UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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HUNTERS POINT
SSIC NO. 5090.3

August 27, 1998

Mr. Richard Powell
Engineering Field Activities West
900 Commodore Drive
San Bruno, CA 94066-2402

SUBJECT: PARCEL C FEASIBILITY STUDY DRAFT FINAL REPORT, HUNTERS POINT NAVAL SHIPYARD

Dear Mr. Powell:

The Environmental Protection Agency has completed review of the subject document. If you have any questions regarding these comments please contact me at (415) 744-2387.

Sincerely,

Sheryl Lauth
Remedial Project Manager

cc: Ms Valerie Heusinkveld, DTSC
Mr. David Leland, RWQCB
Mr. Jim Sickles, PRC
Ms. Glenna Clark, Navy
Ms. Karla Braesemle, Weston
Ms. Amy Brownell, City of SF

COMMENTS ON PARCEL C FEASIBILITY STUDY
~~DRAFT FINAL~~ REPORT
HUNTERS POINT SHIPYARD
SAN FRANCISCO CALIFORNIA

General Comment

1. As outlined in the June 30, 1998 letter from EPA to the Navy, the NCP Preamble directs EPA to use the Groundwater Classification Guidelines when determining the appropriate remediation for contaminated groundwater at CERCLA sites. EPA's guidelines use a total dissolved solids (TDS) standard of 10,000 mg/l or less and a yield of 150 gal/day to define a potential drinking water source. It would appear, based on our cursory review, that groundwater within Parcel C would meet the criteria for a potential groundwater source (we encourage the Navy to evaluate all of the data to confirm this). Therefore, the Navy must re-evaluate the groundwater data against MCLs to determine remediation areas.

2. Please explain how the recent discussions regarding appropriate cleanup depth (i.e. the June 18, 1998 letter including a cost evaluation) will be incorporated into this document. This is of particular concern in the areas where DNAPLs have been detected and in the mixed use areas.

3. It is difficult to consider the use of a CAMU because this is included as Site 1/21 (Parcel E). However, should the Navy chose to use a CAMU, the seven criteria analysis outlined in the regulations (58FR 8658, February 16, 1993) must be included in the FS and summarized in the proposed plan. For reference, the DoD has used a CAMU successfully at the Fort Ord and Moffett Field sites. In addition, the Navy is currently finalizing this process for Camp Pendleton. At these sites, modeling and leachate sampling was used to determine any potential impacts to groundwater from soil contamination.

4. The document references that written comments were not provided on the draft FS. EPA did provide general comments in a letter dated May 14, 1997. Although these are general comments, EPA expects the Navy to provide a written response. Further, EPA is still not in agreement with several of the conclusions of the treatability study. The responses to the agencies comments do not persuade us that the test was of sufficient duration or quality to be of any use for remedial decision making. We believe the data is inconclusive and we have significant concerns about the physical conditions present at the time of the test that may have impaired the test results.

5. In numerous places, the text states that the indoor air model provides conservative estimates of indoor air concentrations. It is not satisfactory to use the "conservatism" of the model as a rationale to not conduct remediation unless the degree of conservatism can be estimated. Please discuss the sources of this conservatism, the relative impact of

the conservatism, (including if possible, the revised estimates which would result from more realistic assumptions) and how the conservatism can be interpreted in terms of required action. For example, discuss how much lower the indoor air concentrations should be, or conversely how much higher the groundwater levels would have to be to require action. It would be sufficient to cite the portion of this FS, which provides this information (i.e., Section 3.1.2.2 or similar) each time the argument that the model is overly conservative is used.

Specific Comments

1. **Page ES-3, paragraph 2.** Where relevant, please summarize environmental quality (i.e., industrial or residential cleanup or reuse) requirements for the various proposed land uses.

2. **Page ES-4, paragraph 4.** Please provide the definitions of Human Health Risk Assessment acronyms such as: RME, ELCR etc., the first time they were used. Also this paragraph discusses contamination of particular aquifer zones before those zones have been defined. Please briefly discuss the aquifer in the text before this paragraph, or define the aquifers as they are listed.

3. **Page ES-5, paragraph 3.** Please indicate the meaning of the acronyms COPS in the fourth line.

4. **Page ES-6, paragraph 1.** It is stated in the text states that due to conservatism in the calculation, the adverse health effect risk from vinyl chloride is over estimated. Please provide a brief statement to indicate whether this component of the risk assessment is more conservative than the remainder of risk assessment.

5. **Page ES-7, paragraph 3.** Please discuss how the indoor air model overestimates the indoor concentrations and why the use of this conservative model is necessary.

6. **Page ES-8, paragraph 1.** Please define acronyms RAOs, ARARs, etc. the first time they are used.

7. **Page ES-8, last paragraph.** Please discuss whether air and particularly indoor air might be considered an environmental medium of concern for Parcel C. In other words, discuss whether air management, treatment, or remediation technologies are appropriate to deal with indoor air quality concerns from VOCs in groundwater.

8. **Page ES-9, last paragraph.** Please summarize or reference a summary of how ambient levels of metals in soil were determined.

9. **Page ES-10, paragraph 4.** Please consider whether air should be considered a medium of concern and whether air management technologies could effectively deal with the risk

from VOCs and groundwater. For example, VOCs seeping into basement spaces might be effectively addressed by subsurface ventilation systems or other management techniques rather than by remediation of the underlying groundwater.

10. **Page ES-11, paragraph 2.** Please clarify that the phrase exceeding residential groundwater cleanup levels or exceeding industrial groundwater levels refers to cleanup levels based upon air concentration rather than drinking water use. Likewise please clarify how the industrial building sizes were revised and indicate the basis upon which revised sizing was considered appropriate.

11. **Page ES-11, paragraph 3.** Please reference the Appendix A summary of how Hunters Point groundwater ambient levels were determined.

12. **Page ES-12, paragraph 2.** Please explain why DAFs are used in this FS when they have been dropped from consideration in the Parcel B ROD.

13. **Page ES-13, paragraph 2.** Please clarify what is meant by the "recommended depth" of the remedial action and whether this is intended to mean the average depth. Discuss how this "recommended depth" was determined and how it relates to the "extended depth" used for TPH areas. Please also define the depth used for "de minimus" areas.

14. **Page ES-16, paragraph 3.** Air emission ARARs may also exist for the S/S process since the elevated process temperatures may result in some emissions. Please address this issue.

15. **Page ES-17, paragraph 1.** Please discuss whether the TD process in this alternative is only for VOCs or whether it is intended to treat SVOCs as well. If TD will be used for SVOCs then the previous alternative may be incomplete because it does not treat SVOCs.

16. **Page ES-18, paragraph 1, and Table ES-10.** Table ES-10 only shows volumes of saturated soils. For some alternatives, volume and flow rates of contaminated groundwater are also needed. Please provide this information.

17. **Page ES-19, paragraph 2.** Detailed analysis of this alternative should consider the potential leakage rate through the sheet piling walls. Please include the leakage rate or reference another section in this FS that includes this information. Further, EPA is concerned that sheet pile walls may not be appropriate as a final remedy, should long term monitoring be required (i.e. the sheet piles may have to be replaced).

18. **Page ES-20, paragraph 5.** Define the ORC acronym the first time it is used. Also, it is recommended that a distinction be made between the concept of "enhanced (bioremediation) oxidation by ORC" and "enhanced oxidation," a phrase which is often used to denote various UV-catalyzed chemical oxidation processes.

19. **Page ES-22, paragraph 3 with Table ES-12 and page ES-23, paragraph 3 with Table ES-15.** Please explain the "numerical analysis" that was used for the alternatives analysis. Please provide a basis and justification for the rating system used, and cite previous uses. Also, please address the appropriateness of weighting the balancing criteria as equal to the threshold criteria in this analysis.

20. **Table ES-5.** Please define acronyms, i.e., TCL, the first time they are used.

21. **Table ES-13.** Please confirm that these costs are Present Worth costs for each alternative.

