pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO: Ragesh R. Patel
Regional Manager

FROM: Lisa Strobridge, PG
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THRU: Richard M. Staron, PG
Licensed Professional Geologist Manager

Richard M. Staron Digitally signed by Richard M. Staron Date: 2022.08.30 14:07:08 -04'00'

DATE: August 25, 2022

RE: ECB – Storage Tank Cleanup Program
Chapter 245 Technical Memo Summary
Tank Group 03
Site Characterization Report
Philadelphia Refinery Point Breeze Processing Area
Facility ID No. 51-33620
Incident No. 56663
3144 West Passyunk Avenue
City of Philadelphia

Owner/Remediator/Operator Name and Address:

Anne Garr, Esq.
Hilco Redevelopment Partners
111 S. Wacker Drive, Suite 3000
Chicago, IL 60606

Act 2 Standard(s) Sought:

Soil -
Nonresidential Statewide health standards (NR SHS) for the following compounds:
Volatiles: *toluene, methyl tert-butyl ether (MTBE), total xylenes, cumene, and 1,2-dichloroethane (EDC)*
Semi volatiles: *anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluorene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene*

Nonresidential site-specific standards for the following compounds:
Volatiles: *benzene, ethylbenzene, naphthalene, 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-trimethylbenzene (1,3,5-TMB), 1,2-dibromoethane (EDB)*
Inorganics*: lead*

Groundwater –
Nonresidential site-specific standards for the following compounds:
Volatiles: *benzene, ethylbenzene, naphthalene, 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-trimethylbenzene (1,3,5-TMB), 1,2-dibromoethane (EDB)*
Inorganics*: lead*

Property Size: 34.5 acres

Project Site History:

Petroleum refining began at the Philadelphia Refinery in 1870 and continued through 2019. The facility consisted of two refineries, Point Breeze operated by Atlantic Petroleum Corporation (formerly ARCO) and Girard Point by Chevron (formerly Gulf). Sunoco purchased these two refineries in 1988 and 1994 and consolidated them into a single facility. In 2012, Sunoco sold the refinery to the Carlyle Group and entered a joint venture to operate it as Philadelphia Energy Solutions (PES). Sunoco, Inc. is now a subsidiary of Energy Transfer Partners, L.P., and Evergreen is a Sunoco affiliate that is responsible for legacy environmental remediation. In 2020, PES was acquired by Hilco Redevelopment Partners (HRP). HRP is redeveloping the property into an industrial park.

In August 2020, PADEP was notified of HRP's intent to begin decommissioning the former refinery, and in December 2020, HRP submitted a site-specific aboveground storage tank (AST) closure soil sampling plan that divided the ASTs into eight tank groups. On April 23, 2021, PADEP approved the *Aboveground Storage Tank Closure Work Plan* (Work Plan), which defined the number of samples and sampling lists for each AST.

Tank Group 03 is located within the former Point Breeze Refinery South Yard (South Yard), includes the area previously known as No. 2 Tank Farm, and is also located within Evergreen's AOI 1 and AOI 2 designations (PF 778374 and PF 778376, respectively). Evergreen has selected site-specific standards as the remedial standards for soil and groundwater for historical releases that it previously characterized in AOI-1 and AOI-2. Remedial Investigation Reports were approved on November 1, 2016 and October 18, 2017, respectively, for AOI 1 and AOI 2.

Decommissioning activities in Tank Group 03 were initiated in December 2020 and were completed in April 2022, when the tank double bottoms were removed at PB 190, PB 121, PB 151, PB 172, and PB 134 and soil samples were collected.

On August 12, 2021, PADEP was notified of a confirmed release following receipt of laboratory data indicating impact to soil at PB 121 (031A) and PB 178 (038A) from soil samples collected during AST closure activities. The initial notice of confirmed release was subsequently modified on August 20, 2021 and May 23, 2022 to add the following ASTs following receipt of laboratory data confirming impact to soil at these locations: PB 126 (005A), PB 162 (006A), PB 190 (007A), PB 172 (036A), PB 176 (037A), and PB 151 (034A).

