pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION	**REPORT COMMENTS** C. David Brown 16 Jan 2014	Commonwealth of Pennsylvania Department of Environmental Protection Southeast Regional Office Environmental Cleanup and Brownfields

Site: **Philadelphia Refinery AOI 4** 3144 Passyunk Avenue Philadelphia, PA 19145		eFACTS Facility ID: 770318	Tank Facility ID: 51-19781
		Incident ID: *multiple*	NIR Date: 16 Oct 2006
Municipality: Philadelphia	County: Philadelphia	Location: 39.9098°N, 75.1965°W	

Comments on AOI 4 "Site Characterization/Remedial Investigation Report" dated 16 Oct 2013, prepared by Langan Engineering and Environmental Services, for the former Sunoco Philadelphia Refinery, currently the Philadelphia Energy Solutions Refining and Marketing LLC facility.

General

1. This report was submitted only as an Act 2 remedial investigation report (RIR). However, it includes a risk assessment (§9.0 and Appendix L). A risk assessment report (RAR) is required when developing site-specific standards [§250.405, 409, and 601]. Submission of a RAR must be noted on the transmittal sheet, include payment of the $250 review fee, and include municipal and public notifications.
2. DEP has not formally reviewed the risk assessment portion of the report pending completion of RAR administrative requirements. One comment is provided below.

Soil Investigation

3. Are there records of past non-tank surface or subsurface releases (such as from pipelines) that were, or should have been, investigated?
4. Little or no soil data was presented in this report for the locations of many removed tanks, such as Tanks 185, 186, 187, 189, 250, 255, 256, 257, 258, 820, and S-35. Were there closure assessments for these tanks? If not, should soil be investigated in those areas?
5. Little soil data was presented in areas with LNAPL, such as the plumes in the southeast near Penrose Avenue and in the north (S-103 and 104). There were presumably surface or shallow releases that were the source of product at these locations, and there may be remaining soil impacts. Sunoco should investigate soil in these areas.
6. We note that lead was not an analyte for soil samples until 2013, so most samples collected in AOI 4 do not have lead results.
7. Soil boring logs were not included with the report (Appendix C).

Groundwater

8. For completeness, Table 1 should also list the deep wells in AOI 4, such as S-38D, S-59D, and S-119D.

9. Many well logs were not included in this and earlier reports, including (but not limited to) S-38I, S-38D, S-233–241, S-278 and 279.

10. I'm unclear on how wells are distinguished as "shallow" or "intermediate" or both. Many shallow wells are screened as deep as the intermediate wells. The important factor, for AOI 4 as well as the rest of the refinery, is what hydrostratigraphic unit is represented by each well. Some wells are screened into the alluvium, but that unit rarely has water in AOI 4. Nearly all the wells I looked at contained water only in the Trenton Gravel.

11. Sunoco's RIRs have not included the monitoring well data collected as part of the annual sampling. This report gives only one or two years of data for most wells (Table 6), although many wells have additional data that give a more complete picture of groundwater conditions and trends. For example, perimeter wells S-38 and S-40 have several rounds of sampling that show recent exceedences, and sampling was performed at S-224 in 2006 as well as in 2005. RIRs should include, or at least reference, all historic data [§250.408(c)].

12. Significant groundwater exceedences exist at the southeast edge of AOI 4. Benzene levels are greater than 5000 µg/L, and LNAPL is present at the property boundary. Fate and transport modeling suggests the plume may be >800′ long, which would extend beyond adjacent right-of-ways onto other properties. The recovery system that was installed in 2013 may exert hydraulic control, but this was not demonstrated. (See EPA's "A systematic approach for evaluation of capture zones at pump and treat systems," EPA/600/R-08/003, Jan 2008.) Also, well S-224 has shown >1000 µg/L benzene and is at least 100′ from the nearest recovery well. Contamination could have migrated from this source area for many years before recovery began and is likely still present offsite. Sunoco is required to delineate the horizontal extent of offsite contamination [§250.408(e)]. (DEP previously communicated the need for an offsite investigation in a 25 Feb 2011 memo.)

13. The report does not explain how water recovered by the Penrose Avenue Recovery System is treated prior to discharge to the city sewer and how vapors are controlled (§6.1).

LNAPL

14. Sunoco should show LNAPL plumes near AOI boundaries in the context of LNAPL occurrence in adjacent AOIs (Figure 11). For instance, the LNAPL at S-282 and S-365 in the northwest of AOI 4 may be contiguous with LNAPL at RW-2 in AOI 3. The operation of a recovery system at RW-2 for some 20 yr may have influenced the LNAPL configuration at these wells. Also, LNAPL was identified in S-369 in the northeast corner; has LNAPL been found in the wells located in the southeast corner of AOI 1?

15. The report suggests that LNAPL around S-369 will be delineated as part of the cleanup plan. Delineation of groundwater contamination is a required part of the remedial investigation [§250.408(e)].

16. LNAPL recovery was conducted at S-29 and S-30 until 2010. Substantial LNAPL remains in these wells, and S-30 has shown an increase in thickness to ~5′ or more. API modeling

indicated a seepage velocity of 2.7 m/yr, indicating appreciable mobility. DEP would like to discuss Sunoco's plans for addressing this LNAPL.

Storage Tanks

17. Sunoco described investigations of ten tanks in Appendix H. Five additional tanks have open incidents that were not addressed in the RIR/SCR. Closure sampling at a sixth tank (PB 844) showed a benzene exceedence that was a reportable release. Corrective actions, including site characterizations, are required for these tanks. They are:

Sunoco Tank	DEP Tank	Incident Date	Incident ID	Material
823	097A	3/26/1993	45961	hydrocracker gas oil
842	110A	10/10/1996	6226	crude oil
253	056A	8/27/1998	45966	diesel
848	116A	6/25/2007	38093	crude oil
252	055A	6/28/2007	38094	No. 2 fuel oil
844	112A	1/7/2008	45998	crude oil

18. We request that you *do not* include previously submitted reports in the RIRs for tanks that were either closed with no confirmed contamination or that completed corrective action such that the incident was already closed in our records. (For example, Tanks 826, 845, 849, and 880.)

