzene	13		ug/l	12	1.1	5
1,2,4-Trimethylbenzene	54		ug/l	12	0.96	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	91		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-06
 Client ID: S-219-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:41
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-06
 Client ID: S-219-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 15:54
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	0.28	J	ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-07
 Client ID: TB-230106-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 00:00
 Date Received: 01/06/23
 Field Prep: None

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 14:50
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-07
 Client ID: TB-230106-2
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 00:00
 Date Received: 01/06/23
 Field Prep: None

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 15:31
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	1.0	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
Toluene	ND		ug/l	0.75	0.20	1
1,2-Dibromoethane	ND		ug/l	2.0	0.19	1
Ethylbenzene	ND		ug/l	0.50	0.17	1
p/m-Xylene	ND		ug/l	1.0	0.33	1
o-Xylene	ND		ug/l	1.0	0.39	1
Xylenes, Total	ND		ug/l	1.0	0.33	1
Isopropylbenzene	ND		ug/l	0.50	0.19	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	98		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 01/09/23 11:35
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 01/09/23 10:06

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01-07 Batch: WG1730665-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8260D
Analytical Date: 01/07/23 13:35
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-07 Batch: WG1731384-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
1,2-Dibromoethane	ND		ug/l	2.0	0.19
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	97		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 01-07 Batch: WG1730665-2									
1,2-Dibromoethane	117		-		80-120	-		20	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-07 Batch: WG1731384-3 WG1731384-4								
Methyl tert butyl ether	84		92		63-130	9		20
Benzene	95		98		70-130	3		20
1,2-Dichloroethane	88		91		70-130	3		20
Toluene	99		100		70-130	1		20
1,2-Dibromoethane	97		99		70-130	2		20
Ethylbenzene	96		97		70-130	1		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
Isopropylbenzene	99		100		70-130	1		20
1,3,5-Trimethylbenzene	99		100		64-130	1		20
1,2,4-Trimethylbenzene	99		100		70-130	1		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	95		99		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	107		110		70-130
Dibromofluoromethane	94		95		70-130

SEMIVOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-01
 Client ID: TG07-MW-05-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/10/23 16:29
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 01/10/23 12:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	17		ug/l	0.10	0.05	1
Fluorene	2.7		ug/l	0.10	0.01	1
Phenanthrene	2.4		ug/l	0.05	0.02	1
Anthracene	0.27		ug/l	0.10	0.01	1
Pyrene	0.22		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.07		ug/l	0.05	0.02	1
Chrysene	0.04	J	ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.03	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	0.04	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.01	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	110		23-120
2-Fluorobiphenyl	66		15-120
4-Terphenyl-d14	57		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-02
 Client ID: TG07-MW-04-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 11:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 13:53
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	4.8		ug/l	0.10	0.01	1
Phenanthrene	4.6		ug/l	0.05	0.02	1
Anthracene	0.43		ug/l	0.10	0.01	1
Pyrene	0.42		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.14		ug/l	0.05	0.02	1
Chrysene	0.11		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.07		ug/l	0.05	0.01	1
Benzo(a)pyrene	0.07	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	116		23-120
2-Fluorobiphenyl	91		15-120
4-Terphenyl-d14	102		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-03
 Client ID: TG07-MW-01-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 14:20
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 14:09
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	0.13		ug/l	0.10	0.01	1
Phenanthrene	0.20		ug/l	0.05	0.02	1
Anthracene	0.05	J	ug/l	0.10	0.01	1
Pyrene	0.14		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.08		ug/l	0.05	0.02	1
Chrysene	0.03	J	ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.02	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	0.02	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01	1
Benzo(ghi)perylene	0.01	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	116		23-120
2-Fluorobiphenyl	88		15-120
4-Terphenyl-d14	81		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-04
 Client ID: TG07-MW-08-230105
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/05/23 15:05
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 14:25
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	3.1		ug/l	0.10	0.05	1
Fluorene	2.9		ug/l	0.10	0.01	1
Phenanthrene	1.8		ug/l	0.05	0.02	1
Anthracene	0.24		ug/l	0.10	0.01	1
Pyrene	0.86		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.18		ug/l	0.05	0.02	1
Chrysene	0.07	J	ug/l	0.10	0.01	1
Benzo(b)fluoranthene	0.03	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	0.02	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.01	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	113		23-120
2-Fluorobiphenyl	87		15-120
4-Terphenyl-d14	104		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-05
 Client ID: TG04-MW-01-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 10:30
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 15:14
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	9.4		ug/l	0.10	0.05	1
Fluorene	0.92		ug/l	0.10	0.01	1
Phenanthrene	0.25		ug/l	0.05	0.02	1
Anthracene	0.11		ug/l	0.10	0.01	1
Pyrene	0.06	J	ug/l	0.10	0.02	1
Benzo(a)anthracene	0.10		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	135	Q	23-120
2-Fluorobiphenyl	99		15-120
4-Terphenyl-d14	96		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-06
 Client ID: S-219-230106
 Sample Location: 3144 W PASSYUNK AVE.

