UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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SFD 8-3

April 27, 2006

Mr. Thomas Macchiarella, Code 06CA.TM
Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

RE: **Draft Feasibility Study Report for OU-2B Sites 3, 4, 11 and 21, Alameda Point**

Dear Mr. Macchiarella:

EPA has reviewed the above referenced document, prepared by Sultech, and submitted by the Navy to the agencies on October 28, 2005. Due to the heavy workload on the BCT at the end of 2005, and the priority placed on Proposed Plans and Record of Decision documents during that time, the team agreed to extend the review of the OU 2B FS, with regulatory comments due on April 28, 2006.

After reviewing the OU 2B FS, we have concluded that the document does not contain a sufficient evaluation of various remedial alternatives to form the basis for a Proposed Plan and Record of Decision. Major problems in the document include: 1) the selection of remedial goals above MCLs for groundwater in the commercial/industrial reuse scenario and for groundwater beneath the oil water separators; 2) the evaluation of Monitored Natural Attenuation as a remedial option in circumstances that are inherently unsuitable for this technology; 3) use of an unacceptably high clean up number for lead contamination in soil; and 4) eliminating COCs from consideration for remediation based on an HHRA in the RI that the regulators did not accept and which we believe consistently underestimates risk. We believe the deficiencies in the document and the amount of revision required are too extensive for the document to go to draft final. We propose an iterim document, which will be developed with the Navy working in close consultation with the regulators. Review and response times for this "working draft final" document can be shortened

from the ususal 60-60 day turnarounds to expedite the submittal of the draft final FS.

Enclosed you will find a detailed list of the major and specific concerns with this Feasibility Study. Please call me at (415) 972-3029 to discuss how best to proceed with the FS for this operable unit.

Sincerely,

Anna-Marie Cook

Anna-Marie Cook
Remedial Project Manager

enclosure

cc list: Steven Peck, BRAC PMO
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EPA Review of the Draft Feasibility Study Report for Operable Unit 2B
IR Sites 3, 4, 11 and 21, Alameda Point

GENERAL COMMENTS

1. Remedial alternatives developed for the OU-Wide groundwater plume in the Draft Feasibility Study Report for Operable Unit 2B Sites 3, 4, 11, and 21 (the FS) include multiple treatment technologies in each alternative. The treatment technologies are selected to address specific contaminants or classes of contaminants, for example: zero-valent iron (ZVI) to treat dense non-aqueous phase liquid (DNAPL), hydrogen releasing compounds (HRC) to treat dissolved phase chlorinated compounds, and oxygen release compound (ORC) to treat benzene and total petroleum hydrocarbon (TPH) plumes. However, according to the information presented in the figures, the plume of dissolved chlorinated compounds overlaps most of the benzene plume and the DNAPL and light non-aqueous phase liquid (LNAPL) plumes overlap both the chlorinated and benzene plumes, but the effectiveness of applying different treatment technologies in the same areas is not discussed in the FS. It appears that some of the technologies grouped together in alternatives are mutually incompatible because some technologies require oxidizing conditions and others require reducing conditions. For example, HRC is recommended to treat dissolved-phase chlorinated compounds combined with ORC to treat benzene. It is not clear that sufficient reagent is included for the switch from reducing conditions to oxidizing conditions. Please revise the FS to include consideration of the possible interactions between different treatment technologies applied in the same areas, and develop alternatives using only combinations of technologies which are implementable and feasible. Also, please clarify if sufficient reagents and/or time is allowed to switch from reducing conditions to oxidizing conditions.

2. According to the information presented on the figures, the dissolved chlorinated plume, the LNAPL plume and the benzene plume appear to be migrating into Sea Plane Lagoon. However, the FS does not discuss actions to prevent migration of the plumes, or the potential effects of injecting reagents into the subsurface on migration of contaminants, or the reagent themselves, into Sea Plane Lagoon. Please include a discussion of how contaminant migration into surface water will be controlled in each alternative, and how the injection of reagents will be controlled to prevent surface water contamination.

3. The issue that the nature and extent of soil contamination beneath buildings has not been determined because there is very little sampling beneath existing buildings was not addressed as requested in EPA's June 20, 2005 letter. There is no discussion of Institutional Controls (ICs) to prevent removal of buildings. Please revise the FS to address soil beneath buildings.