ASTs PB 144 (072A), PB 145 (073A), PB 152 (035A), and PB 179 (039A) are also present in Tank Group 03 but closure analytical results had not detected concentrations of analyzed

compounds or concentrations met applicable NR SHS. Soil samples collected from PB 16V 135 (063A) and PB 16V 137 (013A) were analyzed for pH only as these ASTs contained sulfuric acid, and pH in soil samples was detected within a pH range of 2 to 12.5.

Prior to demolition, the stored products within these tanks were reported to be: heavy naphtha (PB 126, PB 190, PB 176, and PB 178), cat gasoline (PB 162 and PB 172), spent sulfuric acid (PB 16V 137), UDEX feed (PB 121), vacuum gas oil (PB 151), residual vacuum bottoms (PB 152), light naphtha (PB 179), fresh sulfuric acid (PB 16V 135), and main frac bottom (PB 144 and PB 145).

Specific redevelopment details (building placement, cut/fill areas, pavement, etc.) for the Tank Group 03 footprint have not been finalized at the time of this SCR submittal.

Site Findings:

General Information:

- Unconsolidated materials extend to approximately 70-90 feet below grade and consist of fill (up to 25 ft), alluvium (silt, clay, and sand), the Trenton Gravel, and the Potomac-Raritan-Magothy (PRM) formations (sand and clay units) in Tank Group 03. It is noted that the Upper Clay Unit is not continuous in this area. The Wissahickon Formation underlies the unconsolidated materials.
- Shallow groundwater has been reported by Evergreen in AOI 1 and 2 in the vicinity of Tank Group 03 at depths ranging from approximately 15 to 30 feet below grade (ft bg).

Soil:

- Soil borings installed to delineate impacts in Tank Group 03 were predominately installed to a target depth of 5 ft bg, with targeted supplemental borings installed to maximum depths of 14.5 feet to vertically delineate soil impacts.
- Field notes were included as an appendix to the SCR, but soil boring logs were not included. In addition, a description of the soil lithology was included for the sample depth in the field notes, but not for the borehole overall. The report text also states that the continuous soil cores were collected and screened to identify potentially impacted zones and to guide soil sample depth collection to target the impacted zones. Soil boring logs are needed to understand soil lithology and conditions throughout the borehole.
- A total of 211 soil borings were installed and 220 soil samples were collected using a combination of direct push drilling technologies and hand augers for AST closure assessment samples.
    - AST closure assessment samples collected from depths of 1 ft below grade are needed for multiple locations at each of the four tanks where product line samples were collected from deeper intervals.
    - AST closure assessment samples that were designated as AST sample locations should have been sampled at a depth of 3 ft below the tank.
    - Deviations from the AST closure requirements should have been explained and prior approval received. Field screening was not consistently conducted throughout the boreholes, so it is unclear why soil sampling interval deviation took place. An

explanation of deviations is needed for approval and/or re-sampling may be required following review of an explanation of deviations.

- Concentrations of benzene, ethyl benzene, 1,2,4-TMB, 1,3,5-TMB, naphthalene, and/or lead exceeded applicable Statewide health standards in soil samples collected from PB 121 (031A), PB 126 (005A), PB 151 (034A), PB 162 (006A), PB 172 (036A), PB 176 (037A), PB 178 (038A), and PB 190 (007A).
- The laboratory detection limit was above the Statewide health standard and applicable EPA RSL for EDB in multiple samples collected from across Tank Group 03 when high level sample prep was performed. EDB detection limits met SHS MSCs when low level sample prep and analysis was performed. It was reported that EDB was not anticipated to be affiliated with the product types stored in these ASTs, however this COC was on the April 23, 2021 PADEP-approved Aboveground Storage Tank Closure Work Plan. DEP requires EDB, as well as all compounds that exceed the applicable selected standard, to be characterized to the selected standard.
    - DEP recognized SHS MSCs as characterization thresholds for COCs where SHS are selected and regional screening levels (RSLs) or calculated SSS as the characterization threshold for COCs where SSS are selected.
    - DEP does not recognize the use of ½ of the reporting limit as a proxy concentration when the detection exceeds SHS MSCs.