Date Collected: 01/06/23 09:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 15:30
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	ND		ug/l	0.10	0.05	1
Fluorene	ND		ug/l	0.10	0.01	1
Phenanthrene	ND		ug/l	0.05	0.02	1
Anthracene	ND		ug/l	0.10	0.01	1
Pyrene	ND		ug/l	0.10	0.02	1
Benzo(a)anthracene	0.18		ug/l	0.05	0.02	1
Chrysene	ND		ug/l	0.10	0.01	1
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01	1
Benzo(a)pyrene	ND		ug/l	0.10	0.02	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	121	Q	23-120
2-Fluorobiphenyl	92		15-120
4-Terphenyl-d14	93		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 1,8270E-SIM
Analytical Date: 01/06/23 18:22
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 01/06/23 08:28

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 02-06 Batch: WG1730640-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	0.04	J	ug/l	0.10	0.02
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02
Chrysene	0.02	J	ug/l	0.10	0.01
Benzo(b)fluoranthene	0.01	J	ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	111		23-120
2-Fluorobiphenyl	71		15-120
4-Terphenyl-d14	88		41-149

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 01/10/23 16:12
Analyst: JJW

Extraction Method: EPA 3510C
Extraction Date: 01/10/23 12:08

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1731825-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
Benzo(a)anthracene	ND		ug/l	0.05	0.02
Chrysene	ND		ug/l	0.10	0.01
Benzo(b)fluoranthene	ND		ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	104		23-120
2-Fluorobiphenyl	69		15-120
4-Terphenyl-d14	67		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 02-06 Batch: WG1730640-2 WG1730640-3								
Naphthalene	51		81		40-140	45	Q	40
Fluorene	65		86		40-140	28		40
Phenanthrene	70		87		40-140	22		40
Anthracene	72		89		40-140	21		40
Pyrene	83		100		26-127	19		40
Benzo(a)anthracene	78		92		40-140	16		40
Chrysene	78		91		40-140	15		40
Benzo(b)fluoranthene	77		95		40-140	21		40
Benzo(a)pyrene	81		97		40-140	18		40
Indeno(1,2,3-cd)pyrene	86		101		40-140	16		40
Benzo(ghi)perylene	79		93		40-140	16		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	84		125	Q	23-120
2-Fluorobiphenyl	56		80		15-120
4-Terphenyl-d14	85		101		41-149



Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1731825-2 WG1731825-3								
Naphthalene	55		66		40-140	18		40
Fluorene	60		69		40-140	14		40
Phenanthrene	61		68		40-140	11		40
Anthracene	62		70		40-140	12		40
Pyrene	61		66		26-127	8		40
Benzo(a)anthracene	65		73		40-140	12		40
Chrysene	64		70		40-140	9		40
Benzo(b)fluoranthene	66		71		40-140	7		40
Benzo(a)pyrene	69		76		40-140	10		40
Indeno(1,2,3-cd)pyrene	77		81		40-140	5		40
Benzo(ghi)perylene	70		75		40-140	7		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	90		113		23-120
2-Fluorobiphenyl	59		70		15-120
4-Terphenyl-d14	60		65		41-149



METALS



Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300961**Project Number:** P044.001.002**Report Date:** 01/11/23**SAMPLE RESULTS**

Lab ID: L2300961-01

Date Collected: 01/05/23 09:50

Client ID: TG07-MW-05-230105

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 16:35	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-02

Date Collected: 01/05/23 11:05

Client ID: TG07-MW-04-230105

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 16:40	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-03

Date Collected: 01/05/23 14:20

Client ID: TG07-MW-01-230105

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	0.5930	J	ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 16:45	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-04

Date Collected: 01/05/23 15:05

Client ID: TG07-MW-08-230105

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 17:10	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-05

Date Collected: 01/06/23 10:30

Client ID: TG04-MW-01-230106

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 17:15	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

SAMPLE RESULTS

Lab ID: L2300961-06

Date Collected: 01/06/23 09:50

Client ID: S-219-230106

Date Received: 01/06/23

Sample Location: 3144 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 17:21	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2300961

Project Number: P044.001.002

Report Date: 01/11/23

Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01-06 Batch: WG1731110-1									
Lead, Dissolved	ND	ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 15:53	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis**Batch Quality Control****Project Name:** FORMER PHILADELPHIA REFINERY**Lab Number:** L2300961**Project Number:** P044.001.002**Report Date:** 01/11/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-06 Batch: WG1731110-2								
Lead, Dissolved	100		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1731110-3 QC Sample: L2300961-01 Client ID: TG07-MW-05-230105												
Lead, Dissolved	ND	530	539.3	102		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Lab Number: L2300961

Report Date: 01/11/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG1731110-4 QC Sample: L2300961-01 Client ID: TG07-MW-05-230105						
Lead, Dissolved	ND	ND	ug/l	NC		20

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300961**Project Number:** P044.001.002**Report Date:** 01/11/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300961-01A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-01B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-01C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-01D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-01E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-01F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-01G	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-01H	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-02A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-02B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-02C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-02D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-02E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-02F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-02G	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-02H	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-03A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-03B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-03C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-03D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-03E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-03F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-03G	Amber 250ml unpreserved	A	9	9	4.3	Y	Absent		PA-PAHSIM-LVI(7)

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2300961**Project Number:** P044.001.002**Report Date:** 01/11/23**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300961-03H	Amber 250ml unpreserved	A	9	9	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-04A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-04B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-04C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-04D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-04E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-04F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-04G	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-04H	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-05A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-05B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-05C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-05D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-05E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-05F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-05G	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-05H	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-06A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-06B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-06C	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-06D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-06E	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)
L2300961-06F	Plastic 250ml HNO3 preserved	A	<2	<2	4.3	Y	Absent		PB-6020S-PPB(180)
L2300961-06G	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-06H	Amber 250ml unpreserved	A	7	7	4.3	Y	Absent		PA-PAHSIM-LVI(7)
L2300961-07A	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-07B	Vial HCl preserved	A	NA		4.3	Y	Absent		PA-8260(14)
L2300961-07C	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Serial_No:01112312:39

Lab Number: L2300961

Report Date: 01/11/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2300961-07D	Vial Na2S2O3 preserved	A	NA		4.3	Y	Absent		8011(14)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
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Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
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Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2300961
Report Date: 01/11/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpineol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