4. The number derived for the lead clean up level is more than four times higher than EPA's industrial preliminary remediation goal (PRG) for lead (800 milligrams per kilogram [mg/kg]). EPA strongly opposes use of the Navy's proposed lead clean up level and requests that at a maximum 800 mg/kg be used with prohibitions on use of the property for recreational and residential land uses. Additionally, please provide an alternative using a residential clean up level in the evaluation.

5. Several alternatives for treating OU-Wide groundwater involve use of ZVI followed by air sparging or ISCO, but is unclear whether ZVI will block pore spaces that would be needed for these subsequent technologies. Please discuss how ZVI affects pore spaces and other aquifer properties and whether subsequent air sparging or ISCO in the same areas would be impacted by ZVI.

6. The text describing alternatives for treating OU-Wide groundwater do not discuss whether metals would be mobilized by the technologies. Since OU-2B groundwater discharges to the Sea Plane Lagoon (SPL), ecological receptors could be impacted. Please revise each alternative to discuss whether each technology would mobilize metals, and specify the metals that likely would be mobilized.

7. Since the groundwater modeling conducted to evaluate monitored natural attenuation (MNA) and active remediation time frames did not include all contaminants of concern (COCs), and it was assumed that remedial alternatives would reduce the concentrations of other collocated chemicals, it is unclear if the proposed suites of remedial technologies will be sufficient to remediate each COC. A discussion of the effectiveness of each remedial technology that is included in the remedial alternatives for each of the contaminants present in the OU-Wide groundwater plume is needed.

SPECIFIC COMMENTS

Executive Summary:

1. **Risk Management Decisions, Page ES-1:** The summary of risk management decisions refers to the necessity for ICs at Site 3 and 4 where elevated contaminants in soil present a risk to residential receptors. However, as explained elsewhere in the FS, remedial action objectives (RAOs) can be achieved either by reducing COCs or by eliminating exposure pathways. Although the current and expected future site use scenario is commercial/industrial, protecting residential receptors from exposure to contaminants can be achieved by preventing residential use of the sites, or by reducing COCs; both alternatives are evaluated in the FS for Sites 3 and 4. The FS should not conclude that ICs are necessary, or the most cost-effective remedy, prior to the evaluation of alternatives; therefore, please delete the phrase "where institutional controls are necessary to prevent future unrestricted use" from the third sentence in this section.

2. **Risk Management Summary for OU-2B Sites, Page ES-2:** This table indicates that no COCs were identified for Site 4 soil, and that no further action was recommended. However, alternatives are developed in the FS to remediate risk posed to residential receptors from cadmium in soil at Site 4. Furthermore, the table indicates that the action to be taken will be ICs to prevent unrestricted reuse of Site 4, but the comparison of alternatives shows that excavation of cadmium contaminated soil at Site 4 may be the more cost-effective alternative. Please revise this table to clarify that cadmium was identified as a COC for residential receptors and that IC and excavation remedial alternatives will be analyzed.

   In addition, lead, benzene, ethylbenzene, and vinyl chloride should be included as residential risk drivers at Site 4 since concentrations of these analytes in soil exceeded residential PRGs. Please screen the highest concentrations of contaminants against the residential PRGs and revise the list of risk drivers to include all COCs that exceed residential PRGs.

3. **Evaluation of Alternatives, Page ES-3:** The second bullet on this page states that Site 4 soil requires ICs to prevent future unrestricted use; however, cadmium in soil at Site 4 is identified as a COC in the FS and alternatives are developed, including excavation, to address the risk to residential receptors. Please revise this bullet to read something similar to: "Site 4 soil affected by cadmium presents a risk to residential receptors and will be addressed separately," to be consistent with the body of the FS.

4. **Evaluation of Alternatives, Page ES-3, paragraph following bullets**: Please elaborate on the "circumstances" that are limiting the number of available options for addressing soil contamination at the OWS sites.