- An additional 97 soil samples from 44 soil borings were collected from Tank Group 03 to delineate soil impacts observed as part of the AST closure activities.
    - Soil was not adequately characterized at multiple locations across Tank Group 03. For example, the AST closure samples PB 121-08 and PB 121-09 were collected at 3.5-4 ft and 3-3.5 ft, respectively. These were product line samples and should have been collected at 2 ft below grade. The samples that were collected from these locations contained benzene at concentrations above the SHS MSCs. Vertical characterization was not conducted at either location. In addition, locations that could be considered lateral characterization soil boring locations to the west and south were not sampled at the same intervals resulting in inadequate lateral characterization.
    - There are also AST closure samples collected from PB 121 where the EDB detection limit was above the soil to groundwater SHS MSC and are considered exceedances that required characterization.
    - Continuous field screening was not conducted to guide the evaluation for alternative sampling depths of characterization samples. These types of characterization deficiencies were noted at multiple tanks within Tank Group 03.
    - The report also indicates that vertical characterization was not complete in multiple borings as the deepest sample collected exceeded the soil to groundwater SHS MSCs. The soil borings appear to have been terminated at approximately 14.5 feet with no evidence of refusal, bedrock or encountering groundwater. Additional soil delineation is needed. PB 121-12R is an example where vertical characterization was extended to a depth of 14-14.5 ft below grade and that sample interval contained benzene above the SHS MSC. This location requires additional vertical delineation.
    - The report text indicates that no soil impacts "identified during Site Assessment/ Characterization with concentrations greater than Non-Res UA S-GW is contributing notably to the pre-existing groundwater contamination within the Site. The sources of

groundwater contamination appear to be related to the historically identified LNAPL plumes and other releases detailed in Evergreen's AOI 1 and AOI 2 RIRs".

- Technical lines of evidence supporting this statement are needed, including assessment of groundwater in the source areas where tank impacts were identified and evidence of a confirmed release was observed (PB 83).

Groundwater:

- Two aquifers have been historically documented at the site.
  - An unconfined shallow aquifer occurs within the Holocene and Trenton Gravel deposits.
  - A deeper semi-confined aquifer is present within the Farrington Sand and is part of the PRM aquifer system. The deeper groundwater unit is separated by a clay unit, however the clay until is not continuous across AOI 1 and AOI 2.
- Reference to expected depth to groundwater is not reported in the SCR.
- Groundwater monitoring wells were not installed to evaluate soil to groundwater impacts associated with AST removal activities.
- The report indicates that groundwater impacts associated with AST closure activities do not warrant further evaluation as supported by the following lines of evidence:
  - dissolved plumes are currently present in Tank Group 03.
  - groundwater concentrations were estimated using the SHS MSC calculations and result in similar or lower levels of impact present in the area.
  - the calculated groundwater concentration was projected using 1-D groundwater fate and transport modeling to determine the extent of the projected plume.
- PADEP does not concur with the technical basis provided for not evaluating groundwater.
  - A groundwater investigation is required to evaluate potential groundwater impacts for each COC.
  - An assessment of the contribution of impacts to groundwater from the soil samples collected during AST closure activities is needed. It was noted that AST closure samples contained higher concentrations of select compounds than historical samples in some locations.
  - The groundwater modeling performed was not a conservative model (such as Domenico) and would significantly underestimate source area concentrations.

LNAPL:

- The presence or absence of LNAPL was not described in the field notes.

Surface Water:

- The potential for surface water impacts were not evaluated as part of this report.

Vapor Intrusion:

- Soil samples were not screened for vapor intrusion to evaluate a future vapor intrusion exposure pathway.

Ecological:

- A PNDI evaluation was conducted in May 2022, site remediation was selected as the project type, potential impact was identified by the Pennsylvania Fish and Boat Commission (PAFBC) and further review was required. A conservation measure was noted by the Pennsylvania Department of Conservation and Natural Resources (DCNR), but no further review was required.
- A letter from DCNR dated May 17, 2022 indicated "no impact anticipated".
- A response from PAFBC was not included in the SCR.

