



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 December 6, 2013

RE ECB: Land Recycling Program and Tanks Program
Act 2 and Corrective Action Technical Memo Summary
Former Sunoco Philadelphia Refinery AOI 7
Remedial Investigation Report and Site Characterization Report
eFACTS PF No. 750870
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: 39.9072°N, 75.2086°W

Act 2 Standard(s) Sought:

Soil (nonresidential)
 SS BG SHS

GW (nonresidential)
 SS BG SHS

Site Size: 130 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 7 (AOI 7) is known as the Girard Point Fuels Processing Area. It is bordered by the Schuylkill River to the west and north 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 7 include: petroleum processing, a sulfur plant, a hazardous waste incinerator, material storage in regulated under- and above-ground tanks, a wastewater treatment plant, and various buildings.

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

Release Date	Incident ID	Sunoco Tank	DEP Tank	Material
6/25/2002	29142	271	033A	gas oil
6/28/2009	40386	270	032A	crude oil

Site Findings:

The stratigraphy below AOI 7, from the surface to bedrock, consists of recent fill and alluvium, the Trenton Gravel Formation (only locally present), 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 2002–2013 was focused at five leaded tank bottom SWMUs (87–91), five ASTs, and selected other areas. Surface (0–2') and subsurface (2–15') samples were obtained, with about 62 surface and 31 subsurface samples. No leaded tank bottom materials were observed. Analytes from DEP's petroleum short list included up to 10 VOCs, 11 SVOCs, and lead. Sunoco adopted surface direct contact MSCs for the subsurface samples to account for possible future excavation and shallow emplacement of deeper soils. There were some exceedences of soil-to-groundwater MSCs and multiple exceedences of nonresidential direct contact MSCs throughout AOI 7. The substances with direct contact exceedences were the following.

Substance	Maximum (mg/kg)	NR DC MSC (mg/kg)	Number*	Comments
Benzo(a)pyrene	16	11	2	Tanks 271, 1100
Lead	2060	1000	7	SWMU-87, 89, 90, 91

* Number of samples exceeding the standard.

There are about 65 shallow and five deep wells in the AOI that have been installed since 1986. The most recent sampling events were in July 2010 and January 2012, comprising one complete sampling round at a total of 62 wells. The shallow depth to water range is ~2–10'. The overall shallow groundwater gradient is to the west, toward the river, although there are local deviations.

Monitoring well sampling indicated exceedences of nonresidential SHS MSCs for several substances. Analytes consisted of 10 VOCs, five SVOCs, and lead. (Note that wells with LNAPL were not sampled.)

Substance	Maximum (µg/L)	NR MSC (µg/L)	Number*
Benzene	89	5	1
Chrysene	64	1.9	9
Lead	16	5	1

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

The only widespread contaminant of concern in groundwater is chrysene. Wells with exceedences are scattered throughout the AOI with many other wells below the standard. There are no obvious contiguous plumes.

Measurable LNAPL was observed in 18 of 65 wells gauged in January 2012. The primary LNAPL body is next to the former No. 3 Separator and the river bulkhead with thicknesses exceeding 5'. Sheening of the river has been observed there. Isolated LNAPL was identified at two other locations adjacent to the bulkhead (~0.3', 1.8'). LNAPL was fingerprinted and classified as light crude oil, middle distillate, residual oil, and lube oil. API modeling indicated that the LNAPL near the No. 3 Separator could be mobile.

Fate-and-transport analyses were performed for contaminants in wells with the potential to impact the Schuylkill River or the property line. Langan utilized Quick Domenico and SWLOAD. Modeling indicated that contaminants would not reach the property boundaries or impact the river in excess of Ch. 93 standards.

Indoor air sampling was performed in 2012 in Maintenance Building 440; all other buildings are positively pressurized. Two samples were collected in a single round, as well as ambient air samples in other areas. Contaminant concentrations in indoor air were similar in magnitude to but generally higher than outdoor ambient air. Sunoco evaluated the results against OSHA PELs and ACGIH TLVs. All concentrations were more than 100 times below these limits.

AOI 7 is industrialized and has impermeable surface covers in many areas. A 2012 PNDI request indicated the potential presence of threatened and/or endangered species. The ecological evaluation is not complete.

Site Cleanup History:

NIR Received Date October 16, 2006
RIR Received Date March 1, 2012
RIR Addendum Received Date September 20, 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 7 under the CO&A in September 2010. 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 buyer-seller 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:

In 2009 recovered oil was released from Tank GP-270 (Facility 51-36558, Tank 032A). Sunoco excavated and disposed of 800 yd³ of soil. Fifteen attainment samples were analyzed for the fuel oil and waste oil petroleum short lists as well as xylenes. There were no exceedences of nonresidential SHS MSCs. The cleanup satisfied the requirements of §245.310(b), and DEP issued an approval letter on November 6, 2013, closing the incident.

LNAPL was identified near the former No. 3 Separator in 2011. Ten recovery wells were installed in August 2012 and Sunoco began total fluids removal. Approximately 30,000 gal of LNAPL has been recovered and over 4 million gallons of water. The system continues to operate.

Langan and Sunoco concluded that all exposure pathways were incomplete with the exception of direct contact with shallow soil. Refinery protocols prevent exposure to contaminated subsurface 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 7 boundaries but 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 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 RIR/SCR that are listed below. Various other concerns will also be enumerated in a comment e-mail to Sunoco, 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 (§5.0 and Appendix F of the Addendum). 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 7, there should be additional soil investigation. [§250.408(b)]
- All historical soil data should be included in the RIR. [§250.408(c)]
- There was an insufficient characterization of the horizontal extent of soil contamination in certain areas, including BH-12-48 (SWMU-87), C-142 (SWMU-89), BH-12-87 (SWMU-90), and BH-12-94 (SWMU-91). [§250.408(d)]
- More than one round of groundwater sampling is required to adequately characterize the site. [§250.408(e)]
- The extent of LNAPL around wells C-106 and C-168 is not sufficiently delineated. [§250.408]
- Twelve regulated 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
Unknown UST	002?	8/5/1989	5825	51-11554	gasoline?
Unknown UST	003?	8/5/1989	5915	51-11554	diesel?
M-5	005	1/31/1991	45686	51-11554	diesel
275	057A	9/16/1991	45689	51-11554	cat charge stock
272	054A	11/11/1993	45694	51-11554	crude oil
273	035A	6/6/1995	45697	51-36558	vacuum gas oil
M-4	001	5/6/1998	6134	51-36558	gasoline
M-5	002	5/6/1998	45699	51-36558	diesel
1108	149A	9/6/1998	45700	51-36558	No. 6 fuel oil
281	043A	9/18/1999	30777	51-36558	gas oil
281	043A	11/24/2001	5913	51-36558	gas oil
1002	139A	5/2/2006	36456	51-36558	decanted oil
1100	140A	5/30/2006	36578	51-36558	slop oil
277	039A	6/25/2007	38132	51-36558	heavy gas oil
272	034A	3/8/2011	42279	51-36558	crude oil

- A groundwater investigation is required in the area of the former underground storage tanks M-4 and M-5. [§245.309(c)(10)]
- Additional evaluation is required to determine if 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 and input parameter values (source concentrations, hydraulic conductivity, dispersivity, first-order decay rates). [§250.408(a)]
- Sunoco must document how refinery health and safety procedures eliminate worker exposure to contaminated soil and LNAPL. [§250.404]
- Further documentation of the ecological assessment is required. [§250.404]

I recommend issuing a disapproval letter.

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