pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION	**REPORT COMMENTS** C. David Brown 22 Nov 2013	Commonwealth of Pennsylvania Department of Environmental Protection Southeast Regional Office Environmental Cleanup and Brownfields

Site: **Philadelphia Refinery AOI 6** 3144 Passyunk Avenue Philadelphia, PA 19145		eFACTS Facility ID: 769099	Tank Facility ID: 51-11554, 51-36558
		Incident ID: *multiple*	NIR Date: 16 Oct 2006
Municipality: Philadelphia	County: Philadelphia	Location: 39.9026°N, 75.2074°W	

Comments on "Site Characterization/Remedial Investigation Report" dated 3 Sep 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 G). A risk assessment report (RAR) is required when performing a baseline risk assessment and for developing site-specific standards (Sections 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. Some comments are provided below.

Soil Investigation

3. The report only includes soil sampling data from 2006 and 2012 (and tank investigations in Appendix E). Was there no relevant soil data from before 2006?

4. Our records include reports of several historic incidents in AOI 6 that were not addressed in the RIR. Was there remediation and/or soil sampling at these areas? What were the results?

Date	Location	Material	Description
4/28/1992	4th Street	cat charge stock	~10 Bbl released from transfer line
Sep 1992	near Main Office Building	jet fuel	~4000 gal released from underground line
9/3/1993	near No. 4 boilerhouse	No. 2 fuel oil	~30 Bbl released from transfer line
2/21/1994	5th Street and Y Avenue	naphtha	~100 Bbl released from aboveground line

5. Are there records of other recent surface or subsurface releases (say, since 1993) that were, or should have been, investigated?

6. No soil data was presented in this report for the locations of many removed tanks, such as Tanks 237, 238, 240, 241, 242; 401-A, 484, 485; 802–805, and others. Were there closure assessments for these tanks? If not, why hasn't soil been investigated in those areas?

7. There is little or no soil data in some areas with LNAPL plumes. These include the area around the 27 Pump House, wells B-129, B-47, U-3, and B-124. There were presumably surface or shallow releases that were the source of product at these locations, and there may be remaining soil impacts. There should be soil investigations in these areas.

8. What was the rationale for the soil sampling in the northwest section of the area, at and around BH-12-110 and BH-12-106?

9. Contamination in the area of Tank 797 is not delineated to the northwest, north, and northeast.

10. Figure J-3 in Appendix J shows impervious surfaces. We ask that you plot soil sample locations with soil-to-groundwater standard exceedences on this map. Any areas where there are exceedences under pavement may need to have this engineering control maintained in the future.

11. Figure J-3 does not depict the tank pads of removed ASTs as impermeable surfaces. Aren't these pads concrete?

LNAPL

12. The report (§7.4 and Appendix H) indicates API modeling was performed for the wells near 27 Pump House in 2006; it indicated the LNAPL was mobile, but a recovery system was operating. Was the modeling repeated using the 2012 data after recovery ceased? Is that LNAPL plume still mobile or not?

Vapor Intrusion

13. Are all employees in the Main Office Building, the Training Building, and the 24 Gate Building subject to OSHA regulations? For instance, do all workers have annual OSHA training and medical monitoring? Is PES in compliance with 29 CFR Section 1910.1028 for all employees in these buildings? What documentation do PES and Sunoco have demonstrating applicability of OSHA standards to all employees?

14. Did Stantec survey the buildings for possible indoor contaminant sources?

15. How were the buildings ventilated before and during the sampling? Were they being heated?

16. The samples were collected for 4 hr. DEP and EPA recommend 8-hr indoor air samples in nonresidential buildings.

17. Stantec obtained trip blanks. There is little QA/QC value to a trip blank in a Summa canister. A field blank would be more useful.

18. Why wasn't naphthalene analyzed in the indoor air samples? Naphthalene is on Sunoco's contaminant list, it is listed by EPA and DEP as a substance of potential VI concern, and it has an OSHA PEL. Naphthalene can be analyzed using Method TO-15.

19. Detected indoor air concentrations were uniformly higher than (though of similar magnitude to) the outdoor ambient sample. This implies the role of some combination of vapor intrusion and indoor sources. The basement samples in the GP Main Office Building had generally higher concentrations than samples from the first and second floors, which could indicate vapor intrusion.

20. Stantec's description of risk-based screening in §6.2 of the Mar 2013 report (Appendix I) is not correct. DEP's indoor air criteria in our 2004 guidance are derived for the Statewide health standard only (a cancer risk of 10^{-5} and a hazard quotient of 1.0 for each substance). The site-specific standard has been selected for the refinery. The SHS screening criteria are not applicable for the SSS. A SSS pathway evaluation and human health risk assessment is required. Refer to DEP's online Q&A. We do allow SSS screening for indoor air sampling data based on properly adjusted EPA RSLs as described in the Q&A and the Technical Guidance Manual (Section IV.G.2.a.i., p. IV-116). These correspond to a cancer risk of 10^{-6} and a HQ of 0.1 for each substance. On this basis several indoor air results would exceed the SSS screening and require a risk assessment.