Site Cleanup History:

Incident Number(s): 56663
Confirmed Release Date(s): August 12, 2021, August 20, 2021, May 23, 2022
SCR: June 8, 2022
Buyer-Seller COA: PADEP, Sunoco (R&M) f/k/a Sunoco, Inc. (R&M), and PESRM entered into a Buyer-Seller COA on August 14, 2012, when PESRM acquired the Philadelphia Refinery from Sunoco, Inc. (R&M). This Buyer-Seller COA was amended in a First Amendment to Consent Order and Agreement on June 26, 2020 as part of HRP's acquisition of PES.
COA: PADEP and PESRM entered a COA on January 15, 2020 and as approved on January 22, 2020 by the U.S. Bankruptcy Court for the District of Delaware. The COA has been amended on seven occasions.
Soil Management Plan: A Soil Management Plan, dated June 15, 2020 and approved by PADEP on June 18, 2020, describes how HRP will take a site specific approach to characterizing impacted soil, categorize soil for reuse at the site, manage contaminated soil and waste, integrate site grading with site remedy implementation, and perform the work in a manner consistent with Act 2 cleanup requirements.
Aboveground Storage Tank Closure Work Plan: A site specific Aboveground Storage Tank Closure Work Plan was approved by PADEP on April 23, 2021 and outlines the concept of sampling and reporting by Tank Groups, as well as clarifies the sampling to be conducted at tanks and below product lines.
AST Closure Reports: AST Closure Reports for Tank Group 03 have not been received by PADEP as of August 24, 2022.

Discussion of Cleanup Involved:
Pathway elimination to restrict access to impacted soil, as outlined in the previously approved Soil Management Plan, is anticipated.

PADEP Final Action Decision:

The June 8, 2022 SCR for Tank Group 03 is recommended for disapproval due to the following deficiencies:

1. The sources of contamination could not be determined or confirmed in accordance with 25 Pa. Code Sections 245.310(a)(9) and 245.309(b)(3), as referenced by 25 Pa. Code Section 245.310(a). AST Closure Reports were not submitted as part of the SCR as

agreed upon in the April 23, 2021 Aboveground Storage Tank Closure Workplan. Therefore, observations and activities completed during the AST closure could not be assessed with respect to the potential for additional source areas.

2. Sufficient physical data was not presented that determined the extent of migration of regulated substances in soil and groundwater in accordance with 25 Pa. Code Section 245.309(b)(4), as referenced by 25 Pa. Code Section 245.310(a)(12). For example, AST closure samples were not consistently collected from the appropriate depths, resulting in incomplete soil delineation at the 1-foot and 3-foot intervals in select locations. Impacts that were observed in soil were not consistently laterally and vertically characterized across the site to the selected standard. Potential impacts to groundwater were also not sufficiently evaluated.
3. The vapor intrusion exposure pathway was not adequately evaluated in accordance with 25 Pa. Code Sections 245.309(c)(12), as referenced by 25 Pa. Code Section 245.310(a)(32).
4. The soil characteristics were not adequately evaluated as required by 25 Pa. Code Section 245.309(c)(9), as referenced by 25 Pa. Code Section 245.310(a).
5. Soil boring logs were not provided in accordance with 25 Pa. Code Section 245.310(a)(14).
6. A conceptual site model was not provided in accordance with 25 Pa. Code Section 245.310(a)(23).
7. The impacts to ecological receptors were not properly evaluated in accordance with 25 Pa. Code Sections 250.311 or 250.402(d), as referenced by 25 Pa. Code Section 245.310(a)(28). Documentation submitted to the Pennsylvania Fish and Boat Commission and their response was not included as part of the PNDI survey provided in the report.
8. The potential for surface water impacts was not evaluated as part of this report as required by 25 Pa. Code Sections 250.309 or 250.406, as referenced by 25 Pa. Code Section 245.310(a)(29).

The technical deficiencies will be discussed with Hilco and Terraphase on August 31, 2022 and this technical memo will be shared following distribution of the decision letter.

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