pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO: Ragesh R. Patel
Regional Manager

FROM: Lisa Strobridge, PG
Licensed Professional Geologist

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

Richard M. Staron Digitally signed by Richard M. Staron Date: 2022.07.01 15:25:23 -04'00'

DATE: July 1, 2022

RE: ECB – Storage Tank Cleanup Program
Chapter 245 Technical Memo Summary
Tank Group 2
Site Characterization Report
Philadelphia Refinery Point Breeze Processing Area
Facility ID No. 51-33620
Incident No. 56377
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: *cumene, 1,2-dichloroethane (EDC), ethanol*
Semi volatiles: *anthracene, fluorene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene*

Non-residential Site Specific Standards for the following compounds:
Volatiles: *benzene, toluene, ethylbenzene, total xylenes, methyl tert-butyl ether (MTBE), 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 Statewide health standards (NR SHS): for the following compounds:

Volatiles: *cumene, 1,2-dichloroethane (EDC), ethanol*
Non-residential Site Specific Standards for the following compounds:
Volatiles: *benzene, toluene, ethylbenzene, total xylenes, methyl tert-butyl ether(MTBE), naphthalene, 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-trimethylbenzene (1,3,5-TMB), 1,2-dibromoethane (EDB)*
Inorganics*: lead*

Statewide health standards do not exist for ethanol so development of a site-specific standard will be needed for this COC.

Property Size: 33.95 acres

Project Site History:

Petroleum refining began at the Philadelphia Refinery from 1870 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 02 is located within the former Point Breeze Refinery South Yard (South Yard) and includes the former No. 1 Tank Farm, No. 2 Tank Farm, and Point Breeze Process Area. Tank Group 02 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 in AOI-1 and AOI-2 they previously characterized. Historical soil and groundwater samples have been collected by Evergreen to characterize historical releases 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. Groundwater is currently being remediated by Evergreen on the eastern portion of AOI 1 and Tank Group 2 via the 26th Street North Remediation System.

Decommissioning activities in Tank Group 02 were initiated in December 2020 and were completed in August 2021, with the exception of double bottoms at PB 28, PB 34, PB 35, PB 36, PB 37, PB 43, PB 83, PB 84, PB 85, PB 128, and PB 129. The double bottoms at all 11 tanks were completed in January 2022 and the closure soil sampling below these ASTs was also conducted in January 2022.

On June 10, 2021, PADEP was notified of a confirmed release following observation of free product at PB 83 (004A) during AST Closure Activities. The initial notice of confirmed release was subsequently modified on July 13, 2021, August 3, 2021, and August 12, 2021 to add the following ASTs following receipt of laboratory data confirming impact to soil at these locations: PB 27 (019A), PB 28 (020A), PB 29 (021A), PB 33 (002A), PB 34 (022A), PB 35 (023A), PB 36 (087A), PB 37 (024A), PB 38 (003A), PB 39 (025A), PB 40 (026A), PB 42 (027A), PB 84 (029A), PB 85 (030A), PB 128 (032A), PB 129 (033A), and PB 204 (041A).
ASTs PB 26 (001A) and PB 43 (028A) are also present in Tank Group 02 and closure analytical results had not detected concentrations of analyzed compounds or concentrations met applicable Statewide health standards. It should be noted that field notes for PB 26 (001A) indicate that field screening of soil during AST Closure sampling indicated concentrations ranging from 42.9 ppm to 6,790 ppm with the vast majority over 1,000 ppm. Soil samples collected from PB 26 were analyzed for ethanol only and ethanol was not detected above laboratory detection limits. Without evidence that an ethanol release occurred, ethanol is not eligible for cleanup liability protection and should be removed as a site COC.

Prior to demolition, the stored products within these tanks were reported to be: ethanol (PB 26), gasoline components (PB 27, PB 37, and PB 128), alkylate (PB 28), heavy reformate (PB 29 and PB 129), gasoline (PB 33, PB 34, PB 35, PB 36, PB 38, PB 39, and PB 40), no. 2 fuel oil (PB 42), recovered oil (PB 204), 15MV1 distillate (PB 43, PB 83, PB 84, and PB 85), phosphoric acid (PB 7316), methanol (PB 14V 304 and PB 3V 37), and sodium hypochlorite (PB 89A).

Specific redevelopment details (building placement, cut/fill areas, pavement, etc.) for the Tank Group 02 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 2. 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 at depths ranging from approximately 7 to 30 feet below grade (ft bg)

Soil:

- Soil borings installed to delineate impacts in Tank Group 02 were predominately installed to a target depth of 5 feet below grade, 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.