5. **Site 3-Soil and Groundwater, Page ES-3:** The first bullet in this section states that the remedial action objectives (RAOs) for Site 3 soil are to prevent human exposure to Aroclor-1260 at concentrations above 0.74 mg/kg and lead at concentration greater than 3,582 mg/kg; however, in order to be protective of human health, alternatives which remediate Site 3 soil to these levels require ICs to prevent residential use of the site. Therefore, the actual RAOs for Site 3 soil are to prevent human exposure to Aroclor-1260 and lead at concentrations greater than 0.22 mg/kg and 247 mg/kg respectively (the unrestricted reuse scenario). Alternatives are developed in the FS to achieve these RAOs through reduction of COCs to unrestricted reuse levels, or to commercial/industrial reuse levels combined with ICs to prevent residential use. EPA reiterates the comment made in reviewing the OU 2A FS that the commercial/industrial clean up level for lead (3,582 mg/kg) is unreasonably high and that EPA's industrial PRG of 800 mg/kg for lead should be the maximum concentration used for this scenario.

6. **Site 3 - Soil and Groundwater, Page ES-4:** The table on this page, "Comparative Analysis of Alternatives for Site 3", lists costs for each alternative which appear to be

incorrect. Alternative 2 is listed as $1.5 million and Alternative 3 is listed as 16.5 million, but the costs provided in the FS on Pages 3-23 and 3-24 are $700,000 and $4 million respectively. Please provide the correct costs in this table.

7. **Site 4 - Soil, Page ES-5:** This section presents the concentration of cadmium under the unrestricted reuse scenario as 0.37 mg/kg, but Page 4-4 of the FS presents the RAO for cadmium in soil at Site 4 as 3.8 mg/kg. Please correct this discrepancy.

8. **Site 4 - Soil, Page ES-5:** This section concludes that ICs are needed to prevent unrestricted reuse of the site; however, alternatives are developed in the FS to prevent human exposure to cadmium in soil at concentrations greater than 3.8 mg/kg, including excavation to unrestricted reuse concentrations. Therefore, the statement that ICs are needed prejudges the conclusions of the FS. Please revise this section to clarify that remedial alternatives are needed to address risk to human health under the residential scenario (either by reducing COCs or restricting use).

9. **Page ES-7, Table**: The analysis for Short and Long-term Effectiveness and Treatment should be "None" not "Low". In addition, the evaluation of "Short-Term Effectiveness" for Alt. 5 is misleading because it will reach RGs faster than any other alternative.

10. **Page ES-7, OWS Section, first bullet**: The concentrations of contaminants need to be screened against residential as well as commercial/industrial PRGs to analyze whether ICs on or excavation to unrestricted use best meets the criteria.

<u>Section 1:</u>

11. **Section. 1.0, page1-1, second paragraph**, states that the FS documents risk management decisions made by stakeholders. This is confusing, because it is the Navy and regulatory agencies that make the risk management decisions, whereas the term "stakeholders" generally refers to the general public, local government, etc. This should be clarified.

12. **Section 1.1, Purpose, Page 1-1:** According to text in the third paragraph, alternatives were only developed to protect human health, but protecting ecological receptors in SPL from contamination transported in groundwater and discharged to SPL is also important. Please revise the third paragraph, which discusses why the alternatives were developed, to include protection of ecological receptors in SPL.

13. **Section 1.3, Page 1-2, third paragraph**: Please explain or elaborate on the statement that the RI/FS process characterizes threats ... through a risk management decision.

14. **Section 1.3.1, Risk Management, Page 1-3:** The FS uses results of the human health risk assessment (HHRA) to determine whether remedial action is warranted for specific COCs at the OU-2A sites; however, the HHRA was not approved by the regulatory

agencies, who believe that the risk for each site has been consistently underestimated. The HHRA results should not be used to eliminate chemicals as COCs.

15. **Section, 1.3.1, page. 1-4, second paragraph**. The FS states, "Risk drivers that show temporal decreases in concentrations are evaluated on a case-by-case basis to decide whether to retain them as COCs." This sentence causes some concern as it implies that if a contaminant is naturally attenuating, then a remedial action might not be necessary. While it may be true that in some situations an active remedy might not be necessary and that MNA might be sufficient, this doesn't justify not including the chemical as a COC.

16. **Section 1.3.1, Risk Management, Page 1-4:** The second paragraph on this page refers to the "generally accepted risk" for polycyclic aromatic hydrocarbons (PAHs) in soil at Alameda Point; however, some readers may not know how this "generally accepted risk" is documented. Please revise the FS to include a reference for documentation that a 10-5 risk for PAHs is generally accepted for Alameda Point, and by whom.