2.0 SITE CHARACTERIZATION

General Comments

1. Please clarify the various designations of sites/and exposure areas, particularly the use of 6-digit sequences for (i.e., 097052) for exposure areas.

Specific Comments

1. **Section 2.2.1, p. 2-3, paragraph 3 and Table 2-1.** Many buildings are missing from Table 2-1 (e.g., Buildings 228, 251, 258, etc.), yet the text states that "the historical and current land use of Parcel C is summarized in Table 2-1." Since the former use of all buildings should be known, the table should include all 35 buildings.

2. **Section 2.2.1, p. 2-3, paragraph 3.** Please clarify whether the reference to Figure 1-2 should actually be to a figure in Section 2.

3. **Section 2.2.4, p. 2-5, paragraph 3.** Define CCSF the first time it is used.

4. **Section 2.2.7, p. 2-8.** Figure 2-8 does not show the "thin lens of the Bay Mud" that "appears in the southeastern portion of IR-58." Please revise either the text or figure to be consistent.

5. **Section 2.3, p. 2-14, paragraph 2.** The methodology, applicability, and acceptability of the Moffett Field cleanup levels cannot be determined from the information provided.

6. **Section 2.3.1.1, p. 2-17, paragraph 1.** The fact that pentachlorophenol was found in dip tank sludge and that the sludge was not analyzed for dioxins should be explicitly mentioned because pentachlorophenol and its associated dioxin contamination are not typically associated with machine shop activities.

7. **Section 2.3.1.1, p. 2-17, paragraph 2, and Section 2.3.3.1, p. 2-22, paragraph 2.**

Please specify whether the fuel lines are to remain in place and whether they need to be cleaned. Clarify if these lines are included in the fuel lines to be removed as part of IR-49 (page 2-33).

8. **Section 2.3.2.3, p. 2-21, paragraph 1.** Please summarize why groundwater sampling was not conducted at this IR site. This may affect both the HHRA and the ERA.

9. **Section 2.3.3.1, p. 2-22, last paragraph.** Please specify where plating operations took place and whether contaminant distributions are consistent with this history.

10. **Section 2.3.3.1, p. 2-23, paragraph 1, and Section 2.3.4.1, p. 2-26, paragraph 4.** Please indicate where the exploratory excavation program is described.

11. **Section 2.3.4.4, p. 2-28, paragraph 1, and Section 2.3.12.4, p. 2-43. paragraph 1.** The text refers to conclusions regarding inhalation risk as discussed under the current industrial scenario. Indicate where this risk is presented. Also see previous comment concerning the conservatism of the air model.

12. **Section 2.3.10.2, p. 2-35, paragraph 1.** PCBs detected in soil are discussed in this paragraph, but Table 2-5 does not indicate that PCBs were found in significant concentrations at the site. PCB screening levels are typically low so there could have been some exceedances; this would be expected because this site includes areas where transformers were used and stored. Please explain.

13. **Section 2.3.10.4, p. 2-38.** This paragraph refers to risk associated with sanitary sewer investigative samples that does not appear to be associated with transformers. The risk associated with transformer site samples should be discussed.

14. **Section 2.3.10.3, p. 2-38, and Section 2.3.13.3, p. 2-45.** Please indicate why groundwater samples were not collected at these IR sites.

15. **Section 2.3.12.1, p. 2-41, paragraph 3.** The second sentence states that "the Bay Mud Aquitard...is not present at IR-58." This contradicts the statement in the first paragraph on page 2-8 which describes a thin lens of Bay Mud at IR-58. Please resolve.

16. **Section 2.3.12.4, p. 2-43, paragraph 1, and Table 2-5.** The potential hazard to residents from inhaling air containing vinyl chloride is discussed, but Table 2-5 does not list vinyl chloride as a COC at this site. Please explain and revise as necessary.

17. **Section 2.3.13.1, p. 2-43, paragraph 5.** This section refers the reader to the RI for COCs. The COCs should be discussed as they are for other sites in the FS. No organics are listed in Table 2-5 as exceeding screening criteria even though this was a paint storage area. Please confirm that analyses were done for organics and that these compounds are not a problem at this IR site.

18. **Section 2.3.14,1, p. 2-46, paragraph 1.** Please discuss whether soil samples were taken under and around the sumps. Also, it is stated in the text that the pad supports transformers that were dismantled. Discuss whether the transformers are still there, in a dismantled state, and if so, indicate when they will be removed.

19. **Section 2.3.14.1, p. 2-47, paragraph 1.** The text in this paragraphs refers to six sumps but the previous page referred to seven sumps. Please clarify.

20. **Section 2.3.14.2, p. 2-47.** Only metals are listed as having been detected in soil, but Table 2-5 also indicates that a VOC, SVOCs, and TPH were also found exceeding screening levels. These compounds should be discussed as COCs.

21. **Section 2.4.6, p. 2-53, paragraph 3.** Please indicate the status of plans to complete the sediment removal from the drydock culverts.

22. **Figure 2-3.** The dashed demarcation between geologic units is difficult to distinguish in some areas from the dashed demarcation of the 1935 shoreline. Please use unique symbols.

23. **Table 2-7.** For IR-25, it is stated that selection of a remedial alternative "must consider proper handling and disposal of dioxin compounds" and then it is stated that this FS assumes that dioxins are not present in the evaluation of remedial alternatives. Based upon these statements and the fact that pentachlorophenol, which is contaminated by dioxins during the manufacturing process, was detected in a sludge sample from a sump, this FS does not adequately address or identify remedial options for this site and a remedial alternative cannot be identified based upon this FS. Please discuss when samples will be collected to resolve this issue.

24. **Table 2-7.** For IR 28, please clarify how the use of a DAF can eliminate cleanup of TCE. In addition, the table indicates that calculated DAFs have been used to address petroleum and VOC migration. However, a data gap remains because at the current level of knowledge, natural attenuation modeling does not necessarily project with certainty all future events. Based on the Treatability Study response to comments, it is our understanding that conditions do not support natural attenuation. Future monitoring may be required to address this data gap.

3.0 DEVELOPMENT AND SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS

General Comments

1. In general, additional and more consistent use of technical references to support the evaluation of remedial technologies is needed.

2. There appear to be discrepancies between the concentrations of COCs found onsite and the determination of whether the IR site needs to undergo remediation. The cleanup goals in Tables 3-1 and 3-3a, b, and c need to be reviewed against the concentrations listed in Table 2-5.

3. A complete list of COCs should be developed and used consistently in the discussion of the effectiveness for each technology. The discussion of each technology must clearly indicate whether it is effective (or ineffective) for some (list specific exceptions) or all VOCs, SVOCs, PCBs, metals, TPH, etc. As presently written, the technology discussions include inconsistent lists of COCs.

Specific Comments

1. **Section 3.1.1.2, p. 3-5, paragraph 1.** Please discuss the method for determining correlation between groundwater contaminants and soil contamination. Explain whether this was a qualitative evaluation of soil contaminant levels vs. groundwater contaminant levels or a statistical analysis.

2. **Section 3.1.2.2, p. 3-8, paragraph 2.** Please summarize how the industrial building sizes were revised.

3. **Section 3.1.2.3, p. 3-9, paragraph 1, and p. 3-10, paragraph 1.** The conclusion that the HPS impacts on the Bay are small does not necessarily follow from the fact that there are other contaminant sources in the Bay. Additional support is necessary before this conclusion is drawn. Relying on the ESAP data is not sufficient, the results of the Parcel F sampling program should also be summarized.

4. **Section 3.1.2.6, p. 3-14, paragraph 2.** Groundwater monitoring as a means to assess airborne contaminant risk is at best a very indirect way of accomplishing this goal, particularly in light of the uncertainty in the Indoor Air Model which has been often cited in this report. Please consider instead either direct assessment of indoor air quality for future structures at the site and/or remedial alternatives to address the potentially contaminated air.

5. **Section 3.1.2.4, p. 3-12, last paragraph.** Please explain why DAFs are considered appropriate for Parcel C when DAFs were not considered appropriate for the Parcel B ROD and Remedial Action.