Storage Tanks

21. Two tanks have open incidents that were not addressed in the RIR/SCR. Corrective action is required for these tanks, and they must have a site characterization. They are:

Sunoco Tank	DEP Tank	Incident 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

22. We request that you *do not* include documentation (such as past 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 677, 201, and 1088.)

23. Appendix E, Attachment A lacks soil disposal documentation for Tank GP 250.

24. Please clarify what materials were stored in Tank 797. Different sections of the report refer to benzene, cumene, and process water. What is an appropriate analyte list for the release from this tank?

25. Appendix E recommends that DEP administratively close out the cases for five tanks. One of these, Tank 797, will require further action.

Sunoco ID	DEP ID	Incident	Explanation
GP U 201	175A	38646	We closed the incident for this tank on 7/30/2008, and no further action was required.
GP U 1088	089A	38644	We closed the incident for this tank on 7/30/2008, and no further action was required.
GP U 677	131A	n/a	This tank was closed in place and no release was confirmed. There is no incident to close in our records. Additional investigation might be warranted when the tank is dismantled.

Sunoco ID	DEP ID	Incident	Explanation
GP 250	030A	37546	Based on the information provided in the report, there appeared to be a satisfactory demonstration of attainment for soil pursuant to §245.310(b). This incident can be closed upon receipt of soil disposal documentation.
GP 797	097A	29122	The information in the report did not demonstrate attainment of an Act 2 standard. The incident will remain open until that is accomplished.

Fate & Transport Modeling

DEP provided several general remarks on fate-and-transport analyses in the 12 Sep 2013 comments for AOI 11. Many of those apply to the modeling described in the AOI 6 report as well. Some additional comments follow.

26. Modeling in Appendix F was based on groundwater contamination in 18 wells. Because Sunoco did not sample groundwater in wells with LNAPL, no exceedences were identified in those areas and they were not considered as sources for dissolved contaminant plumes. However, LNAPL is a source for dissolved contaminants, and there should be fate-and-transport analyses for all locations with LNAPL.

27. The modeling used a hydraulic conductivity of 24 ft/day from a 2002 study by URS. Please provide the complete data and solutions for that well testing.

28. The two-step model assigns a low permeability (K = 0.28 ft/day) to a 150-foot-wide zone adjacent to the river. This is intended to simulate the effect of the sheet pile wall. However, it artificially slows the plume over and allows contaminant degradation to have a much greater role. This may not be realistic. The low-permeability zone is in fact only a foot or two wide near the wall.

29. Sunoco should consider how the hydraulic gradient changes as a plume approaches the sheet pile wall. As the gradient decreases the seepage velocity will decrease, changing the relative importance of advection and decay.

30. What is the transport distance from each source to the river?

31. On Figure F.1 show, for each modeled plume: the centerline, the planform outline, and the intersection with the sheet-pile wall.

32. Langan does not give a complete picture of contaminant fate and transport by basing the modeling on 2013 sampling data alone. For instance, well URS-5 was not sampled in the last event, but in 2006 the benzene concentration was 5900 μg/L. This well is ~60′ from the river. Is this contamination part of the plume from B-154/155? Or is it a separate source area? What does it mean for benzene reaching the river? Are there other wells that weren't sampled in 2013 but had elevated contaminant levels previously that are of concern?

33. The model results are poorly determined because of the lack of calibration wells. Are none of the wells between the source area (B-154 and B-155) and the river suitable for calibration? If not, Sunoco should consider installing calibration wells.

34. A 1 Apr 2011 DEP memo, provided to Sunoco and Langan on 28 Apr 2011, explained that there should be a determination of the cumulative contaminant loading by diffuse groundwater flow into the Schuylkill River, and not just modeling for individual sources. We recommend that all sources in each AOI be evaluated cumulatively; after approval of all RIRs Sunoco should submit a report that evaluates the cumulative river loading from all refinery sources.

35. As noted in the 12 Sep 2013 AOI 11 comments, the tidal portion of the Schuylkill River is exempt from Ch. 93 potable water supply standards.

Risk Assessment

36. The soil direct contact exposure scenario needs to be much more clearly defined. There should probably be more than one scenario. Appendix G refers to "an industrial worker scenario." Is this a refinery operator, a contractor, a worker involved in excavation, or some other employee? You've assumed an equal likelihood of exposure to soil represented by all samples in AOI 6, although sampling is biased to certain areas and workers may rarely frequent some of those areas. Workers are not confined to AOI 6, and will have exposures elsewhere in the facility. What if an employee is working for a year in an area with elevated benzene in soil (e.g., vicinity of Tank 797); what would that risk level be? (See EPA's exposure assessment guidance.)

37. All formulas used and all input parameter values must be provided for the risk calculations. Explain what the exposure route is—ingestion or inhalation (by volatiles or particulates).

38. Only carcinogenic risks were calculated for benzene. Benzene also has non-cancer toxicity, and this must be evaluated as well.

39. 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 | 11/22/13

C. David Brown P.G. | Date

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