



# pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

MEMO

**TO** Sachin Shankar, P.E. *SS*  
Assistant Regional Director

**FROM** C. David Brown, P.G. *CDR*  
Licensed Professional Geologist

**THROUGH** Susan Kennedy, P.G. *SK*  
Professional Geologist Manager

**DATE** April 28, 2017

**RE** ECB: Land Recycling Program  
Act 2 Technical Memo Summary  
**AOI 5**—Girard Point South Tank Field Area  
Remedial Investigation Report  
eFACTS PF No. 748141  
3144 West Passyunk Avenue  
City of Philadelphia  
Philadelphia County

**Property Owner Name and Site Address:**

Owner	Remediator	Site
Philadelphia Energy Solutions 3144 W. Passyunk Ave. Philadelphia, PA 19145	Evergreen Resources Management Operations 2 Righter Parkway, Suite 200 Wilmington, DE 19803	3144 West Passyunk Avenue Philadelphia, PA 19145

Coordinates: 39.8980°N, 75.2041°W

**Act 2 Standard(s) Sought:**

Soil and groundwater—nonresidential site-specific standard

**Property Size:** 114 acres

**Project Site History:**

Area of Interest 5 of the Philadelphia Refinery complex (AOI 5) is located in the southeastern corner of the facility and is known as the Girard Point South Tank Field Area. Petroleum refining began at the facility circa 1870. The area was formerly operated by Chevron (previously Gulf) as part of the Girard Point Refinery, and it was purchased by Sunoco in 1994. 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. Evergreen Resources Management Operations is a Sunoco subsidiary responsible for its legacy environmental liabilities.

Petroleum contamination exists in AOI 5 from historical operations, including releases from above ground storage tanks and pipelines. Most historic ASTs have been removed from the area. Other operations have included product packaging as well as rail, truck, and marine transfer facilities. Evergreen (Sunoco) is participating in the Act 2 program to address contamination predating the transfer of the property to PES on September 8, 2012. Corrective action responsibilities under the Storage Tank and Spill Prevention Act are being addressed simultaneously. There are presently ten open tank incidents associated with ten regulated storage tanks in AOI 5 (51-11554, 51-36558). A site characterization report for these tanks was received on February 23, 2017 and is under review.

**Site Findings:**

Unconsolidated materials at AOI 5, with increasing depth, consist of fill, alluvium (sand, silt, and clay), and the Potomac-Raritan-Magothy (PRM) formations (sand and clay units). (The Trenton Gravel (sand and gravel), present elsewhere in the area, is apparently not found in AOI 5.) The Wissahickon Formation bedrock is around 90' deep or greater. Shallow groundwater depths range from ~1' to 10'.

In 2007–2016 over 350 soil samples were collected in AOI 5. Samples were obtained for general characterization, in monitoring well borings, at regulated storage tanks with reported incidents, at suspected locations of historic leaded tank bottoms (SWMUs 93 and 94), and to delineate previously identified exceedences. Samples were typically analyzed for 10 VOCs, 10 SVOCs, and lead.

Sample results showed numerous exceedences of soil-to-groundwater MSCs for VOCs and lead. Three locations in SWMUs 93 and 94 met the criteria of leaded tank bottom materials (TCLP test results exceeding 5000 µg/L). Direct contact MSC exceedences were identified for benzene, cumene, benzo(a)pyrene, and lead.

Substance	Number	Depths (ft)	Maximum (mg/kg)	Locations
Benzene	1	1–2	1100	eastern tank farm
	4	3–6	1500	eastern tank farm
Cumene	2	0–2	21,000	eastern tank farm
	5	2–4	33,000	
Benzo(a)pyrene	2	0–2	19	southwest, eastern tank farm
Lead	11	0–2	18,000	various

Over 80 monitoring wells are present in AOI 5. Eleven wells were abandoned in 2014 upon construction of a Butane Rail Terminal by PES. Three wells (one abandoned) are screened in the PRM Lower Sand aquifer (60–85' depths). The shallow wells are commonly ~15' deep, and they are screened in the fill or alluvium. The wells were gauged and sampled in 2007 and 2014 with two to four rounds of analytical data for most wells. Samples were analyzed for 10 VOCs, 10 SVOCs, and lead.