6. **Section 3.1.2.6, p. 3-15, paragraph 1.** It is stated in the text that sentinel wells are not needed at various locations because groundwater modeling indicates that contaminants will attenuate prior to reaching the Bay. Please address how the groundwater modeling effort is considered to be sufficiently accurate to eliminate the need for future monitoring. A discussion of the validity and/or uncertainly associated with the groundwater modeling and of the *Dilution Attenuation Factor* calculation is warranted

to support this conclusion. Furthermore, consider that the elimination of monitoring wells under these situations may be inconsistent with EPA Guidance on Monitored Natural Attenuation. Reliance on attenuation based only on modeling results is unacceptable given the results cited on page 3-26 that reductive dechlorination, hydrolysis and other degradative mechanisms are not favored under Parcel C Groundwater conditions.

7. **Section 3.1.3.4, p. 3-20.** It is stated in the text there is one federal TBC for groundwater. It is unclear whether this TBC is the same as the ambient air PRGs. Please clarify. Also address how these air standards serve as criteria for water.

8. **Section 3.1.4, p. 3-21, third bullet.** Where relevant, please summarize environmental quality (i.e., industrial or residential cleanup or reuse) requirements for the various intended land uses.

9. **Section 3.1.5.1, p. 3-22, paragraph 2.** Please provide and support the rationale for eliminating areas for considerations of remediation because they exhibit only one anthropogenic contaminant, and they have "low" noncarcinogenic toxicity. Please address the threshold for the HI to be considered "low" and whether HI values greater than one (HI > 1) can be written off in this manner. Also discuss the threshold for the metals concentrations relative to background that were eliminated. It is strongly recommended that the referenced figure include the areas written off under these definitions so the reader can be fully informed.

10. **Section 3.1.5.1, p. 3-22, paragraph 3.** Please clarify what is meant by the "recommended depth" of the RA and whether this is intended to mean the average depth. Discuss how this "recommended depth" was determined and how it relates to the "extended depth" used for TPH areas and the depth used for "de minimus" areas.

11. **Section 3.1.5.2, p. 3-23, paragraph 1.** It is stated in the text that air contamination is considered under the groundwater remedial units. Please discuss whether indoor air might be considered an environmental medium of concern for Hunters Point Parcel C. Discuss whether air management, treatment, or remediation technologies are appropriate to deal with indoor air quality concerns from VOCs in groundwater. For example, VOCs seeping into subsurface structures might be effectively addressed by subsurface ventilation systems or other management techniques rather than by remediation of the underlying groundwater.

12. **Section 3.1.5.2, p. 3-24, paragraph 4.** This paragraph states that the maximum TCE concentration found in IR-28 was 50,500 μg/l, but Table 2-5 shows 61,000 μg/l. Please reconcile this discrepancy.

13. **Section 3.1.5.2, p. 3-26, paragraph 2.** The phrase "liquid non aqueous phase liquids" should be "light non aqueous phase liquids." Please discuss whether any of the LNAPLs

identified in this and following paragraphs been characterized with respect to chemical composition or physical parameters that may affect the ability to recover or remediate them.

14. **Section 3.1.5.2, p. 3-27, paragraph 2.** The text suggests that following source control, biodegradation of chemicals may occur at the fringes of the plume. Please clearly indicate where monitoring will be used to evaluate and monitor this process to ensure protection of human health and the environment.

15. **Section 3.3.2.1.2, p. 3-31.** Restrictions which restrict the future use of land should be included in addition to access restrictions.

16. **Section 3.3.2.1.4, p. 3-32, last paragraph, and p. 3-33, paragraph 3.** Since the use of the IR-21 CAMU is dependent upon remedy selection for that site, please provide a brief summary of status and schedule for determination of that remedy.

17. **Section 3.3.2.1.4, p. 3-33, paragraph 3.** Please provide information on the construction of the IR-1/21 CAMU to allow an evaluation of the level of containment to be provided and to indicate for the reader that this unit will meet subtitle C containment standards.

18. **Section 3.3.2.1.4, p. 3-34, paragraph 3.** Please consider that the elimination of O&M cost components from this remedy (due to disposal in IR-1/21 CAMU) will make this alternative unrealistically inexpensive. Costs for this disposal *will* be incurred and should be reflected even if they will be paid in conjunction with a different action.

19. **Section 3.3.2.1,4, p. 3-35, paragraph 1.** The text states that wastes from Parcel C are not expected to be ignitable, corrosive, or reactive. Please provide supporting rationale for this assumption.

20. **Section 3.3.2.1.5, p. 3-37, paragraph 3.** In discussing the aerobic biodegradation process, please clarify that this process is appropriate for TPH but not for many of the chlorinated compounds found in soil and groundwater at these sites.

21. **Section 3.3.2.1.5, p. 3-37, paragraph 4.** The text notes the advantages of continuous phase treatment. For completeness, the advantages of batch treatment should also be discussed. For the SPB project completed to date, please discuss what has been learned relative to the advantages of continuous vs. batch treatment for similar wastes. In the last sentence, clarify what is meant by the statement that the waste is stabilized and dewatered upon leaving the reactor. Discuss whether the purpose of chemical stabilization is to reduce leachability and whether the dewatering step precedes stabilization.

22. **Section 3.3.2.1.5, p. 3-38, paragraph 4.** SPB should not be eliminated solely because

it does not treat inorganics; this would suggest that all other technologies that do not treat inorganics would also have to be eliminated. SPB should be eliminated based on performance uncertainties, inefficiencies or other reasons. Further, if the soils are stabilized after slurry treatment as suggested on page 3-37 (even though this is a separate process), SPB could be used.

23. **Section 3.3.2.1.5, p. 3-38, paragraph 1.** Please summarize the treatability test results for contaminants other than TPH-d.

24. **Section 3.3.2.1.5, p. 3-39, paragraph 4.** The fact that inorganics are not treated should not be listed as a significant disadvantage. Otherwise, all other technologies that do not treat inorganics would have this drawback. This technology should be eliminated based on performance uncertainties, inefficiency, or other reasons.

25. **Section 3.3.2.1.5, p. 3-40, paragraph 2.** Oxidation does not normally use typical acids or bases and does not convert hydrocarbons to carbon and aluminum oxides. Please have a chemist review and revise this paragraph so that it reflects solid chemical principles.

26. **Section 3.3.2.1.5, p. 3-40, paragraph 2.** Please address whether the use of rehydratable aluminum compound is the only alternative for offgases.

27. **Section 3.3.2.1.5, p. 3-40, paragraph 4.** The text indicates that the cost for oxidation is high. Please indicate whether the costs for this technology are significantly higher than, for example, SPB for which costs were previously rated as moderate.

28. **Section 3.3.2.1.5, p. 3-41, paragraph 3.** The text discussed the use of elevated pH to immobilize metals. Please address whether the process is sensitive to pH for different combinations of metals present at the site.

29. **Section 3.3.2.1.5, p. 3-42, paragraph 2.** The text indicates that a treatability test will be required for S/S. If this test is needed for remedy selection, it may be necessary to conduct this test as part of the FS. Please consider USEPA guidance on the use of treatability testing in general and on S/S testing in particular.

30. **Section 3.3.2.1.5, p. 3-43, paragraph 2.** The text indicates that the FS assumes SVOCs remaining after TD will be treated by S/S. This is not the correct point in the FS to combine technologies into treatment trains and the assumption of post treatment by S/S should not be used to support decisions regarding TD. If the use of follow-on treatment technologies is allowed at this point then SPB can likewise be retained with the assumption that treated soils can be stabilized for metals. Also, please cite data to support the assertion that chlorinated compounds will not be a limitation on the use of TD.

31. **Section 3.3.2.1.6, p. 3-45, paragraph 1.** Please discuss whether the heterogeneity of

the artificial fill at the site poses a limitation for SVE. The subsequent discussion of in situ S/S indicates significant heterogeneity. Also, the text indicates that a pilot test will be required for SVE. A treatability study has been completed; the results and recommendations should be discussed in this section.