17. **Section 1.3.2, Evaluation of Alternatives, Page 1-5, paragraph following bullets**, second sentence: Replace with "Federal and State of California maximum ..." otherwise it sounds confusing.

18. **Section. 1.3.2.4, page. 1-7, last paragraph**. We are concerned with the following statement: "The FS avoided remedies that would use active treatment with GW at Site 3, where the concentrations and volumes of lead have not been confirmed, and with GW at the OWSs, where no contaminants in GW have been confirmed. The volumes of contaminated soil and GW are small at both Site 3 and the OWSs, and active treatment costs are inordinately expensive with these small volumes." While cost is a factor in remedy selection, and in deciding among remedies to proceed to detailed analysis in a FS, it cannot be used to justify not evaluating any active remedies in an FS – especially here, where the groundwater is potential drinking water and needs to be remediated to MCLs.

19. **Section 1.3.2.4, Page 1-8, last paragraph**: EPA is unaware of the particular circumstances that limit the number of available options for these sites and requests more detail and clarification on this point in the FS.

Section 2:

20. **Section 2.1.1, Marsh Crust, Page 2-1:** This section indicates that the Marsh Crust Ordinance limits the extent of excavations to designated threshold depths for some areas of Alameda Point, but the limit on the depth of excavation in the OU-2B area is not discussed. Please revise the FS to clarify the impact of the Marsh Crust Ordinance on the Alternatives developed for OU-2B, including the depth of excavation at Sites 3 and 4.

21. **Section 2.2.2, Operable Unit 2B Hydrogeology, Page 2-3:** This section discusses groundwater elevations in the first water bearing zone (FWBZ), but does not provide the depth to groundwater. For clarity and completeness, and to better evaluate alternatives, please revise the FS to include a discussion of the depth to groundwater at OU-2B.

22. **Section 2.5, Future Land Reuse, Page 2-5:** This section states that the original reuse plans for Sites 3, 4, 11, and 21 included both residential and commercial/industrial areas. The FS concludes that the most likely future use of these sites in commercial/industrial because "recent city planning documents and discussions between the City of Alameda and the Navy reference only commercial and industrial future land use for Site 3, 4, 11, and 21." However, this statement is not definitive. It is not clear whether the reuse plans have been revised, or whether some residential use of these site is still possible. Since the evaluation of Alternatives in the FS is based, in part, on assumptions regarding future land use, the FS should state definitively whether residential use of the sites is possible under the current reuse plans. Please revise the FS to clarify whether any residential use of Sites 3, 4, 11, and 21 is possible based on current reuse plans.

Section 3.0:

23. **Section 3.0, Feasibility Study Evaluation for Site 3, Page 3-1:** This section includes development of alternatives for soil and groundwater at Site 3; however, only groundwater contaminated with lead is included in this section. Groundwater contaminated with chlorinated solvents, benzene, and total petroleum hydrocarbons at Site 3 is included in the OU-Wide groundwater plume in Section 7 of the FS. For clarity and completeness, please revise Section 3.0 to refer to Section 7 for the evaluation of alternatives for the other groundwater COCs at Site 3.

24. **Section. 3.1.1, page. 3-2**, statement that no further action is warranted "for current use or planned reuse" of Site 3 is misleading, as it suggests a NFA remedy would be appropriate. However, given the HI numbers under the residential scenario, there will need to at least be ICs.

25. **Section 3.1.1, Page 3-2, second full paragraph:** Add the phrase "or remediation" to the end of the sentence beginning "The residential scenario is the most conservative and ..." It is not a foregone conclusion that ICs will be the only remedial alternative evaluated and chosen.

26. **Section 3.1.1, Page 3-3, Table**: It is not supportable to claim that arsenic is due to background when the risk is an order of magnitude higher than the risk attributed to background for the rest of the base.

27. **Section 3.1.1, Page 3-4, first paragraph:** It is stated that Site 3 is slated for residential reuse in this paragraph. This statement conflicts with statements on previous pages.

28. **Section. 3.1.3, page. 3-4, ARARs**. It's not correct to state that the only chemical-specific ARARs for soil are RCRA restrictions when the ARARs table also includes PCB regulations.