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WESTBORO, MA
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TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: 1/7/23

ALPHA Job #: 2300961

Project Information

Project Name: *Former Philadelphia Refinery*

Project Location: *3144 Passyunk Ave*

Project #: *P044.001.002*

Project Manager: *Nick Scala*

ALPHA Quote #:

Turn-Around Time

Standard RUSH *(only confirmed if pre-approved!)*

Date Due: *48 hr TAT* Time:

Report Information - Data Deliverables

FAX EMAIL
 ADEx Add'l Deliverables

Billing Information

Same as Client info PO #:

Client Information

Client: *Terraphase Engineering*

Address: *160 Canal Pointe Blvd*

Princeton NJ 08540 Suite 108

Phone: *215 297 3502*

Fax:

Email: *nick_scala@terrphase.com*

These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

EDD @ Terraphase.com
Eq 13 EDD
** See attached sheet for Short List compounds.*

Regulatory Requirements/Report Limits

State/Fed Program	Criteria

ANALYSIS	Vec's - Short List 1-5	SVC's - Short List 1-5	Vec's - Short List 1-6	SVC's - Short List 1-6	Lead	SAMPLE HANDLING		TOTAL # BOTTLES
						Filtration	Preservation	
						<input type="checkbox"/> Done	<input type="checkbox"/> Lab to do	
						<input checked="" type="checkbox"/> Not needed (see)	<input type="checkbox"/> Lab to do (see)	
						<input type="checkbox"/> Lab to do	<input type="checkbox"/> Lab to do	
						(Please specify below)		
						Sample Specific Comments		

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	Vec's - Short List 1-5	SVC's - Short List 1-5	Vec's - Short List 1-6	SVC's - Short List 1-6	Lead	Sample Specific Comments	TOTAL # BOTTLES
		Date	Time									
00961-01	T6-07-MW-05-230105	1/5/23	0950	GW	KJO		X	X	X		48 hr Rush	8
02	T6-07-MW-04-230105	1/5/23	1105	GW	KJO		X	X	X		48 hr Rush	8
03	T6-07-MW-01-230105	1/5/23	1420	GW	NAK		X	X	X		48 hr Rush	8
04	T6-07-MW-08-230105	1/5/23	1505	GW	KJO		X	X	X		48 hr Rush	8
05	T6-04-MW-01-230106	1/6/23	1030	GW	KJO	X	X		X		48 hr Rush	8
06	S-219-230106	1/6/23	0950	GW	NAK	X	X		X		48 hr Rush	8
07	TB-230106-2	1/6/23	1120	TB	KJO	X	X				48 hr Rush	8

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
<i>Tom O'Rourke</i>	<i>1/6/23 1455</i>	<i>John AAL</i>	<i>1/6/23 14:55</i>
<i>Sit</i>	<i>1/6/23 1800</i>	<i>John AAL</i>	<i>1/6/23 1800</i>
<i>John AAL</i>	<i>1/6/23 2120</i>	<i>John AAL</i>	<i>1-6-23 2100</i>

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

- **Short List 1. *Leaded Gasoline, Aviation Gasoline and Jet Fuel***: benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, and lead.
- **Short List 2. *Unleaded Gasoline***: benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- **Short List 3. *Kerosene, Fuel Oil No. 1***: benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- **Short List 4. *Diesel Fuel and Fuel Oil No. 2***: benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethyl benzene, and 1,3,5-trimethyl benzene.
- **Short List 5. *Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids***: benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(g,h,i)perylene.
- **Short List 6. *Waste Oil***: benzene, toluene, ethyl benzene, cumene, naphthalene (Method 8270), pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)pyrene, and lead.



ANALYTICAL REPORT

Lab Number:	L2301049
Client:	Terraphase Engineering Inc. 100 Canal Pointe Boulevard Suite 108 Princeton, NJ 08540
ATTN:	Nick Scala
Phone:	(609) 236-8171
Project Name:	FORMER PHILADELPHIA REFINERY
Project Number:	P044.001.002
Report Date:	01/10/23

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Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2301049-01	TG07-MW-07-230106	WATER	1344 W PASSYUNK AVE.	01/06/23 15:50	01/06/23

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Case Narrative (continued)

Report Submission

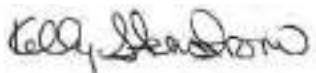
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Microextractables

The WG1731499-2 LCS recovery for 1,2-dibromoethane (136%), associated with L2301049-01, is outside Alpha's acceptance criteria, but within the acceptance criteria specified in the method.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 01/10/23

ORGANICS

VOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01
 Client ID: TG07-MW-07-230106
 Sample Location: 1344 W PASSYUNK AVE.

Date Collected: 01/06/23 15:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8011
 Analytical Date: 01/09/23 18:53
 Analyst: AMM

Extraction Method: EPA 8011
 Extraction Date: 01/09/23 16:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	0.005	1	A

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01 D2
 Client ID: TG07-MW-07-230106
 Sample Location: 1344 W PASSYUNK AVE.

Date Collected: 01/06/23 15:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/09/23 11:19
 Analyst: MKS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Benzene	240000		ug/l	1000	320	2000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01 D
 Client ID: TG07-MW-07-230106
 Sample Location: 1344 W PASSYUNK AVE.