32. **Section 3.3.2.2.2, p. 3-47.** Use restrictions should also be included to control how groundwater is used.

33. **Section 3.3.2.2.3, p. 3-48, paragraph 4.** Please address whether there are any chemical compatibility concerns between slurry walls and the site contaminants.

34. **Section 3.3.2.2.3, p. 3-52, paragraph 3.** Please discuss why the use of sheet piling is considered feasible in light of the extent of subsurface heterogeneity and obstructions.

35. **Section 3.3.2.2.4, p. 3-55, paragraph 1.** Infiltration of rainwater into stockpiled soil is not the real problem. The problem solved by covering the soils is the reduction of leachate and minimization of erosion of contaminated soil. Please revise.

36. **Section 3.3.2.2.5, p. 3-55, paragraph 2.** Please make a distinction between the concept of "enhanced (bioremediation) oxidation by ORC" and "enhanced oxidation," a phrase which is often used to denote various UV-catalyzed chemical oxidation processes.

37. **Section 3.3.2.2.5, p. 3-55, paragraph 2.** The discussion of oxygen-enhanced bioremediation should clearly discuss which of the groundwater contaminants will be treated by this process.

38. **Section 3.3.2.2.5, p. 3-56, paragraph 1.** Strictly speaking, the use of ORC is only likely to support the degradation of the lesser chlorinated hydrocarbons, which are aerobically degradable. Please revise.

39. **Section 3.3.2.2.5, p. 3-56, paragraph 2.** Please discuss whether there is independent literature supporting the performance of ORC in reducing VC levels, to supplement the vendor literature.

40. **Section 3.3.2.2.5, p. 3-57, paragraph 5.** The text indicates that chemical oxidation is capable of complete non-selective oxidation of organics. Please cite and/or summarize performance data on the specific organics to be addressed at this site. The FS should be specific in evaluating the performance of technologies for the COCs requiring treatment, not just generic capability of the process on broad classes on chemicals. Also, please discuss whether the chemical oxidation process may in some cases provide incomplete oxidation, resulting in breakdown products that may also be toxic.

41. **Section 3.3.2.2.5, p. 3-57, paragraph 6.** The text discusses the effectiveness of potassium permanganate on TCE and PCE. However, previous discussions of other

technologies such as SPB have discussed primarily treatment of TPH. All technologies should be evaluated for performance all of the contaminants present in Parcel C media. Alternatively, the text should clearly indicate that a particular technology would be used only for a particular subset of the COCs and that other technologies would be needed in the final assembled remedial alternative.

42. **Section 3.3.2.2.5, p. 3-59, paragraph 1.** Please discuss the status of development of SPSH, cite literature on its performance, and list sites at which it has been used.

43. **Section 3.3.2.2.5, p. 3-59, paragraph 2.** SPSH would be extremely expensive in saturated or very wet unsaturated media due to the energy costs required to convert water to steam. Please discuss.

44. **Section 3.3.2.2.5, p. 3-59, paragraph 4.** Please discuss the status of development of RF heating, cite literature on its performance, and list sites at which it has been used.

45. **Section 3.3.2.2.5, p. 3-59, paragraph 5.** RF heating would be extremely expensive in saturated or very wet unsaturated media due to the energy costs required to heat soil to over 100°C and vaporize high boiling point compounds. Please discuss this issue in the text.

46. **Section 3.3.2.2.5, p. 3-59, paragraph 5.** Please explain why a uniform heating pattern cannot be obtained with RF heating but can be obtained with SPSH.

47. **Section 3.3.2.2.5, p. 3-60, paragraph 5.** Please cite data to support the cited 95% removal effectiveness for VOCs and the "relatively short duration of treatment" (top of page 3-61).

48. **Section 3.3.2.2.5, p. 3-61, paragraph 6.** Please discuss whether there is any possibility that the injection of water or sand will push contaminants in undesired directions. Please discuss the status of development of this technology and indicate similar sites at which it has been used effectively.

49. **Section 3.3.2.2.6, p. 3-63, paragraph 1.** Since the COCs include both volatiles and semivolatiles for each technology, indicate which COCs are not effectively treated so that the need for treatment trains in the subsequent alternatives development is clear.

50. **Section 3.3.2.2.6, p. 3-64, paragraph 2.** Please discuss why offgas treatment for steam stripping is more difficult and expensive than for other technologies.

51. **Section 3.3.2.2.6, p. 3-64, paragraph 4.** The text refers to the ability of GAC to treat metals. However, metals were not on the list of COCs provided on page 3-63. Also, if metals are to be treated, the ability of the other technologies in this section to treat metals must be discussed, and/or additional technologies specific for metals must be

included. Please be consistent and clearly identify which COCs are effectively treated by each technology.

52. **Section 3.3.2.2.6, p. 3-64, paragraph 4.** The text states that the capital cost for GAC is comparable to "other technologies." Given that "other technologies" represent a wide range of costs, this statement provides no useful information on GAC cost. Also the statement that O&M cost is higher may be inaccurate. GAC is relatively conventional in both capital and O&M costs, certainly more than steam stripping for similar situations. Its overall cost, including O&M, may very well be competitive with others in this group such as UV oxidation. Note also that the statements on page 3-64 regarding costs are somewhat inconsistent with those at the top of page 3-65 which state that the process option had moderate capital and O&M costs. Please revise for consistency.

53. **Section 3.3.2.2.6, p. 3-65, paragraph 4.** Please address whether the potential problems with solids plugging of IE systems also exist for GAC.

54. **Section 3.3.2.2.6, p. 3-66, paragraph 1.** The statement that IE is not effective over a wide range of contaminants contradicts the statement on page 3-65, paragraph 3, sentence 4 that the system "could remove a broad range of ionic species..." The rationale for rejection of this technology is therefore insufficient. It is possible that, depending upon final discharge limits for metals (even though none are listed as applicable COCs on page 3-63), IE may work better than precipitation. Please revise the text in this section.

55. **Section 3.3.2.2.6, p. 3-66, paragraph 4.** Please explain why precipitation is included in technology screening if metals are not COCs. If metals are COCs, some metals removal technology such as precipitation or IE must be retained. Also recognize that other processes, such as GAC, are to varying degrees non-selective (a stated disadvantage of precipitation) and in each such case the non-selectivity increases cost, due to inefficient use of the technology capacity. For example, the non-selectivity of GAC results in high carbon usage rates because non-target compounds are also removed. In fact, non-selectivity can be worse for GAC or IE than for precipitation since in the former cases the non-target compounds may compete with COCs and actually reduce COC removal.

56. **Section 3.3.2.2.6, p. 3-66, paragraph 6.** An ozone destruction tank is only used with the ozone version of this process; however, other offgas treatment may be required for residual contaminants or breakdown products in the air stream. Please revise the text.

57. **Section 3.3.2.2.6, p. 3-67, paragraph 1.** Please discuss whether the chemical oxidation process may, for some compounds, provide incomplete oxidation, resulting in breakdown products that may also be toxic. Also, please indicate whether are any humic substances present in HPS groundwater, and if not, explain the relevance of this limitation.

58. **Section 3.3.2.2.6, p. 3-67, paragraph 4.** This discharge option does not necessarily

involve or require extraction wells as indicated. It is technically independent of how the groundwater is captured and collected. Please revise the text.

59. **Section 3.3.2.2.6, p. 3-68, paragraph 1.** It is stated in the text that capital and O&M costs are low, then this option is immediately rejected because of the potential high costs of treatment to meets NPDES standards; this is a direct contradiction. In addition, the previous section said that cost for POTW discharge would be moderate which is inconsistent with the statement that O&M for surface water discharge is low, since treatment standards for POTW discharge are likely to be less stringent and therefore less costly to achieve than for surface water discharge. Please revise.

60. **Figure 3-3c.** This figure is not clear. There are boxes that are shaded as indicating the area either exceeds the HI or risk yet portions of the box are not included inside the boundary line that for exceeding either the HI and/or risk. For example area 93043 and 87037 exceed the risk or HI, but there is no *de minimus* area or soil remediation area indicated. Please clarify the information on this figure.