Groundwater flow is broadly inferred to the south and southwest, towards the Schuylkill River. Isolated areas of middle distillate LNAPL occur in the southwest corner of AOI 5, adjacent to the river. A larger, contiguous heavy distillate LNAPL plume is present in the southeast, but it is not proximal to the river. Recent LNAPL thicknesses are up to ~4'. Langan concluded that LNAPL plumes are stable and relatively immobile.

Benzene exceeds in groundwater at only a few wells (maximum 65 µg/L), none near the river. Several SVOCs exceed in numerous wells, many along the river. Lead exceedences occur in multiple wells (maximum 95 µg/L), some of which are adjacent to the river. Other exceedences are isolated; MTBE exceeds only in one deep well at the northern (upgradient) corner of AOI 5 (64 µg/L). No plumes are known to cross the property boundary, other than at the river bulkhead. Insufficient data is available to understand plume stability.

The Schuylkill River adjoins AOI 5 to the southwest and south. A sheet pile wall bulkhead along the river bank was constructed into the alluvium layer.

A PNDI review was performed in March 2015. The Pennsylvania Fish and Boat Commission identified the eastern red-bellied turtle as a threatened species of concern.

There are several occupied buildings in AOI 5. Indoor air samples were collected in 2016 at five buildings that are not positively pressurized. None of the results exceeded occupational limits (such as OSHA PELs) or applicable DEP screening values. Outdoor air samples were also collected at five locations of potential exposure to vapors from subsurface sources. Those results did not exceed occupational limits.

**Site Cleanup History:**

NIR Received Date	December 14, 2016
RIR Disapproved Date	March 15, 2012
RIR Addendum Received Date	February 10, 2017

An initial NIR was submitted October 16, 2006; it was revised with updated information on November 17, 2014 and December 14, 2016. The facility entered into a consent order and agreement with DEP's Clean Water Program in December 1993; the agreement was succeeded by another in December 2003 which terminated in December 2013. The facility is currently subject to a DEP buyer-seller agreement which became effective September 8, 2012. A site characterization report was submitted for AOI 5 on August 24, 2007 under the Clean Water Program agreement. The site entered into the One Cleanup Program with DEP and EPA on November 8, 2011. A previous AOI 5 RIR was submitted December 13, 2011.

On May 6, 2015 DEP approved a site-specific numerical standard of 2240 mg/kg for lead in soil at the Philadelphia Refinery. This standard was developed in a risk assessment report received February 26, 2015.

**Discussion of Cleanup Involved and Demonstration of Attainment:**

Sunoco operated a total fluids recovery system for LNAPL and groundwater contamination at the No. 9 Berth. The system startup date was not reported. There were two recovery wells, and extracted fluids were discharged to the process sewer and treated at the facility's WWTP. The system was shut down in 2009 because of a lack of recoverable LNAPL. The quantity of LNAPL removed was not measured. There has been a recent increase in LNAPL thickness in one of the wells, and Evergreen will assess additional remedial action.

Evergreen intends to attain a site-specific standard with pathway elimination for soil and groundwater. Soil direct contact exceedences and potential LNAPL exposures will be addressed in a cleanup plan. Further vapor intrusion evaluation will be conducted. Groundwater contamination will be managed with a use restriction. An environmental covenant will be required. Institutional controls, such as OSHA workplace requirements, may be utilized for the inhalation pathway.

A fate-and-transport model will be developed for the entire refinery site and provided in a future report. This analysis will include a surface water assessment. An ecological evaluation is required for the eastern red-bellied turtle.

**DEP Final Action Approval/Disapproval Letter:**

I recommend approving the RIR. Soil and groundwater have been adequately characterized in AOI 5. DEP will communicate several comments and concerns that require follow-up to Evergreen by e-mail.

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