29. **Section 3.1.3, Potential Applicable or Relevant and Appropriate Requirements, Page 3-5:** The sentence in the middle of this page: "The Navy assumes that high concentration of lead in soil at Site 3 may have resulted in some migration of lead to groundwater and intends to monitor groundwater to verify this assumption."appears to be misplaced. This sentence does not appear to be relevant to the applicable or relevant and appropriate requirements (ARARs) discussion, nor does it discuss any remedial action needed to address the lead contamination that is assumed to be present in groundwater.

30. **Page. 3-5, last paragraph**, indicates that the Navy is using an action level of 15 ppb for lead based on 22 CCR 64672.3 to make risk management decisions on lead in GW. The FS should note that this is the same as the EPA action level of .015 mg/L. Also, is 22 CCR 64672.3 still in effect?

31. **Page 3-6, first paragraph**. Sentences other than the first should be removed. There is no basis for the statement that the Water Board will remove DW designation for this GW, or that it will be classified as an EPA Class III aquifer.

32. **Section 3.1.4, Remediation Goals, Page 3-7:** This section states that "any land use scenario for commercial/industrial reuse must include ICs to prevent future unrestricted use"; however, the risk to potential residents may be prevented by either ICs or reduction of COCs. Therefore, please revise this statement to include reduction of COCs below unrestricted reuse goals as a potential means of addressing risk to residents.

33. **Section 3.1.4, Remediation Goals, Page 3-7:** EPA does not believe that the RG for lead in soil for restricted reuse (3,582 mg/kg) is appropriate since it far exceeds the industrial PRG of 800 mg/kg. Further, we do not think that excavating soil to 3,582 mg/kg clean up level would allow for achieving the groundwater RG for lead if the soil source remains at concentrations up to 3,582 mg/kg.

34. **Section 3.1.4, Remediation Goals, Page 3-7:** Numerous chemicals were detected at concentrations that exceeded the PRGs in Site 3 soil and groundwater (i.e., the concentrations exceed a 10-6 excess lifetime cancer risk), so it is unclear why remedial action objectives (RAOs) were only developed for lead and Aroclor 1260 in soil and for lead in groundwater. Other analytes that exceeded PRGs in soil include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, Benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, arsenic, mercury, thallium, benzene, ethylbenzene, and xylenes. In groundwater, chemicals that exceeded PRGs include antimony, arsenic, manganese, thallium, benzo(a)anthracene, benzo(a)pyrene ndeno(1,2,3-cd)pyrene,

naphthalene, pentachlorophenol, 1,1,2-trichloroethane (1,1,2-TCA), 1,1-dichloroethane (1,1-DCA), 1,2,4-trimethylbenzene, 1,2-DCA, 1,2-dichloroethene (1,2-DCE), cis-1,2-DCE, 1,3,5-trimethylbenzene, benzene, chlorobenzene, chloroethane, chloroform, chloromethane, ethylbenzene, methylene chloride, methyl-tert-butyl ether (MTBE), naphthalene, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. Even though some of these chemicals may be addressed in a corrective action area (CAA) program, it appears that CERCLA contaminants are also present in the CAA areas. Please include RAOs for all chemicals detected above the PRGs.

35. **Section 3.1.5, Remedial Action Objectives, Page 3-8:** The first bullet in this section states that the RAOs for Site 3 soil are to prevent human exposure to Aroclor-1260 at concentrations above 0.74 mg/kg and lead at concentration greater than 3,582 mg/kg; however, in order to be protective of human health, alternatives which remediate Site 3 soil to these levels require ICs to prevent residential use of the site. Therefore, the actual RAOs for Site 3 soil are to prevent human exposure to Aroclor-1260 and lead at concentrations greater than 0.22 mg/kg and 247 mg/kg respectively (the unrestricted reuse scenario). Alternatives are developed in the FS to achieve these RAOs through reduction of COCs to unrestricted reuse levels, or to commercial/industrial reuse levels combined with ICs to prevent residential use. Please revise this section to include unrestricted reuse RGs as the RAOs for Site 3 soil.

36. **Section 3.2, Volumes of Contaminated Media at Site 3, Page 3-8:** The volume of contaminated soil described in this section is based on an estimated vertical extent of contamination 1.5 feet below the commercial/industrial reuse scenario depth of 8 feet below ground surface (ft bgs). It is not clear from this discussion whether the excavation depth is limited to the exposure depth of 8 ft bgs, whether the excavation will extend until RAOs are achieved, or whether the Marsh Crust will limit the excavation depth. Please revise the FS to clarify how the maximum depth of excavation is to be determined.