61. **Figure 3-9.** According to this figure no containment options passed initial screening. Please confirm this and discuss the rationale.

62. **Figure 3-9.** Solvent extraction is not designed for inorganics. Please provide supporting data for the statement that solidification and stabilization is "effective for treating all soils."

63. **Figure 3-9.** It is concluded in the text that incineration is not effective for PCBs and pesticides. In actuality, incineration may be the primary, if not the only, proven technology for many of these compounds.

64. **Figure 3-9.** The Description, Comments and Effectiveness sections for in situ biodegradation and bioventing are not correct. Bioventing, for example, does not involve grout injection and is not effective for inorganics. Please revise.

65. **Figure 3-9.** The Description, Comments and Effectiveness sections for SVE, shallow soil mixing and in situ vitrification are not correct. Please revise.

66. **Figure 3-10.** The Description and Comments sections for groundwater monitoring and surface water monitoring appear to be reversed. Please correct.

67. **Figure 3-10.** The Effectiveness evaluation for thermal destruction is not correct, i.e., incineration is effective for a wide variety of contaminants. However, incineration of groundwater is recognized to be an inherently bad idea. Please revise.

4.0 DEVELOPMENT AND DESCRIPTION OF REMEDIAL ALTERNATIVES

General Comment

1. Please address which alternatives make any use of the metals treatment technologies which were screened in Section 3 and if no such technology was needed why technologies to treat metals were included in screening.

2. It is our understanding that there may be some problems with stray voltage as part of the 6-phase soil heating technology. Please inform EPA if this has been evaluated.

Specific Comments

1. **Section 4.1.2, p. 4-3, paragraph 2.** The text indicates the maximum planned depth of excavation will be 10 feet. Please clarify whether the excavation will stop at the water table, if encountered, regardless of contaminant levels or proceed to a specified contaminant removal level. If the excavation will proceed into groundwater also discuss whether excavation dewatering will be required. Further, please consider the discussions regarding excavation depth that are on-doing for Parcel D.

2. **Section 4.1.2, p. 4-3. last paragraph.** Please clarify whether monitor wells abandoned within excavation boundaries will be replaced. It is possible that significant contamination may be left because it is below the groundwater table, so in areas with DNAPLs there would be no way to monitor groundwater contamination, breakdown of chlorinated solvents, etc. if the monitor well(s) is not replaced.

3. **Section 4.1.2, p. 4-5, paragraph 5.** It is stated in the text that wastes for Parcel C are not expected to be ignitable, corrosive, or reactive. Please provide supporting rationale for this assumption.

4. **Section 4.1.3, p. 4-9, paragraph 3, and Section 4.1.5, p. 4-16, paragraph 4.** Please discuss the data requirements needed for design of the SVE system relative to issues such as vent radius of influence, offgas treatment requirements, and similar design and operation parameters. Discuss the extent to which the treatability study answered these questions and whether further pilot tests are needed. Clarify whether costs for pilot tests are included in the cost estimate. If this testing is needed for remedy selection it may be necessary to conduct this test as part of the FS, but if tests are needed only to develop design parameters testing could be deferred to RD/RA.

5. **Section 4.1.3, p. 4-10, paragraph 3.** The text indicates that a treatability test will be required for S/S. This test should have been conducted as part of the treatability study so that results could be included in this FS and used for alternative evaluation.

6. **Section 4.1.3, p. 4-11, paragraph 2.** The use of elevated pH to immobilize metals is discussed in the text. Please clarify whether the process is sensitive to pH for the different combinations of metals present at the site.

7. **Section 4.1.3, p. 4-11, paragraph 4, and Section 4.1.4, p. 4-14, paragraph 4.** Please provide information on the construction of the IR-1/21 CAMU to allow an evaluation of the level of containment to be provided. For example, address whether this unit will meet Subtitle C containment standards. Since the use of the IR-1/21 CAMU is dependent upon remedy selection for that site, please provide a brief summary of the status and schedule for determination of that remedy.

8. **Section 4.1.3, p. 4-12, paragraph 3; Section 4.1.4, p. 4-15, paragraph 2; and Section 4.1.5, p. 4-19, paragraph 1.** The intent of these paragraphs is unclear. These paragraphs describe placing a small volume of soil in a Class I facility, but Table 4-3 suggests that a Class II facility will be used. It is not clear if the intent is to treat all excavated soil regardless of whether it is hazardous or not.

   The text also states that desorption of PCBs and pesticides can be problematic but previous text says the process will be controlled so as not to desorb these contaminants. Please clarify.

   Also consider that the thermal desorber will not be set up to treat the offgas for PCBs/pesticides when the system will be used to treat VOCs. The TD has an offgas treatment system to destroy VOCs and it could be equipped with a scrubber if PCBs and pesticides are a concern. It is likely that the added cost of a scrubber would be more than offset by the additional costs to treat PCBs and pesticides by other means. In addition, TD would be much more protective than solidifying these organics. Please consider adding a scrubber.

9. **Section 4.1.5, p. 4-17, paragraph 2.** Please address whether asphalt encapsulation (the preferred S/S process) can be conducted with in situ mixing equipment as is proposed for in situ cement/pozzolanic stabilization.

10. **Section 4.1.5, p. 4-17, paragraph 3.** It appears that a pilot test may be needed to verify that the in situ mixing approach will work with asphalt encapsulation and also that is will work under site constraints with respect to soil heterogeneity. Please confirm.

11. **Section 4.1.5, p. 4-18, paragraphs 1 and 3.** Please explain why the performance goal is based on percent immobilization rather than either: (1) passing waste classification requirements; (2) meeting acceptance criteria for the onsite CAMU; (3) meeting acceptance criteria for offsite disposal; (4) meeting LDRs, or an appropriate combination of all four.

12. **Section 4.1.5, p. 4-18, paragraph 3.** The text states that the durability and longevity of the stabilized mass is important to the effectiveness of this alternative. Please explain how durability and longevity will be assessed during testing and at full-scale implementation.

13. **Section 4.1.5, p. 4-18, paragraph 4.** The text indicates that both bench and pilot scale treatability tests will be required for S/S. If one of these tests is needed for remedy selection it should be conducted as part of the FS.

14. **Section 4.2.2, p. 4-19, last paragraph.** In describing this alternative it would be useful to discuss how it would relate to the excavation for the vadose zone soil alternative. Assuming both are implemented, please differentiate between the areas that would be excavated for each alternative.

15. **Section 4.2.2, p. 4-21, paragraph 3, and Section 4.2.4, p. 4-39, paragraph 3.** Please indicate whether the utilidors will be cleaned when the lines are removed.

16. **Section 4.2.2, p. 4-22, paragraph 3, and Section 4.2.4, p. 4-39, paragraph 3.** Please discuss the status of the plans to complete the sediment removal from the drydock culverts. Also, for completeness please indicate whether the FS costs include all costs for the proposed mitigative measures.

17. **Section 4.2.2, p. 4-23, paragraph 2.** Groundwater monitoring as a means to assess airborne contaminant risk is at best a very indirect way of accomplishing this goal, particularly in light of the uncertainty in the Indoor Air Model which has been often cited in this report. The FS should require either direct assessment of indoor air quality for future structures at the site or include remedial alternatives to address the potentially contaminated air.

18. **Section 4.2.2, p. 4-24, paragraph 1.** The text refers to the alternative selected for treatment of vinyl chloride. Please clarify which technology has been selected for this treatment.

19. **Section 4.2.2, p. 4-24, paragraph 2, and p. 4-25 paragraph 1.** The monitoring discussed here is equivalent to natural attenuation. In this case, including parameters to demonstrate natural attenuation is necessary and it is not sufficient to only monitor COCs.

20. **Section 4.2.2, p. 4-23, paragraph 3.** The sentry wells should be monitored initially for all COCs at the site, not just the compounds representative of the nearest groundwater RU. If periodic monitoring shows no concerns, then the list of COCs can be shortened. Please revise.

