



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

MEMO

TO Stephan Sinding
Regional Manager, Environmental Cleanup and Brownfields

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

THROUGH Walter Payne, P.G. *WP*
Professional Geologist Manager

DATE November 22, 2013

RE ECB: Land Recycling Program and Tanks Program
Act 2 and Corrective Action Technical Memo Summary
Former Sunoco Philadelphia Refinery AOI 6
Remedial Investigation Report and Site Characterization Report
eFACTS PF No. 769099
Tank Facility IDs 51-11554, 51-36558
3144 Passyunk Avenue
City of Philadelphia
Philadelphia County

Property Owner Name and Site Address:

Owner	Remediator	Site
Philadelphia Energy Solutions Refining and Marketing LLC 3144 Passyunk Ave. Philadelphia, PA 19145	Sunoco, Inc. 10 Industrial Highway MS4 Lester, PA 19029	3144 Passyunk Ave. Philadelphia, PA 19145

Coordinates: 39.9026°N, 75.2074°W

Act 2 Standard(s) Sought:

Soil (nonresidential)
 SS BG SHS

GW (nonresidential)
 SS BG SHS

Site Size: 117 acres

Project Site History:

Petroleum refining began at the site circa 1870. 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.

The refinery can process up to 330,000 barrels a day of crude oil. It produces gasoline, diesel, jet fuel, kerosene, home heating oil, and other petroleum liquids. The facility consists of multiple process units, above-ground storage tanks, pipelines, as well as truck, railcar, and barge transfer equipment. This includes the Belmont Terminal which is owned and operated by Sunoco Logistics Partners L.P.

Area of Interest 6 (AOI 6) is known as the Girard Point Chemicals Processing Area. It is bordered by the Schuylkill River to the west and other areas of the refinery on the remaining sides. A sheet pile bulkhead exists along the river frontage. Historic and current operations in AOI 6 include: petroleum and chemical processing, steam boiler plants, storage in regulated above-ground tanks, oil-water separators, maintenance buildings, office buildings, and a laboratory.

This combined RIR/SCR includes a site-wide characterization and addresses two regulated storage tank releases (Facility ID 51-36558):

Release Date	Incident ID	Sunoco Tank	DEP Tank	Material
6/10/2002	29122	797	097A	various hydrocarbons
1/27/2007	37546	250	030A	kerosene

Site Findings:

The stratigraphy below AOI 6, from the surface to bedrock, consists of recent fill and alluvium, the Trenton Gravel Formation, the Middle/Lower Clay unit and the Lower Sand unit of the Potomac-Raritan-Magothy aquifer, and the Wissahickon Formation schist.

Soil sampling performed in 2002–2012 was focused at two leaded tank bottom SWMUs (92 and 95), four ASTs with releases, and selected other areas. Surface (0–2') and subsurface (2–15') samples were obtained. Analytes included up to 10 VOCs, 11 SVOCs, and lead from DEP's petroleum short list. Sunoco adopted surface direct contact MSCs for the subsurface samples to account for possible future excavation and emplacement of deeper soils at the surface. There were numerous exceedences of soil-to-groundwater MSCs and multiple exceedences of nonresidential direct contact MSCs throughout AOI 6. The substances with direct contact exceedences were the following.

Substance	Maximum (mg/kg)	NR DC MSC (mg/kg)	Number*	Comments
Benzene	1850	290	7	Tank 797 vicinity
Benzo(a)pyrene	59	11	1	area NW of SWMU 95
Lead	2930	1000	12	SWMU 92, area NW of SWMU 95

* Number of samples exceeding the standard.

There are about 80 shallow and four deep wells in the AOI that have been installed since 1986. The most recent sampling rounds were in 2005, 2006, and 2012, encompassing 49 wells. The depth to water range is ~1–8'. Groundwater flow is to the southwest on the western side of the AOI, and there is a groundwater depression on the eastern side.

Monitoring well sampling indicated exceedences of nonresidential SHS MSCs for several substances. (Note that wells with LNAPL were not sampled.)

Substance	Maximum (µg/L)	NR MSC (µg/L)	Number*
Benzene	450,000	5	24
Toluene	6200	1000	2
MTBE	34	20	2
1,2-DCA (EDC)	140	5	1
1,2,4-TMB	212	62	1
1,3,5-TMB	64	53	1
Benzo(a)anthracene	66	3.6	3
Benzo(a)pyrene	115	0.2	7
Benzo(b)fluoranthene	161	1.2	3
Benzo(g,h,i)perylene	118	0.26	5
Chrysene	810	1.9	6
Naphthalene	270	100	1
Pyrene	2600	130	3
Lead	17	5	2

* Number of wells with one or more exceedences of the standard.

The primary contaminant of concern in groundwater is benzene. Most benzene exceedences are around Tank 797, the 27 Pump House, and downgradient areas (e.g., wells B-149, B-154, and B-155). This is also near the largest LNAPL plume in AOI 6.

Measurable LNAPL was observed in 19 of 38 wells recently gauged. The primary LNAPL body is at the 27 Pump House area (<0.5' thick), and isolated LNAPL was identified at seven other locations (generally <0.5', maximum 5'). LNAPL was fingerprinted and classified as gasoline, middle distillate, and residual oil. API modeling indicated that the LNAPL bodies were not significantly mobile.