- The AFR contractor identified evidence of releases to the environment during the AST removal in the vicinity of tank PB 83 (i.e., the identification of free product). PADEP was notified by JD2 via telephone of this release on June 10, 2021.
    - The SCR states that interim remedial measures including Interim Remedial Actions were also implemented, including the recovery of water with sheen and free product, but documentation was not included in the SCR.
- A total of 338 soil borings were installed and 351 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 to 3.5 ft below grade.
    - 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, EDB, ethyl benzene, MTBE, toluene, 1,2,4-TMB, 1,3,5-TMB, xylenes [total], naphthalene, and/or lead exceeded applicable Statewide health standards in soil samples collected at all ASTs, except for PB 26 (001A) and PB 43 (028A).
        - Soil samples collected from PB 26 (001A) were analyzed for ethanol only and a Statewide health standard does not exist for comparison.
- An additional 79 soil samples from 32 soil borings were collected from Tank Group 02 to delineate soil impacts observed as part of the AST Closure activities.
    - Soil was not adequately characterized at multiple locations across Tank Group 02. For example, the AST Closure sample PB-27-01 at 2.5-3 ft exceeded the direct contact Statewide health standard for naphthalene and the soil to groundwater concentration for benzene, ethylbenzene, MTBE, 1,2,4-TMB, and 1,3,5-TMB. Soil samples were later collected from the 0-0.5 ft and 3.5-4 ft intervals and were analyzed for naphthalene only and not the additional volatile compounds. In addition, PB-27-18 was installed north of PB-27-01 to delineate soil impacts in the northern direction. Soil samples collected from PB-27-18 were collected from the 0-0.5 ft and 6-6.5 ft intervals, but not the depth where impacts were observed in PB-27-01 where impact was observed. Continuous field screening was not conducted to guide the evaluation for alternative sampling depths. These types of characterization deficiencies were noted at multiple tanks within Tank Group 02.
    - The report also indicates that vertical characterization was not complete in multiple borings as “the deepest sample collected exceeded the soil to groundwater Statewide health standards”. The soil borings appear to have been terminated at approximately

15 feet with no evidence of refusal, bedrock or encountering groundwater. Additional soil delineation is needed.

- 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.
- Reference to expected depth to groundwater is not reported in the SCR.
  - Groundwater is encountered in the vicinity of PB 83 in Tank Group 2 at approximately 20 ft below ground surface (bgs), as reported in AOI 1 RIR.
- 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 2
  - light non-aqueous phase liquids (LNAPL) are present in Tank Group 2 and are currently being remediated.
  - 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.
  - The presence of historical LNAPL does not exclude the possible contributions of impacts from the ASTs, especially in the area of PB 83 where LNAPL was observed during AST Closure. Additional lines of evidence, such as forensic sampling, are needed.
  - An evaluation of the presence of lead in groundwater, considering groundwater flow direction, is needed to further support the basis of a historical condition.
  - 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, especially in the vicinity of PB 83.
- The groundwater modeling performed was not a conservative model (such as Domenico) and would significantly underestimate source area concentrations.

LNAPL:
- LNAPL was noted during the AST Closure of PB 83, but was not further evaluated.

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 April 2022, site remediation was selected as the project type, and potential impact was identified by the Pennsylvania Fish and Boat Commission (PAFBC) and further review was required.
- A letter from PAFBC dated May 17, 2022 indicated that "given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence, no adverse impacts are expected to the species of special concern".
  - Copies of the documentation submitted to PAFBC were not included in the SCR.

Site Cleanup History:

Incident Number(s): 56377
Confirmed Release Date(s): June 10, 2021, July 13, 2021, August 3, 2021, and August 12, 2021
SCR: April 7, 2022, Amended May 20, 2022
COA: PADEP and PESRM entered into 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 02 have not been received by PADEP as of June 30, 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 April 7, 2022 SCR that was amended on May 20, 2022, 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 Section 245.309(a) and (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. Potential impacts to groundwater were not sufficiently evaluated, and the extent of LNAPL observed at PB 83 was not delineated. Since Statewide health standards do not exist for ethanol, a development of a site-specific standard will be need to be developed for this COC and delineated to the standard, if there is evidence of a release.
3. The interim remedial actions associated with product removal at PB 83 were not documented in accordance with 25 Pa. Code Section 245.310(a)(4).
4. The disposition of recovered LNAPL waste from interim remedial actions at PB 83 was not documented in accordance with 25 Pa. Code Section 245.310(a)(4)(iv)(F).
5. 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), and 245.310(a)(32).
6. Soil boring logs were not provided in accordance with 25 Pa. Code Section 245.310(a)(14). The soil characteristics were therefore not adequately evaluated as required by 25 Pa. Code Section 245.309(c)(9), as referenced by 25 Pa. Code Section 245.310(a).
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 was not included as part of the PNDI survey provided in the report.
8. The potential for surface water impacts were 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).

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The technical deficiencies will be discussed on the next bi-weekly project call on July 6, 2022.

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