Date Collected: 01/06/23 15:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8260D
 Analytical Date: 01/07/23 18:13
 Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	400	66.	400
Benzene	150000	E	ug/l	200	64.	400
1,2-Dichloroethane	ND		ug/l	200	53.	400
Toluene	27000		ug/l	300	81.	400
Ethylbenzene	360		ug/l	200	67.	400
p/m-Xylene	1300		ug/l	400	130	400
o-Xylene	370	J	ug/l	400	160	400
Xylenes, Total	1700	J	ug/l	400	130	400
Isopropylbenzene	5300		ug/l	200	75.	400
1,3,5-Trimethylbenzene	ND		ug/l	1000	87.	400
1,2,4-Trimethylbenzene	220	J	ug/l	1000	76.	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	91		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/07/23 13:35
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1731384-5					
Methyl tert butyl ether	ND		ug/l	1.0	0.17
Benzene	ND		ug/l	0.50	0.16
1,2-Dichloroethane	ND		ug/l	0.50	0.13
Toluene	ND		ug/l	0.75	0.20
Ethylbenzene	ND		ug/l	0.50	0.17
p/m-Xylene	ND		ug/l	1.0	0.33
o-Xylene	ND		ug/l	1.0	0.39
Xylenes, Total	ND		ug/l	1.0	0.33
Isopropylbenzene	ND		ug/l	0.50	0.19
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.22
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.19

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	97		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260D
Analytical Date: 01/09/23 10:59
Analyst: MJV

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1731477-5					
Benzene	ND		ug/l	0.50	0.16

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	113		70-130

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8011
Analytical Date: 01/09/23 17:14
Analyst: AMM

Extraction Method: EPA 8011
Extraction Date: 01/09/23 16:22

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1731499-1						
1,2-Dibromoethane	ND		ug/l	0.010	0.005	A

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1731384-3 WG1731384-4								
Methyl tert butyl ether	84		92		63-130	9		20
Benzene	95		98		70-130	3		20
1,2-Dichloroethane	88		91		70-130	3		20
Toluene	99		100		70-130	1		20
Ethylbenzene	96		97		70-130	1		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
Isopropylbenzene	99		100		70-130	1		20
1,3,5-Trimethylbenzene	99		100		64-130	1		20
1,2,4-Trimethylbenzene	99		100		70-130	1		20

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
1,2-Dichloroethane-d4	95		99		70-130
Toluene-d8	105		105		70-130
4-Bromofluorobenzene	107		110		70-130
Dibromofluoromethane	94		95		70-130



Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2301049

Project Number: P044.001.002

Report Date: 01/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1731477-3 WG1731477-4								
Benzene	88		88		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	94		100		70-130
Toluene-d8	101		100		70-130
4-Bromofluorobenzene	95		98		70-130
Dibromofluoromethane	103		104		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2301049

Project Number: P044.001.002

Report Date: 01/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 01 Batch: WG1731499-2									
1,2-Dibromoethane	136	Q	-		80-120	-		20	A

SEMIVOLATILES

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01
 Client ID: TG07-MW-07-230106
 Sample Location: 1344 W PASSYUNK AVE.

Date Collected: 01/06/23 15:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/08/23 15:46
 Analyst: WR

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	110	E	ug/l	0.10	0.05	1
Fluorene	2.0		ug/l	0.10	0.01	1
Phenanthrene	2.6		ug/l	0.05	0.02	1
Anthracene	0.25		ug/l	0.10	0.01	1
Pyrene	0.30		ug/l	0.10	0.02	1
Benzo(b)fluoranthene	0.04	J	ug/l	0.05	0.01	1
Benzo(a)pyrene	0.07	J	ug/l	0.10	0.02	1
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01	1
Benzo(ghi)perylene	0.01	J	ug/l	0.10	0.01	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	142	Q	23-120
2-Fluorobiphenyl	98		15-120
4-Terphenyl-d14	96		41-149



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01 D
 Client ID: TG07-MW-07-230106
 Sample Location: 1344 W PASSYUNK AVE.

Date Collected: 01/06/23 15:50
 Date Received: 01/06/23
 Field Prep: Refer to COC

Sample Depth:

Matrix: Water
 Analytical Method: 1,8270E-SIM
 Analytical Date: 01/10/23 10:19
 Analyst: JJW

Extraction Method: EPA 3510C
 Extraction Date: 01/07/23 07:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Naphthalene	130		ug/l	0.50	0.24	5
Benzo(a)anthracene	0.12	J	ug/l	0.25	0.10	5
Chrysene	ND		ug/l	0.50	0.06	5

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 01/06/23 18:22
Analyst: AH

Extraction Method: EPA 3510C
Extraction Date: 01/06/23 08:28

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1730640-1					
Naphthalene	ND		ug/l	0.10	0.05
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	0.03	J	ug/l	0.05	0.02
Anthracene	ND		ug/l	0.10	0.01
Pyrene	0.04	J	ug/l	0.10	0.02
Benzo(a)anthracene	0.02	J	ug/l	0.05	0.02
Chrysene	0.02	J	ug/l	0.10	0.01
Benzo(b)fluoranthene	0.01	J	ug/l	0.05	0.01
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	111		23-120
2-Fluorobiphenyl	71		15-120
4-Terphenyl-d14	88		41-149

Lab Control Sample Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1730640-2 WG1730640-3								
Naphthalene	51		81		40-140	45	Q	40
Fluorene	65		86		40-140	28		40
Phenanthrene	70		87		40-140	22		40
Anthracene	72		89		40-140	21		40
Pyrene	83		100		26-127	19		40
Benzo(a)anthracene	78		92		40-140	16		40
Chrysene	78		91		40-140	15		40
Benzo(b)fluoranthene	77		95		40-140	21		40
Benzo(a)pyrene	81		97		40-140	18		40
Indeno(1,2,3-cd)pyrene	86		101		40-140	16		40
Benzo(ghi)perylene	79		93		40-140	16		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	84		125	Q	23-120
2-Fluorobiphenyl	56		80		15-120
4-Terphenyl-d14	85		101		41-149



METALS



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2301049

Project Number: P044.001.002

Report Date: 01/10/23

SAMPLE RESULTS

Lab ID: L2301049-01

Date Collected: 01/06/23 15:50

Client ID: TG07-MW-07-230106

Date Received: 01/06/23

Sample Location: 1344 W PASSYUNK AVE.

Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 17:26	EPA 3005A	1,6020B	SV



Project Name: FORMER PHILADELPHIA REFINERY

Lab Number: L2301049

Project Number: P044.001.002

Report Date: 01/10/23

Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1731110-1										
Lead, Dissolved	ND		ug/l	1.000	0.3430	1	01/09/23 09:06	01/09/23 15:53	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A



Lab Control Sample Analysis**Batch Quality Control****Project Name:** FORMER PHILADELPHIA REFINERY**Lab Number:** L2301049**Project Number:** P044.001.002**Report Date:** 01/10/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1731110-2								
Lead, Dissolved	100		-		80-120	-		

Matrix Spike Analysis Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

<u>Parameter</u>	<u>Native Sample</u>	<u>MS Added</u>	<u>MS Found</u>	<u>MS %Recovery</u>	<u>MSD Qual</u>	<u>MSD Found</u>	<u>MSD %Recovery</u>	<u>MSD Qual</u>	<u>Recovery Limits</u>	<u>RPD Qual</u>	<u>RPD Limits</u>
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1731110-3 QC Sample: L2300961-01 Client ID: MS Sample											
Lead, Dissolved	ND	530	539.3	102		-	-		75-125	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: FORMER PHILADELPHIA REFINERY

Project Number: P044.001.002

Lab Number: L2301049

Report Date: 01/10/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1731110-4 QC Sample: L2300961-01 Client ID: DUP Sample						
Lead, Dissolved	ND	ND	ug/l	NC		20

Project Name: FORMER PHILADELPHIA REFINERY**Lab Number:** L2301049**Project Number:** P044.001.002**Report Date:** 01/10/23**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

Cooler Information**Cooler** **Custody Seal**

A Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2301049-01A	Vial HCl preserved	A	NA		3.3	Y	Absent		PA-8260(14)
L2301049-01B	Vial HCl preserved	A	NA		3.3	Y	Absent		PA-8260(14)
L2301049-01C	Vial HCl preserved	A	NA		3.3	Y	Absent		PA-8260(14)
L2301049-01D	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		8011(14)
L2301049-01E	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		8011(14)
L2301049-01F	Plastic 250ml HNO3 preserved	A	<2	<2	3.3	Y	Absent		PB-6020S-PPB(180)
L2301049-01G	Amber 250ml unpreserved	A	7	7	3.3	Y	Absent		PA-PAHSIM-LVI(7)
L2301049-01H	Amber 250ml unpreserved	A	7	7	3.3	Y	Absent		PA-PAHSIM-LVI(7)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: FORMER PHILADELPHIA REFINERY
Project Number: P044.001.002

Lab Number: L2301049
Report Date: 01/10/23

REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

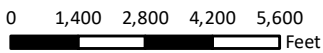
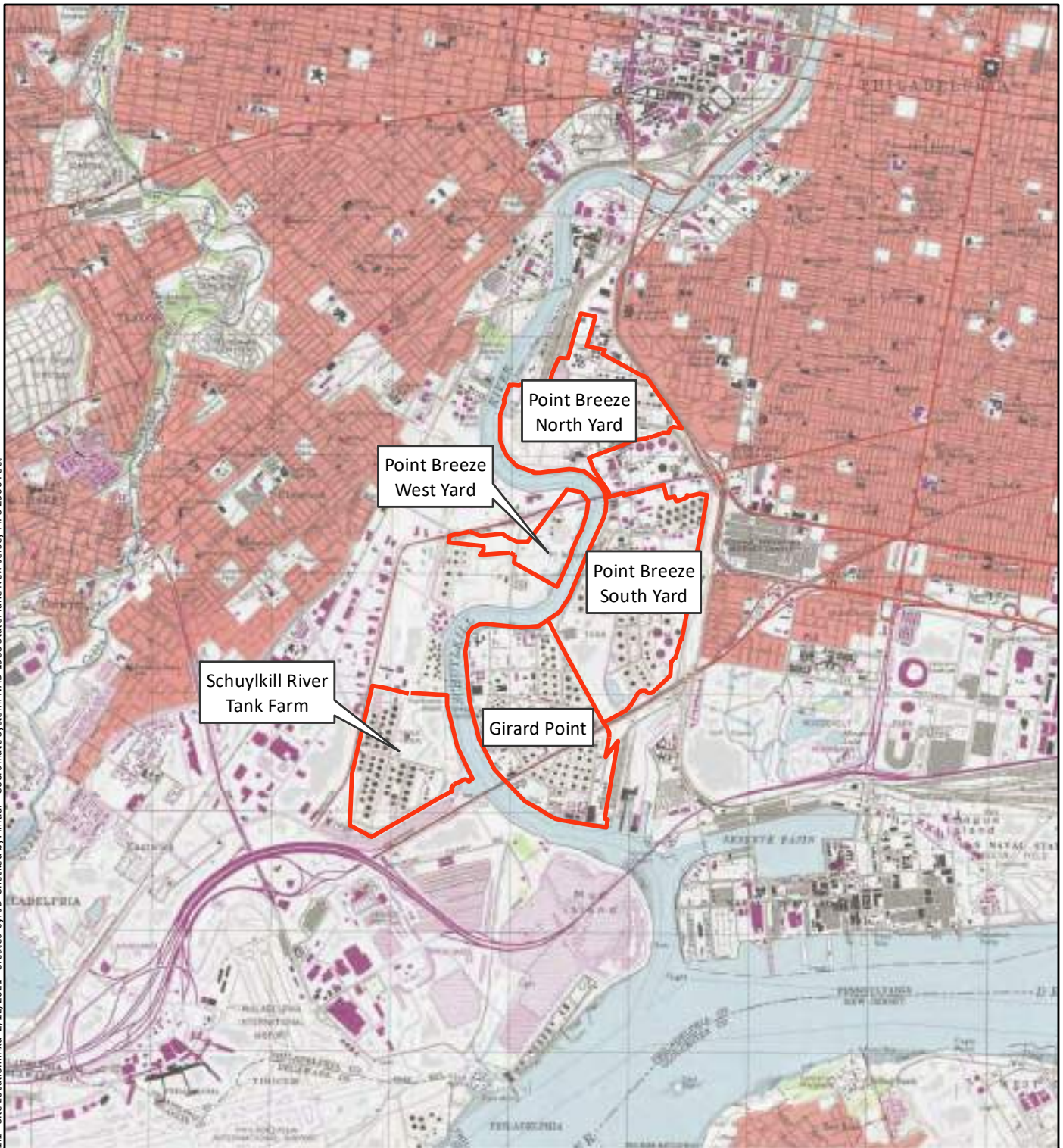
- **Short List 1. Leaded Gasoline, Aviation Gasoline and Jet Fuel:** benzene, toluene, ethyl benzene, xylenes (total), cumene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, 1,2-dibromoethane, and lead.
- **Short List 2. Unleaded Gasoline:** benzene, toluene, ethyl benzene, xylenes (total), cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- **Short List 3. Kerosene, Fuel Oil No. 1:** benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- **Short List 4. Diesel Fuel and Fuel Oil No. 2:** benzene, toluene, ethyl benzene, cumene, methyl tert-butyl ether, naphthalene, 1,2,4-trimethyl benzene, and 1,3,5-trimethyl benzene.
- **Short List 5. Fuel Oil Nos. 4, 5, and 6, and Lubricating Oils and Fluids:** benzene, naphthalene, fluorene, anthracene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(g,h,i)perylene.
- **Short List 6. Waste Oil:** benzene, toluene, ethyl benzene, cumene, naphthalene (Method 8270), pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)pyrene, and lead.