Fate-and-transport analyses were performed for contaminants in wells with the potential to impact the Schuylkill River. Langan utilized Quick Domenico, SWLOAD, and PENTOXSD. Modeling indicated that benzene could exceed the fish and aquatic life surface water criterion. This was

reevaluated accounting for a lower permeability zone reflecting the effect of the sheet pile wall. These results did not exceed the surface water criterion.

Indoor air sampling was performed in 2012 in three buildings: the Girard Point office building, the training building, and the 24 Gate building. (Other buildings are positively pressurized.) Thirteen samples were collected in a single round, as well as an ambient air sample. Contaminant concentrations in indoor air were similar to but higher than outdoor ambient air. Sunoco evaluated the results against OSHA PELs and ACGIH TLVs. All results were at least 100 times below these limits.

AOI 6 is industrialized and has impermeable surface covers in many areas. A 2012 PNDI request indicated the potential presence of threatened and/or endangered species. Langan is awaiting decisions by the Pennsylvania Fish and Boat and Game Commissions as to whether there are any ecological receptors of concern at the site.

Site Cleanup History:

NIR Received Date October 16, 2006

RIR Received Date September 5, 2013

DEP signed a CO&A with Sunoco in December 1993 which was succeeded by a new agreement in December 2003. It requires corrective action to achieve an Act 2 standard for the entire facility and any offsite areas with contamination. A site characterization report was submitted for AOI 6 under the CO&A in September 2006. DEP received the NIR in October 2006, and the site entered the One Cleanup Program for joint RCRA and Act 2 actions in November 2011. An August 2012 CO&A established that Sunoco retained environmental liability for preexisting contamination upon sale of the refinery to PES. Reports are submitted to satisfy both Act 2 and Act 32 obligations.

Discussion of Cleanup Involved and Demonstration of Attainment:

A groundwater remediation system operated around the 27 Pump House from 2001 until 2010. Total fluids were collected at 12 recovery wells. Operation ceased because LNAPL recovery was greatly diminished. The wells currently have absorbent socks. An estimated 12,900 gal of LNAPL has been recovered.

In 2007 light fuel oil was released from Tank GP-250 (51-36558 tank 030A). Sunoco excavated 40 yd³ of soil. Eight attainment samples were analyzed for the jet fuel/kerosene petroleum short list. There were no VOC exceedences, and lead exceedences were not attributable to the product that was released. This attainment apparently satisfies the requirements of §245.310(b).

Langan and Sunoco concluded that all exposure pathways were incomplete with the exception of direct contact with shallow soil. Groundwater is not used, worker contact with groundwater is restricted by the facility's health and safety protocols, and modeling suggests that groundwater does not impact the river in excess of Ch. 93 criteria. LNAPL is located within the AOI 6 boundaries, is immobile, and worker contact is limited by health and safety rules. Indoor air sampling indicates no exceedences of OSHA PELs.

The report includes a human health risk assessment for direct contact exposures to benzene, benzo(a)pyrene, and lead in soil. Because the submission does not satisfy the administrative requirements of a risk assessment report, it has not been reviewed here.

DEP Final Action Approval/Disapproval Letter:

There are several significant administrative and technical deficiencies with the final report that were communicated to Sunoco in a November 22, 2013 e-mail. They are listed below. Various other concerns were also enumerated in the comment e-mail, and these must be resolved prior to submission of a revised RIR/SCR and eventually a final report.

- The report was submitted only as an Act 2 remedial investigation report (RIR). However, it includes a risk assessment (§9.0 and Appendix G). A risk assessment report (RAR) is required when performing a baseline risk assessment and for developing site-specific standards. Submission of a RAR must be noted on the transmittal sheet, include payment of the \$250 review fee, and include municipal and public notifications. [§250.405, 409, and 601]
- Based on knowledge of past releases and the existence of LNAPL in AOI 6, there should be additional soil investigation. [§250.408(b)]
- Contamination in the area of Tank 797 is not delineated to the northwest, north, and northeast. [§245.309(c)(9), 250.408(d)]

- Two tanks have open incidents that were not addressed in the RIR/SCR. [§245.309(a), 310(a)]

Sunoco Tank	DEP Tank	Date	Incident ID	Facility ID	Material
T-81	121A	9/12/1993	45692	51-11554	fresh caustic
676	130A	7/19/1998	4844	51-36558	No. 6 fuel oil
676	130A	1/11/2000	6133	51-36558	No. 6 fuel oil

- Appendix E, Attachment A lacks soil disposal documentation for Tank GP 250. [§245.310(a)(4)(v)(C)]
- Additional evaluation is required to determine whether the vapor intrusion pathway is incomplete and what inhalation standards apply to occupied buildings in the refinery. [§250.404(a)]
- The fate-and-transport analysis requires a fuller consideration of source areas, input parameter values (hydraulic conductivity, hydraulic gradient, first-order decay rates), and model calibration. [§250.408(a)]

I recommend issuing a disapproval letter.

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