37. **Section 3.3, General Response Actions Chart, Page 3-10:** The only GRAs indicated in the chart are no action, ICs, and GW monitoring. Especially given that this is potential drinking water, the Navy needs to consider a remedy that would result in attainment of the groundwater RGs. Additionally, "Groundwater Monitoring" is not a response action, since it will not be protective of human health and the environment by itself and would not reduce contaminant levels.

38. **Page. 3-10, sentence under GRA table.** The document references sections 3.2.1 and 3.2.2, but there are no sections with those numbers.

39. **Section 3.3, General Response Actions, Page 3-10; Section 3.4.4.2, Alternative 2: (Commercial/Industrial Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-17; and Section 3.4.4.3, Alternative 2: (Unrestricted Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-17:** The description of Alternatives 2 and 3 includes groundwater monitoring until groundwater RGs are achieved, but this implies MNA, not simple groundwater monitoring. MNA will not work to remediate lead in groundwater and so does not qualify as a remedial. Please evaluate other remedial alternatives to achieve the groundwater RGs for lead.

40. **Section 3.4.2.2, Institutional Controls, Page 3-12**: This section includes a sentence related to engineering controls. This sentence appears to be misplaced. Please revise the FS to move this sentence to Section 3.4.2.3, Engineering Controls.

41. **Page 3-13, Proprietary Controls, second paragraph**: What does the phrase "because long-term MNA is a critical component to assess the effectiveness of the IC approach" mean? Apart from the fact that MNA will not work for Site 3 lead contamination in groundwater, how does monitoring attenuation of contaminants in groundwater indicate the success of an IC implementation? They are unrelated.

42. **Section 3.4.2.3, Engineering Controls, Page 3-15:** It is puzzling why vapor removal systems were retained to address PCBs and lead in soil and lead in groundwater. Please clarify.

43. **Section 3.4.2.5, Containment, Page 3-15:** This section states that "active treatment technologies were not retained for soil at Sites 3 and 4 and the OWS", but it is not clear how this discussion relates to the paragraph heading "containment". Since this section appears to address all soil and groundwater remedies apart from excavation with off-site disposal and monitored natural attenuation, it appears that the title should be changed to reflect the scope of the discussion. For clarity, please revise the FS to title this section "Active Treatment" or a similar title. In addition, EPA disagrees with the conclusion that pump and treat would not be effective due to the lack of thickness of the saturated zone. This technology may be a quick, cost-effective method to bring the groundwater lead contamination levels down to the RG and deserves to be fairly evaluated.

44. **Section 3.4.2.6, Monitored Natural Attenuation, Page 3-15 and 3-16:** EPA does not support the conclusion that MNA would be effective for addressing lead in groundwater at Site 3, and requests that MNA not be retained for further evaluation here.

45. **Page 3-16, Section. 3.4.3.** The retained GRAs for groundwater include dewatering. This is different from the chart on page 3-10. This should be made consistent.

46. **Section 3.4.4.1, Alternative 1: No Action for Soil, Page 3-16:** Why does this alternative only address soil? The no action alternative should be no action for soil *and* groundwater. Please revise the text and title of this subsection to clarify that Alternative 1 is no action for soil and groundwater.

47. **Section 3.4.4.2, Alternative 2: (Commercial/Industrial Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-17; and Section 3.4.4.3, Alternative 2: (Unrestricted Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-17:** The text states that "soil will be dewatered during excavation to remove any water within the excavation limits and any water with concentrations above the groundwater RG," but it is unclear how it will be determined when this would be accomplished. Although groundwater monitoring is proposed, the extent of the lead plume has not been determined, as demonstrated by the dashed line on Figure 3-4. It appears that five additional groundwater monitoring wells are proposed in the cost estimate, but this is not discussed in the text of these sections and the wells are not shown on any of the figures. Further, groundwater sampling before and during dewatering is not included in the cost estimate; the purpose of this sampling is to confirm removal of lead-contaminated groundwater and to evaluate when the objective has been reached and groundwater extraction by dewatering can cease.