Appendix K

PNDI



File: N:\GIS\Prj\044.001_PESRM-PE5\MXD5\AST Work\Figure 1.1 - Site Location.mxd 2/17/2021 - Created by: JD - Checked by: Initial - Coordinate System: NAD 1983 StatePlane New Jersey FIPS 2900 Feet



1 inch = 4,000 feet



Legend

— Property Boundary

Base Map: USGS Philadelphia 1994 7.5 Minute Quadrangle.

SAFETY FIRST



CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

Site Location

FIGURE 1.1

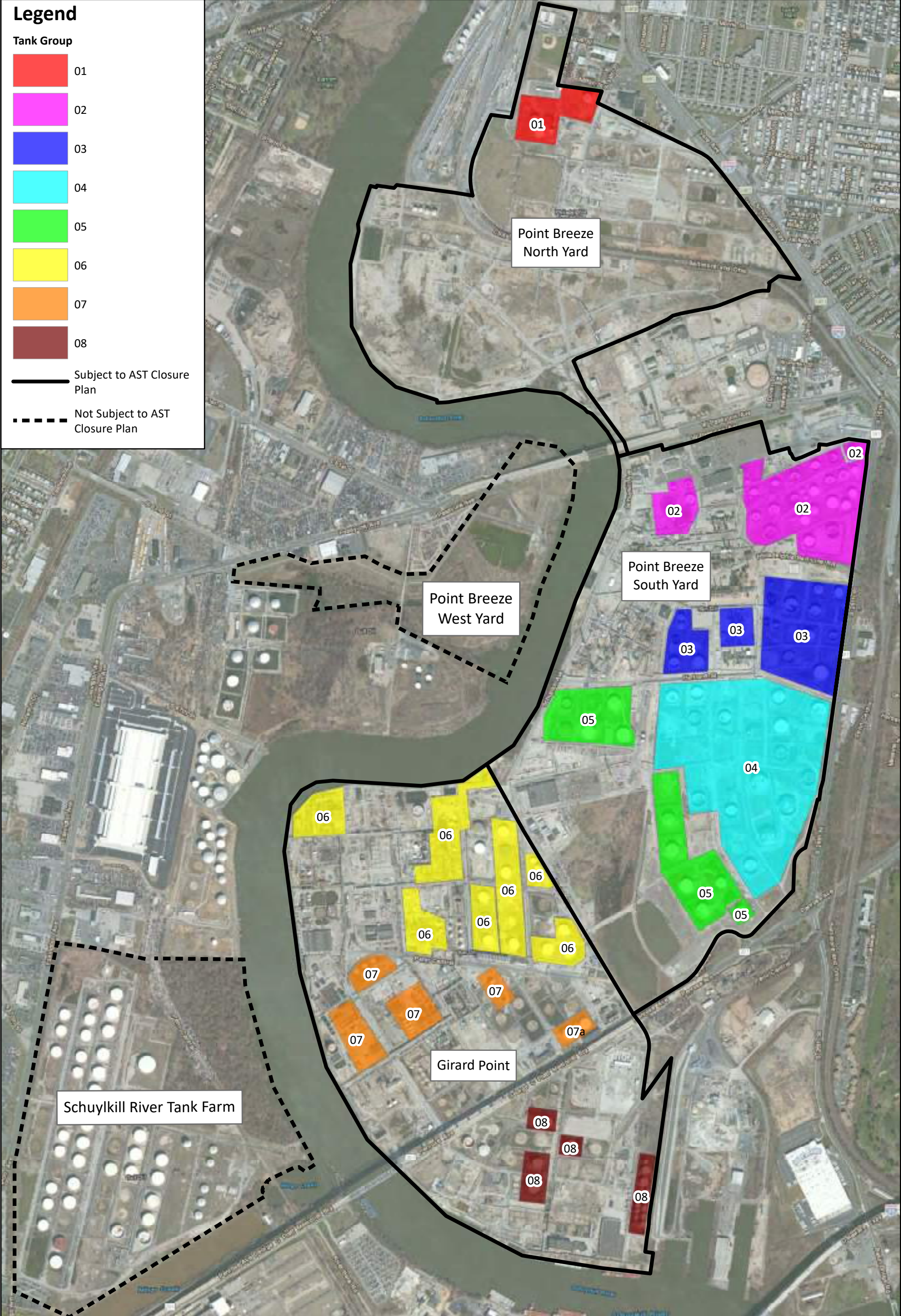
Legend

Tank Group

- 01
- 02
- 03
- 04
- 05
- 06
- 07
- 08

Subject to AST Closure Plan

Not Subject to AST Closure Plan



File: N:\GIS\Prj\044_001_PESRM-PES\WXDS\AST Work\Figure 1.2 - Site Layout.mxd 2/26/2021 Created by: JD Checked by: Initial Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

Notes: Aerial imagery source Maxar 10/19/2019

0 300 600 900 1,200
Feet
1 inch = 1,000 feet

DRAFT

SAFETY FIRST



CLIENT: Philadelphia Energy Solutions Refining and Marketing LLC

PROJECT: Aboveground Storage Tank Closure

PROJECT NUMBER: P044.001.002

Site Layout and AST Closure Phase

FIGURE 1.2

Project Description – PNDI-776057

Terraphase Engineering Inc. (Terraphase) is supporting Philadelphia Energy Solutions Refining and Marketing LLC (PESRM), with the closure of several Aboveground Storage Tanks (ASTs) in accordance with the Storage Tank and Spill Prevention Act (Act 32) and 25 Pa. Code 245, that will be emptied, cleaned, dismantled, and removed during the demolition and redevelopment of the Point Breeze Terminal (Facility ID 51-33620) and Girard Point (Facility ID 51-33624) at the former Philadelphia Energy Solutions (PES) Refinery located at 3144 West Passyunk Avenue, Philadelphia, PA (Site) (Figure 1.1).

The Site is a 1,300-acre former refinery that is being repurposed and redeveloped into a state of the art, multimodal industrial park with ancillary rail infrastructure, energy infrastructure, marine capabilities, and commercial uses. To facilitate redevelopment, existing infrastructure at the Site, including the ASTs, will be demolished. Demolition is anticipated to progress generally from north to south with AST removal to be completed for Point Breeze and Girard Point between 2020 and 2024. Terraphase will prepare reports for submission to the Pennsylvania Department of Environmental Protection (PADEP) as the work progresses by Tank Group (Figure 1.2).

This PNDI review request (776057) is associated with Tank Group 07. Tank Group 07 is located approximately 150 feet east of the Schuylkill River at the nearest point. No wetlands or other potential sensitive receptors are in or adjacent to the Site. The Tank Group consists of approximately 23-acre area within the former PES refinery.



January 13, 2023

IN REPLY REFER TO