19. We request that RIRs identify all past and present regulated storage tanks on a map, such as the current and historic use figures of Appendix B or Figure 4. Each tank should be marked with its number (e.g., "846").

20. For DEP to approve the SCR, the report must address all applicable parts of Title 25 Pa. Code Sections 245.309 and 310. If Sunoco is pursuing closure of an incident pursuant to §245.310(b) (attainment of the Statewide health standard for soil), then the demonstration of attainment must comply with the applicable parts of §250.703 and 707(b). (See the specific deficiencies in #22–25 below.)

21. Appendix H recommends that DEP administratively close out the cases for ten tanks. Six of these (Tanks 843, 844, 846, 847, 881, and 885) will require further action.

Sunoco ID	DEP ID	Incident	Explanation
PB 826	100A	33821	A crude oil release occurred in Jul 2004. DEP approved the Jan 2005 SCR/RACR on 7 Mar 2005. No further action was required.
PB 843	111A	6229	Sunoco documented the 2006 closure of the tank. However, there was a Mar 2000 crude oil release that was not addressed. DEP apparently received a RACR for this incident in Oct 2004, but we did not issue a decision on the report and I cannot find it in our file. The incident remains open.
PB 844	112A	45998	The closure sampling in 2006 revealed a benzene exceedence at one location (Line 10). This was a reportable release. Further work is required to close the incident.

Sunoco ID	DEP ID	Incident	Explanation
PB 845	113A	—	This tank was closed in 2006 and no release was confirmed. There is no incident to close in our records.
PB 846	114A	6227	There was a May 2002 release of recovered oil and the tank was closed in 2006. The information provided did not demonstrate attainment of an Act 2 standard for soil. (See #22 below.)
PB 847	115A	37051	This tank was closed in 2006 following a Sep 2006 crude oil release. Further information must be provided to close the incident. (See #23 below.)
PB 849	117A	—	This tank was closed in 2007 and no release was confirmed. There is no incident to close in our records.
PB 880	119A	33449	A crude oil release occurred in Apr 2004. DEP approved the Oct 2004 SCR/RACR on 10 Jan 2005. No further action was required.
PB 881	120A	35654	There was a Sep 2005 release of crude oil. Further information must be provided to close the incident. (See #24 below.)
PB 885	124A	37107	There was an Oct 2006 release of crude oil. Further information must be provided to close the incident. (See #25 below.)

22. A 29 May 2002 recovered oil release occurred at Tank 846. Sunoco submitted a Jul 2003 assessment report that was revised in Jan 2004. The reporting did not describe the interim remedial actions following the release. According to the figures, there was an excavation on the north side of the tank. There was no description of the excavation, volume of soil removed, or the disposition of the soil. No attainment sample results were presented. One point, GP-8, exceeded for naphthalene outside the excavation. Demonstration of attainment of an Act 2 standard is required.

23. A 3 Sep 2006 release of crude oil occurred at Tank 847. Sunoco provided a Jan 2007 assessment report. It did not describe the interim remedial actions taken. (Sampling did not indicate any soil exceedences.)

24. A 3 Sep 2005 release of crude oil occurred at Tank 881. Sunoco provided a Dec 2005 assessment report. There was an inadequate description of the remediation. The excavation area should be shown on a figure. The depth(s) and volume of the excavated soil must be provided. Soil disposal documentation was not submitted. Sunoco must demonstrate that the attainment sampling requirements of §250.707(b) were satisfied (such as biased sampling and the number of samples).

25. A 15 Oct 2006 release of crude oil occurred at Tank 885. Sunoco submitted an Apr 2007 assessment report. The remedial activities must be completely described. Were there any actions taken other than the excavation? Provide a figure showing the excavated area. Describe the depth(s) and volume of excavated soil. Document the soil disposition.

Fate & Transport Modeling

DEP provided remarks on fate-and-transport analyses in previous comments on the AOI 6, 7, and 11 RIRs. Many of those apply to the modeling described in the AOI 4 report as well. Some additional comments on the analyses in Appendix K follow.

26. Longitudinal dispersivity was a fixed value (32′) based on an empirical formula assuming a 2000′ plume. This is not a unique value, and it's unclear that it is conservative. Another common estimate of dispersivity is one-tenth the plume length, which could give values up to ~80′.

27. The modeling used a hydraulic conductivity of 24 ft/day from 2003 well testing of RW-406 in AOI 1. Provide a copy of the test data and analysis. Have there been aquifer tests of other refinery wells screened in the Trenton Gravel? Why the reliance on data from this single well? The USGS has published hydraulic conductivity estimates for 14 Trenton Gravel wells, with a median value of 430 ft/day ("Geohydrogeology of Southeastern Pennsylvania").

28. Offsite wells to the southeast of AOI 4 are necessary to properly calibrate fate-and-transport models of the plume in that area.

Exposure Pathways

29. The reports suggest that worker direct contact exposures with contaminated soil and subsurface LNAPL will be prevented by means of existing refinery procedures. Explain how these procedures will eliminate all direct contact exposure routes.

Risk Assessment

30. The revised target and baseline blood lead levels appear to be appropriate. Based on these studies, we expect that the geometric standard deviation of blood lead distribution should also change. This value should be determined and input into the calculation.

C. David Brown P.G. | 1/16/14

C. David Brown P.G. | Date

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