    Placing the sentry wells in the tidally influenced zone near the water/land interface would provide more defensible data showing which contaminants are likely to be discharged than placing the wells inland because there is much uncertainty associated with the DAF calculation. Under the approach proposed in the text and Figure 4-5, there will be no concrete evidence that shows whether a release to surface water is or is not occurring. Please relocate the sentry wells to a location where groundwater data can be compared

directly with the criteria without the assumption of large DAFs. Other wells should be located to provide advanced warning of impending exceedances in the sentry wells so that there is adequate time to implement a corrective action.

21. **Section 4.2.2, p. 4-25, paragraph 2.** In order to be protective of human health, sampling for vinyl chloride cannot be done at a sentry well that is located outside the plume; this sampling must be done at "hot spots" and in or near buildings where vinyl chloride could become an inhalation hazard. Please revise the text so this is clear to the reader.

22. **Section 4.2.2, p. 4-30, paragraph 1.** Please provide landfill acceptance criteria consistently for all alternatives.

23. **Section 4.2.2, p. 4-30, paragraph 2.** Please explain why excavation, which is straightforward except near structures, is expected to have higher capital cost than, for example, groundwater extraction which will require a significant capital investment for the treatment plant.

24. **Section 4.2.3, p. 4-31, paragraph 1 and Section 4.2.5, p. 4-49, paragraph 2.** Sealing buildings may reduce the amount of vinyl chloride that enters buildings, but this will not address either the issue of construction workers who are replacing or installing utilities, or the potential that quantities exceeding BAAQMD standards could be released during the utility work.

25. **Section 4.2.3, p. 4-31, paragraph 3.** Please clearly indicate how water behind the containment structure will be managed. Clarify whether this water will be captured, extracted or whether it will flow around the end of the containment structure (which is implied on page 4-33).

26. **Section 4.2.3, p. 4-36, paragraph 2.** It is stated in the text there will be four columns in series. Clarify whether this means four columns in one treatment train or two trains to two columns each as implied later in this paragraph.

27. **Section 4.2.3, p. 4-37, paragraph 3.** The text cites a cleanup time frame of greater than 50 years as a potential limitation. However no time frame has been discussed for the other alternatives. Please provide estimated cleanup periods for all alternatives and base the evaluation on a comparison of these options.

28. **Section 4.2.3, p. 4-37, paragraph 3.** The text cites the presence of LNAPL and DNAPL as a limitation for pump and treat. However, no discussion of how the other alternatives address these problems has been provided, such as how soil excavation will address these issues. Please discuss how each alternative addresses LNAPL and DNAPL.

29. **Section 4.2.3, p. 4-38 paragraph 3.** Please explain why discharge to the POTW will be difficult to implement. According to text on pages 4-36 and 4-37, SPWCP has already established standards that the treatment system is expected to achieve, and the overall flow of 20 gpm would not likely pose a problem compared to historical discharges from HPS when it was active. Please clarify.

30. **Section 4.2.4, p. 4-41, paragraph 4.** Please discuss the status of development of SPSH, cite literature on its performance and indicate sites at which it has been used successfully. SPSH would be extremely expensive in saturated or very wet unsaturated media due to the energy costs required to convert water to steam by raising the temperature of a subsurface area to the boiling point of water.

31. **Section 4.2.4, p. 4-42 paragraph 2.** Please address how long it will take and how much energy is required to boil off an LNAPL area. Also, please cite previously successful applications of this technology.

32. **Section 4.2.4, p. 4-42, paragraph 3.** Please discuss the chemical composition of the DNAPL at the site. Please discuss how it can be assured that 100°C will be appropriate for the removal of this DNAPL and how the high contaminant flux through the soils will be captured and treated during this operation.

33. **Section 4.2.4, p. 4-42, paragraph 4.** Please provide the basis (i.e., contaminant removal rates supported by test data/experience) for the estimated operational time at each site. Note that the case cited on page 4-43 does not address DNAPL, so it is unclear whether this technology would be effective.

34. **Section 4.2.4, p. 4-45, paragraph 4.** Please discuss whether entrained moisture in the SVE vapor will interfere with the performance of the vapor phase GAC.

35. **Section 4.2.4, p. 4-46, paragraph 5 and p. 4-47, paragraph 1.** Please provide data on operating conditions (dosages, rates, etc.) for the in situ oxidation of VOCs by permanganate. Indicate whether data from the Kansas City DOE demonstration site will be available in time for the HPS remedial design.

36. **Section 4.2.5, p. 4-49, paragraph 5.** The use of oxygen to prevent the undesirable breakdown of PCE to vinyl chloride appears to be an inappropriate use of this technology, implying that sustaining the level of PCE and TCE by removing one of the natural attenuation mechanisms is preferable to enhancing the destruction of these compounds. Please explain.

37. **Section 4.2.5, p. 4-50, paragraph 3.** Please provide a reference for the results cited of the field experiments on ORC so that reviewers can evaluate these data.

38. **Section 4.2.5, p. 4-50, paragraph 4.** Please explain why Fenton's reagent is proposed

in this alternative instead of permanganate as in the previous alternative. Include in the discussion literature references and previous experience on the relative performance of each and discuss whether one is known to be more effective. Also, explain why Fenton's reagent is not suitable for all alternatives using chemical oxidation. The text suggest that Fenton's reagent may perform better than permanganate; please discuss whether Fenton's reagent should be substituted in the previous alternative.

39. **Section 4.2.5, p. 4-52, paragraph 2.** Please discuss whether there is any possibility that the injection of water or sand will push contaminants in undesired directions. Please discuss the status of development of this technology and indicate similar sites at which it has been used.

40. **Section 4.2.5, p. 4-52, paragraph 4.** Please discuss how certain it is that excavation will capture LNAPL and will not tend to disperse it.

41. **Figure 4-6.** Please show the areas of LNAPL or DNAPL in the subsurface on this figure.

42. **Figure 4-9.** Please indicate whether a solid separation step is required for either TSS or precipitated metals to avoid plugging the GAC columns.

5.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

General Comment

1. Remediation of Parcel C may include transport of treated materials to the CAMU at Parcel E. This detailed evaluation section argues that the mass of hazardous substances at Parcel C will therefore be reduced. However, this means that the Parcel E FS, Proposed Plan, and ROD must clearly state that the mass of hazardous substances at Parcel E will increase due to receiving treated waste from Parcel C. This may affect remedy selection, and community/state acceptance of the CAMU at Parcel E.

2. For several exposure scenarios in the HHRA, risks from exposure to groundwater result from metals and inorganics. Please discuss why metal treatment technologies were not included in any groundwater remedial alternatives to address these risks.

Specific Comments

1. **Section 5.1.2.2, p. 5-7 paragraph 1, Section 5.1.4.2, p. 5-29, paragraph 1, and Section 5.1.5.2, p. 5-39.** Please explain the use of palliatives in controlling dust as this will not be obvious to a reader from the public.

2. **Section 5.1.2.2, p. 5-7, paragraph 2.** Please discuss whether Parcel C should be designated as a CAMU for purposes of soil management during remediation.

3. **Section 5.1.2.5, p. 5-11, paragraph 5.** Although the soil cleanup goal does affect the overall time required for implementation, this alternative is nevertheless and even under the most stringent cleanup scenario, likely to be substantially shorter in duration than the other alternatives. This should be acknowledged in this section.

4. **Section 5.1.2.7, p. 5-13.** The periodic cost of maintaining the backfilled and covered excavations should be included as O&M costs.

5. **Section 5.1.3, p. 5-15, paragraph 1.** If SVE removal is, for example, 70%, consider and discuss whether additional volatilization of VOCs during S/S (which includes both mixing and heat) result in air emissions requiring control.

6. **Section 5.1.3, p. 5-15, paragraph 3.** Please consider and discuss whether the use of subcontracted service for the S/S process vendor more likely than equipment lease and operation by the remedial contractor for implementation of this process.

7. **Section 5.1.3, p. 5-16, paragraph 2.** Since the use of the IR-21 CAMU is dependent upon remedy selection for that site, please provide a brief summary of status and schedule for determination of that remedy.