    Please revise the text to discuss the purpose of the additional groundwater wells and include them on a figure. In addition, please discuss how the objective quoted above will be accomplished. Further, please add at least 3 rounds of groundwater sampling; one prior to excavation to determine the extent and magnitude of lead contamination in groundwater and at least 2 during dewatering to evaluate the effectiveness of removing lead-contaminated groundwater. Finally, please briefly discuss criteria that will be used to evaluate whether dewatering has successfully removed groundwater contaminated by lead.

48. **Sections 3.4.4.2 and 3.4.4.3, Page 3-17, second paragraphs**: a) For both Alternatives 2 and 3, the FS states that soil would be dewatered "to remove any water within the excavation limits and any water with concentrations above the groundwater RG." This needs to be explained. Does this mean the groundwater itself will be cleaned up through dewatering (or pump and treat)? b) The FS also states that there will be ICs to prohibit domestic use of groundwater until the concentrations of lead are below the RGs. Since MNA is not effective at remediating lead in groundwater, what would cause the lead levels to drop so that RGs would be met?

49. **Section 3.4.4.2, Alternative 2: (Commercial/Industrial Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-17; and Section 3.4.4.3, Alternative 2: (Unrestricted Use) Excavation and Off-Site Disposal, Dewatering, Groundwater Monitoring, and Institutional Controls, Page 3-**

17: The discussion of disposal only includes disposal of excavated materials and does not include disposal of contaminated groundwater that will be removed during groundwater extraction by dewatering. Please revise the discussion of disposal to include disposal of contaminated groundwater.

50. **Section 3.5.2.2, Waste Generated from Soil Sampling, Page 3-20:** It is unclear why this section addresses waste generated from soil sampling rather than waste generated by excavation and groundwater extraction by dewatering. Please explain or revise the text to discuss requirements for waste generated by excavation and dewatering.

51. **Section 3.5.2.3, Long-Term Effectiveness and Permanence, Page 3-22 and Section 3.5.3.3, Long-Term Effectiveness and Permanence, Page 3-24:** It is not clear why it is assumed in the second paragraph that groundwater RGs will be achieved over a period of time. Please revise this discussion to clarify how and when groundwater RGs will be achieved.

52. **Section 3.6.1.2, Page 3-25.** What is meant by "Alt. 2 and 3 meet or have the potential to meet ARARs for soil and GW at Site 3 based on the reuse scenarios for each alternative"? It is not clear why reuse scenarios matter in this ARARs analysis.

53. **Section 3.6.1.4, Long-Term Effectiveness and Permanence, Page 3-25:** This section states that "all alternatives ...would permanently treat lead in soil and groundwater". The soil alternatives also address Aroclor-1260 and treatment is not involved in these alternatives. Please revise this section to include Aroclor-1260 in the evaluation and replace the word "treat" with "address".

54. **Section 3.6.1.5, Reduction in Toxicity, Mobility, and Volume through Volume, Page 3-25:** The heading is incorrect, and the discussion is of the wrong criterion.

55. **Figure 3-4, Site 3 Concentrations of Lead in Groundwater:** For clarity and completeness, please show the groundwater flow direction on this figure.

56. **ARARs table 3-1** includes the State action level for lead as probably relevant and appropriate. Is this requirement still in effect? If so, and if it is considered an ARAR, then none of the alternatives will meet it. EPA recommends that this requirement, and/or the corresponding EPA action level, be considered a to-be-considered (TBC) criterion. (Same comment for Table B-1, page 3).

57. **ARARs table 3-3, page 6, 22 CCR 66264.94.** The Navy should document in the administrative record why cleanup to background is not technically or economically feasible.

58. **Table 3-4, Summary of Comparative Analysis of Remedial Alternatives Site 3:** The ranking of alternatives under the criterion "cost effectiveness" is backwards.

Section 4.0:

59. **Section 4.1.1.1, Risk Management Decisions for Site 4, Pages 4-1 and 4-2:** It is unclear why only cadmium is identified as a contaminant of concern when the maximum concentration of lead in soil (2900 mg/kg) exceeded its industrial PRG. In addition, several VOCs, PAHs and Aroclor 1254 were detected at concentrations that exceed the industrial PRGs in Site 4 soil. Please revise the list of COCs to include all analytes that exceeded industrial and residential PRGs.