SIR# 57293

Terraphase Engineering
Alexander Strohl
1100 E. Hector Street
Conshohocken, Pennsylvania 19428

**RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 776057_1
Former Philadelphia Refinery - Tank Group 07
Philadelphia City: PHILADELPHIA County**

Dear Alexander Strohl:

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 and 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 and Boat Code (Chapter 75), or the Wildlife Code.

An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Kathy Gipe at 814-359-5186 or kgipe@pa.gov and refer to the SIR # 57293. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

A handwritten signature in black ink that reads "Christopher A. Urban". The signature is written in a cursive style with a large initial "C" and "U".

Christopher A. Urban, Chief
Natural Diversity Section

CAU//KDG/dn

January 12, 2023

PNDI Number: 776057
Version: Final_1; 1/3/23

Alexander Strohl
Terraphase Engineering
1100 E. Hector Street, Suite 400
Conshohocken, PA 19428
Email: alexander.strohl@terrphase.com (hard copy will not follow)

Re: Former Philadelphia Refinery – Tank Group 07
Philadelphia, Philadelphia County, PA

Dear Alexander,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number **776057 (Final_1)** for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

No Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

Recommended Best Management Practices:

- Use a conservative approach to project design that minimizes permanent and temporary disturbances to soil and native vegetation. This will conserve habitat and limit opportunities for invasive plants.
- Clean boot treads, tools, construction equipment, and vehicles thoroughly (especially the undercarriage and wheels) before they are brought on site. This will remove invasive plant seeds and invasive earthworms/cocoons that may have been picked up at other worksites.
- Use clean project materials (e.g., weed-free straw) or materials native to the worksite to avoid introducing invasive species from contaminated sources.
- Revegetate or cover disturbed soil and stockpiles quickly to discourage the germination of invasive plants. Implement proper erosion control practices to stabilize soil and reduce runoff.
- Do not use seed mixes that include invasive species. More information about invasive plants in Pennsylvania can be found at the following link: <http://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx>
- Use habitat appropriate seed mixes. For example, use a riparian seed mix when reseeding along a waterway. The Bureau of Forestry Planting & Seeding Guidelines can be found at the following link for recommendations: http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20031083.pdf