8. **Section 5.1.3.1, p. 5-17, paragraph 2 and Section 5.1.3.3, p. 5-18, paragraph 3.** Onsite disposal will require less complete treatment than offsite disposal since in the latter case LDRs must be met. Please clarify whether this is the case and whether this alternative is actually less protective than offsite disposal.

9. **Section 5.1.3.2, p. 5-17, paragraph 2 and Section 5.1.3.5, p. 5-21, paragraph 2.** Please discuss whether the S/S process also requires evaluation and/or monitoring with respect to air emission for the reasons cited in Comment 5, above.

10. **Section 5.1.3.3, p. 5-18, paragraph 2.** The use of SVE may minimize residual risk for VOCs, but will not necessarily address all residual risk as implied in the second sentence. Please revise.

11. **Section 5.1.3.3, p. 5-19, paragraph 1.** The text cites relatively long-term (6 years) experience with stabilization of metals. In order to support the argument that this alternative will be protective, please cite similar data for long-term (relatively) stability of the SVOCs that will be treated by this process at HPS.

12. **Section 5.1.3.3, p. 5-19, paragraph 3 and Section 5.1.3.6, p. 5-25, paragraph 2.** The text states that long-term effectiveness will be demonstrated by treatability testing. Please describe how this will be accomplished and include how long the predesign treatability study will last and whether accelerated aging/leaching procedure will be used to demonstrate long-term stability. Note that the overall implementation period including treatability tests is only 18 months which will not allow long term evaluation of the S/S

product.

Also, cement-based and pozzolanic S/S is not acceptable for treating PCBs. This should be clearly stated.

13. **Section 5.1.3.8, p. 5-26, Section 5.1.3.9, p. 5-27, Section 5.1.4, p. 5-28, paragraph 5, Section 5.1.4.3, p. 5-30, paragraphs 1 and 3, and Section 5.1.4.8, p. 5-36.** Since remediation of Parcel C under this alternative may include transport of treated materials to the CAMU at Parcel E, the Parcel E FS, Proposed Plan, and ROD should clearly state that the mass of hazardous substances at Parcel E will increase due to receiving treated waste from Parcel C. This may affect remedy selection, and community/state acceptance of the CAMU at Parcel E.

14. **Section 5.1.3.7, p. 5-26, paragraph 4.** O&M costs will be incurred regardless of the duration of the project. O&M costs will be associated with operation of the SVE system, stabilization, soil excavation, maintenance of equipment, carbon replacement, etc. These short-term O&M costs need to be included in the estimate.

15. **Section 5.1.4, p. 5-28, paragraph 4.** Please discuss whether the S/S process also requires evaluation and/or monitoring with respect to air emission for the reasons cited in Comment 5, above.

    Also, cement-based and pozzolanic S/S is not acceptable for treating PCBs. This should be clearly stated.

16. **Section 5.1.4.3, p. 5-30, paragraph 2.** It may be necessary to remove debris from the soils prior to TD processing. Please discuss how debris separated from the soils will be managed.

17. **Section 5.1.4.3, p. 5-31, paragraph 1.** The text cites relatively long-term (6 years) experience with stabilization of metals. In order to support the argument that this alternative will be protective, please cite similar data for long-term (relatively) stability of the SVOCs that will be treated by this process at HPS.

18. **Section 5.1.4.3, p. 5-31, paragraph 3.** The text states that long-term effectiveness will be demonstrated by treatability testing. Please describe how this will be accomplished and include how long the predesign treatability study will last and whether accelerated aging/leaching procedure will be used to attempt to demonstrate long-term stability. Note that the overall implementation period including treatability tests is only 18 months which will not allow long-term evaluation of the S/S product.

19. **Section 5.1.4.4, p. 5-32, paragraph 1, last sentence.** Please replace the word immunization with immobilization.

20. **Section 5.1.4.4, p. 5-32, paragraph 4.** The reference to Alternative S-4 should probably be to Alternative S-3. Please confirm and revise as necessary.

21. **Section 5.1.4.5, p. 5-33, paragraph 2.** It is indicated in the text that a treatability test will be required for TD. If this test is needed for remedy selection, it may be necessary to conduct this test as part of the FS. Please refer to USEPA guidance on the use of treatability testing.

22. **Section 5.1.4.5, p. 5-34, paragraph 4.** It is stated in the text that TD will improve soil quality. Please discuss the effect of temperatures of up to 800 degrees on natural soil properties.

23. **Section 5.1.4.6, p. 5-35, paragraph 3.** Please discuss the nature and source of inert material that will be blended with contaminated soil. Also, discuss the effect of this addition on the soil volume.

24. **Section 5.1.4.7, p. 5-36, paragraph 1.** The project duration is estimated on p. 5-34 at up to 20 months, not less than 1 year as indicated in this paragraph. O&M costs are applicable regardless of project duration. O&M costs are associated with the TD, stabilization of soil, soil excavation, etc. TD requires significant operations and maintenance. These costs should be included in the estimate.

25. **Section 5.1.5, p. 5-37, paragraph 1.** Comments on SVE and in situ S/S from previous sections also apply to this alternative.

26. **Section 5.1.5, p. 5-38, paragraph 3 and Section 5.1.5.3, p. 5-41, paragraph 5.** Please address why the performance goal is based upon percent removal rather than passing TCLP.

27. **Section 5.1.5.2, p. 5-40, paragraph 2.** Please discuss whether Parcel C should be designated as a CAMU for purposes of soil management during remediation.

28. **Section 5.1.5.5, p. 5-44, paragraph 3.** If in situ S/S is used following SVE, please discuss what will be done with the SVE vents.

29. **Section 5.1.5.6. p. 5-46, paragraph 5.** The text states that long-term effectiveness will be demonstrated by treatability testing. Please describe how this will be accomplished and include how long the predesign treatability study will last and whether an accelerated aging/leaching procedure will be used to attempt to demonstrate long-term stability.

30. **Section 5.1.5.7, p. 5-47, paragraph 1.** The project duration is estimated on p. 5-45 at up to 20 months, not less than 1 year as indicated in this paragraph. O&M costs are applicable regardless of project duration. O&M costs are associated with the SVE, stabilization of soil, soil excavation, etc. These costs should be included in the estimate.

31. **Section 5.2.7, p. 5-50.** Please revise the statement concerning Alternative S-5 as being the lowest cost when there is no cost for Alternative S-1.

32. **Section 5.3.2, p. 5-55, paragraphs 1 and 2, Section 5.3.3, p. 5-63, paragraph 2, Section 5.3.4, p. 5-72, and Section 5.3.5, p. 5-82.** Previous comments on mitigative measures also apply to these alternatives.

33. **Section 5.3.2, p. 5-55, paragraph 4.** Please describe how LNAPL and or DNAPL will be captured during excavation.

34. **Section 5.3.2, p. 5-56, paragraph 2.** Please describe the criteria that will be used to delineate the area for excavation. It is assumed that soil from locations exceeding groundwater cleanup levels will be "excavated."

    Generally, soil that is associated with contaminated groundwater is less contaminated than soil associated with a direct release. It seems inconsistent that the majority of vadose soil directly contaminated from releases can be disposed in a Class II landfill (see Table 4-3, S-2) but soil associated with impacted groundwater requires Class I disposal. This soil may be acceptable for Class II landfilling.

35. **Section 5.3.2.2, p. 5-57, paragraph 3.** Please discuss whether Parcel C should be designated as a CAMU for purposes of soil management during remediation.

36. **Section 5.3.2.4, p. 5-59, last paragraph.** This paragraph is inconsistent with earlier paragraphs. If the volume of affected groundwater is not reduced, it is not clear how COCs will be significantly reduced and how the mass of affected groundwater will be reduced as stated in earlier paragraphs. Please revise this section to clarify how this alternative results in remediation of groundwater.

37. **Section 5.3.2.6, p. 5-62, paragraph 3.** This is the first time that specific offsite disposal facilities are cited. The presentation of the various alternatives that require offsite disposal should be consistent; these disposal facilities should, at a minimum, be listed the first time offsite disposal is discussed as part of an alternative.

38. **Section 5.3.3, p. 5-63, paragraph 1 and Section 5.3.3.3, p. 5-66, paragraph 2.** Previous discussion of this alternative acknowledges that groundwater will not be extracted from behind the sheet pile wall, and will ultimately flow around the wall. Please justify the statement that this approach provides long-term effectiveness in light of this fact. Note that the statement at the top of page 5-67 contradicts the statement made on page 5-63 (last paragraph) regarding long-term effectiveness. Please resolve.

39. **Section 5.3.4, p. 5-74, paragraph 3.** Please discuss whether there is a possibility that injection of permanganate solution into the excavation will push contaminants in

undesired directions. Describe what volume of solution would be required and how it would be thoroughly mixed into the groundwater plume.

40. **Section 5.3.4.3, p. 5-76, paragraph 1.** It is stated in the text that the active treatment period would be 1 year. Please clarify whether this means that the GAC system is only needed for this very short time.

41. **Section 5.3.5.3, p. 5-84, paragraph 3.** Please discuss whether there is a possibility that pressure injection into the soil will push contaminants in undesired directions.

42. **Section 5.4, p. 5-89.** The alternatives should be compared and rated against each other for each of the evaluation criteria; this is not done. A discussion of the ranking of the alternatives and the rationale behind this ranking should also be included.

43. **Section 5.4.7, p. 5-93.** Please revise the statement concerning Alternative GW-4 as having the lowest cost when there is no cost for Alternative GW-1 is a no-cost alternative.

44. **Tables 5-1 through 5-16.** The text comments on the evaluation of alternatives apply to these tables as well.

APPENDIX C

1. **Attachment C-1.** Natural attenuation monitoring will be necessary to verify that the estimated DAFs are appropriate and to more directly ensure that the project results (i.e., no contamination migration to the Bay) are achieved.

APPENDIX D

1. Based upon Figure 2-2, it appears that most of Parcel C will be designated for non-industrial use. Therefore, based upon this figure, cleanup criteria should not be based on future industrial use exposure scenarios. Please confirm that this is the case and discuss how this relates to the rationale behind the three differing soil cleanup scenarios. Please explain why industrial scenarios are considered relevant in areas designated for non-industrial use. Clarify whether contaminated areas could be re-designated as industrial if cleanup is not conducted to non-industrial standards.

2. **Page D-3.** Please provide a rationale supported by data or by previous examples, for accepting child Total HI of greater than 1.

3. **Page D-5 and Table D-2a.** It is stated in the text that under certain cases excavation depth is set at 10 feet or less. Please clearly state whether this limit is established only for planning proposes or whether it is proposed that this limit be set for actual remediation regardless of whether evidence exists for contamination deeper than this

level. For the excavation depths in Tables D-2, D-3, and D-4, please indicate whether these limits are established only for planning proposes or whether it is proposed that these limits be set for actual remediation regardless of whether evidence exists of contamination deeper than these levels.

4. **Table D-4b, RA28-11, p. 8.** Figure D-3 shows EA 91019 arsenic and PAHs at 25 and 0.7 mg/kg, not 0.25 and 7 mg/kg as stated in the table. Please reconcile.

5. **Table D-4b, RA28-13, p. 8.** Figure D-3 shows manganese at EA 92039 at 9.5 feet deep not at 9.25 as stated in the table.

6. **Table D-4b, RA28-29, p. 15.** The ECLR should be $5x10^{-4}$ based on the concentrations given in figure D-3. PCB = 0.2 mg/kg and chrysene = 0.9 mg/kg. If the concentrations given in Table 3-2c equate to a risk of $1x10^{-5}$ as indicated, the risk given for RA 28-29 should be higher. Please check the risk calculations and figure and revise as necessary.

7. **Table D-4b, p. 20.** Please include *de minimus* area 91019 as part of RA 28-11 since both have the same types of PAHs.

8. **Table D-4b, p. 21.** *De minimus* areas 101032 and 101033 should be grouped into an RA based on oil contamination. It appears that these two areas have been subjected to the same oil release and similar contamination can be expected to be found in these two locations.

9. **Table D-4b, p. 24.** Action area 106012 findings do not say that aluminum and vanadium are below twice the HPALs. Table 2-4 does not include an HPAL for aluminum and indicates that the vanadium concentration in area 106012 is greater than twice the HPAL. Please revise.

10. **Table D-4c.** The samples collected from the northwest corner of the IR-29 boundary as shown in Figure D-4 are not discussed. These samples and this area needs to be discussed.

11. **Table D-4f, RA58-2, p. 1.** Exposure Area 80026 is indicated as having a mercury content of 4.4 mg/kg. However, Figure D-5 indicates a mercury content of 1530 mg/kg. Please correct.

12. **Table D-5.** Please indicate whether the calculated soil volumes are in-place or excavated volumes.

13. **Figure D-5.** Sample data from the samples located in the eastern part of IR-58 are not discussed in Table D-4f yet the data indicates a potential concern exists. For example, PA58SS04 has a lead concentration which exceeds the 221 mg/kg criteria for a residential

scenario yet Table D-4f does not indicate that remediation is necessary. Other samples taken in this area of IR-58 also indicate exceedances of Aroclors and PAHs. Please explain why these samples/areas are not included for remedial action.

APPENDIX E

1. **Page E-4.** An allowance should be included for dioxin analyses if confirmation is needed for offsite disposal; this analysis may be necessary for RU-6, where pentachlorophenol, which is contaminated with dioxin during the manufacture of this compound, was detected in a sump sludge sample, but soil and groundwater samples were not analyzed for dioxins.

2. **Page E-8.** Please identify the contractor/vendor for SPSH. In the final bullet, please refer to previous comments on the potential bias introduced in Parcel C cost estimates by having other real Parcel C costs covered under other Parcels.

APPENDIX F

1. Refer to previous comments on the indoor air modeling uncertainties. It is strongly recommended that this appendix include a discussion of those uncertainties, the degree of conservatism and recommendations for qualitatively interpreting the degree of conservatism in selecting groundwater cleanup levels.

COMMENTS FROM EPA TECHNICAL SUPPORT, CYNTHIA WETMORE

1 - Sheet piling for containment purposes. Sheet piling for containment purposes may be suitable at Hunter's Point but more analysis needs to be conducted prior to a final decision. Most important is to conduct corrosion studies on the sheet pile material in the soil type and the brackish water found in the tidally influenced area at Hunter's Point. If there is corrosion potential, cathodic protection may not be a reasonable solution because it will fail after a period of time. Other potential corrosion protection options are to increase the thickness of the sheet pile to allow for a rust barrier to form or to use vinyl sheet pile that would not corrode. Another issue for use of sheet piles is the compatibility of the grout sealant with the brackish waters in the tidal influences areas. The groundwater in this area may affect the quality of the grout.

2- Slurry walls. Although slurry walls were eliminated from further consideration because of the variability of the soil types found at the site, slurry walls may be more attractive cost wise after a more detailed analysis is performed on sheet pile alternative. The slurry wall could be designed to take into account the variability of fill material and can also be designed to minimize left over fill material which needs disposal. The slurry wall may have the same compatibility problem between the brackish waters and the grout or bentonite.

3 - Access restrictions. Access restrictions have been typically difficult to implement and have failed on the long term. Often, agencies assigned responsibility of access restrictions do not have the mechanisms or the redundant features in the system to ensure compliance. Therefore, access controls should not be considered as long-term effective or necessarily easy to implement.

4- Excavation of Saturated Soils. The contamination in the hot-spots is sorbed on the soils and dissolved in the groundwater. Therefore, extraction and management of groundwater during excavation should be included. The opportunity to remove as much contaminated groundwater as possible from the pit should be seized. There are also concerns about the amount of chemicals that will volatilize during excavation.

5- Alternative GW-3. This alternative does not adequately control the contaminated groundwater posing an ecological threat. The partial installation of the sheet piles and the absence of pumping to control flow will result in spreading of the contamination around the sheet piles.