- Use native plants for landscaping, revegetation, and stormwater management. Do not use nonnative invasive species. Reduce the area of lawn and impermeable surfaces to the fullest extent practicable in favor of native gardens or habitat restoration (e.g., forest, meadow, wetland, etc.). More information about lawn conversion can be found at the following link: <https://www.dcnr.pa.gov/Conservation/Water/LawnConversion/Pages/default.aspx>
- Plant forest buffers where trees were historically present along streams, wetlands, and bodies of water. Buffers should be a minimum of 35 feet in width (ideally at least 100 feet in width). Where trees are not appropriate (e.g., powerline rights-of-way), buffer with native shrubs and herbaceous plants. More information about riparian buffers can be found at the following link: <https://www.dcnr.pa.gov/Conservation/Water/RiparianBuffers/Pages/default.aspx>
- Manage road/utility rights-of-way, median strips, edges, and other green spaces for diverse native plant communities and wildlife (e.g., monarch butterfly). In seed mixes, include wildflowers that have overlapping bloom periods and provide forage for pollinators throughout the growing season. Avoid blanket herbicide applications; instead, spot-treat undesirable tall woody vegetation and invasive weeds. Where mowing is necessary, reduce frequency to once every few years during the dormant season (i.e., after first frost in late fall and before bird nesting in early spring), leaving some refugia for overwintering wildlife.
- Monitor for invasive plants before, during, and after project activities and promptly control any identified infestations. Frequent monitoring allows for early detection and rapid response.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an “Update” (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR’s jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth’s other resource agencies for environmental review.

Should you have any questions or concerns, please contact Jason Ryndock, Ecological Information Specialist, by phone (717-705-2822) or via email (c-jryndock@pa.gov).

Sincerely,



Greg Podnieszinski, Section Chief
Natural Heritage Section



PENNSYLVANIA GAME COMMISSION

BUREAU OF WILDLIFE MANAGEMENT

2001 ELMERTON AVENUE HARRISBURG, PA 17110-9797 | (717) 787-5529

January 5, 2023

Alexander Strohl
Terraphase Engineering
1100 E. Hector Street
Suite 400
Conshohocken, PA 19428
alexander.strohl@terrphase.com

PNDI Receipt File: *project_receipt_former_philadelphia_refin_776057_FINAL_1.pdf*

Re: Former Philadelphia Refinery - Tank Group 07

Philadelphia Township; Philadelphia County, Pennsylvania

Dear Alexander,

Thank you for submitting Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt *project_receipt_former_philadelphia_refin_776057_FINAL_1.pdf* for review. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

No Impact Anticipated

PNDI records indicate species or resources of concern are located within the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, the PGC has determined that no impact is likely. Therefore, no further coordination with the PGC will be necessary for this project at this time.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,



Halie Parker
Wildlife Biologist / Environmental Review
Bureau of Wildlife Management
Phone: 717-787-4250, Extension 73421
Fax: 717-787-6957
E-mail: halparker@pa.gov

A PNHP Partner



HAP/hap

1. PROJECT INFORMATION

Project Name: **Former Philadelphia Refinery - Tank Group 07**

Date of Review: **1/3/2023 09:39:48 PM**

Project Category: **Hazardous Waste Clean-up, Site Remediation, and Reclamation, Spill (e.g., oil, chemical)**

Project Area: **17.73 acres**

County(s): **Philadelphia**

Township/Municipality(s): **PHILADELPHIA**

ZIP Code:

Quadrangle Name(s): **PHILADELPHIA**

Watersheds HUC 8: **Schuylkill**

Watersheds HUC 12: **City of Philadelphia-Schuylkill River**

Decimal Degrees: **39.903030, -75.210435**

Degrees Minutes Seconds: **39° 54' 10.9086" N, 75° 12' 37.5647" W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
PA Department of Conservation and Natural Resources	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
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.

Former Philadelphia Refinery - Tank Group 07



-  Buffered Project Boundary
-  Project Boundary



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, MMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Former Philadelphia Refinery - Tank Group 07



- Buffered Project Boundary
- Project Boundary



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, MMA, Geodatasystemen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

RESPONSE TO QUESTION(S) ASKED

Q1: Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur.

Your answer is: The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands (holding a natural resource degree or equivalent work experience), or it is currently unknown if the project or project activities will affect wetlands.

Q2: Aquatic habitat (stream, river, lake, pond, etc.) is located on or adjacent to the subject property and project activities (including discharge) may occur within 300 feet of these habitats?

Your answer is: Yes

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 jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game 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).

PGC 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
Cistothorus palustris	Marsh Wren	Special Concern Species*
Ixobrychus exilis	Least Bittern	Endangered

PA Department of Conservation and Natural Resources

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).

DCNR 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. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: <https://conservationexplorer.dcnr.pa.gov/content/survey-protocols>)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Amaranthus cannabinus	Waterhemp Ragweed	Special Concern Species*	Special Concern Species*	Flowers July - September

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**		Endangered
Sensitive Species**		Endangered
Sensitive Species**		Endangered
Sensitive Species**		Threatened

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.

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) (see AGENCY CONTACT INFORMATION). 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 (but not USFWS).

*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

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

PA Fish and Boat Commission

Division of Environmental Services
595 E. Rolling Ridge Dr., 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
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Game Commission

Bureau of Wildlife Management
Division of Environmental Review
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: _____
Company/Business Name: _____
Address: _____
City, State, Zip: _____
Phone:(_____) _____ Fax:(_____) _____
Email: _____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

date