60. **Page 4-2, first paragraph**. It is incorrect to say that no further action is warranted for current or planned reuse, as at least ICs are necessary to prohibit unrestricted use.

61. **Section 4.1.1.1, Risk Management Decisions for Site 4, Page 4-2:** It is unclear why the text of the second paragraph on page 4-2 states that the "residential scenario ... is used to evaluate whether the IR sites can be designated for unrestricted use with no requirement for institutional controls," when the extent of contamination beneath Site 4 Buildings is unknown. For example, the extent of copper, cadmium, and cyanide beneath Building 360 has not been determined. Similarly, the extent of contamination in the vicinity of the oil-water separators (OWS) has not been defined. It appears that at a minimum, an IC to prohibit removing the buildings and structures will be required. Please delete the statement that there will be "no requirement for institutional controls," or explain how and when the data gap associated with the extent of contamination beneath buildings and structures will be addressed and propose alternatives to address this contamination.

62. **Section 4.1.1.1, Risk Management Decisions for Site 4, Page 4-3:** It is unclear why lead, benzene, ethylbenzene, and vinyl chloride are not included as residential risk drivers since concentrations of these analytes in soil exceeded residential PRGs. Since the risk assessment did not include the highest concentrations of all contaminants, please screen the highest concentrations of contaminants against the PRGs and revise the list of risk drivers to include all COCs that exceed residential PRGs.

63. **Section 4.1.1.1, Risk Management Decisions for Site 4, Page 4-3:** N-nitroso-di-n-propylamine should have been selected as a COC because there is a 1 x 10-4 risk associated with this chemical. It is a contaminant of and breakdown product of the pesticide trifluralin, which is present in dozens of commercial pesticides. It is a contaminant in some fertilizers and it was used by the rubber industry. It can also be produced during some industrial processes, so it is not correct to say, "N-nitroso compounds are produced primarily as research chemicals and not for industrial use." Since the location where this chemical was found is beneath Building 360, where a variety of industrial processes occurred, it is possible that this chemical is a byproduct of

industrial processes conducted in this building. Further, this chemical can be addressed during remediation of other contamination in Site 4 soil. If additional sampling is planned, sampling to confirm the presence of this chemical and to evaluate the extent of contamination in the vicinity of B04-45 could be conducted. Since there is a 1 x 10-4 cancer risk associated with n-nitroso-di-n-propylamine, please retain it as a COC, delete the quoted statement, and revise the paragraph to include the uses of this chemical, the potential that it was present in a pesticide used at Alameda Point, or the potential that it was produced as an industrial byproduct. Please also include remediation in the vicinity of B04-45 in soil alternatives.

64. **Section 4.1.1.1, Risk Management Decisions for Site 4, Pages 4-3 and 4-4:** Trichloroethene (TCE), Aroclor 1254, and some PAHs should also be retained as risk drivers since the concentrations of these chemicals exceed residential PRGs. In addition, the detection limits for many semi-volatile organic compounds (SVOCs), pesticides, and PCBs exceeded the PRGs by several orders of magnitude so the extent of SVOCs, pesticides, and PCBs is not known. Also, it is not clear that arsenic, which had a maximum concentration of 24.8 mg/kg and was historically used as a pesticide, can wholly be attributed to background, so areas with arsenic concentrations that exceed background should be retained. Please retain TCE, Aroclor 1254, arsenic, and PAHs with maximum concentrations that exceed residential PRGs as residential risk drivers.

65. **Section 4.1.1.1, Risk Management Decisions for Site 4, Page 4-4:** Since the extent of copper and silver contamination has not been defined, it is possible that the risk associated with these metals has been underestimated. Also, if the buildings and paving are removed, it is possible that ecological receptors would be exposed to these metals. Since it cannot be assumed that these buildings and all of the pavement will be maintained in perpetuity, copper and silver need to be retained as ecological risk drivers. At a minimum, ICs will be required to ensure that buildings and pavement are maintained, if active remediation is not done. Please retain copper and silver as ecological risk drivers.

66. **Section 4.1.2, Potential Receptors and Exposure Pathways, Page 4-4:** The exposure scenario for a commercial/industrial worker to soil at Site 4 is presented as 0 to 2 feet. It is not clear why exposure at Site 4 is limited to 2 feet below ground surface (bgs) while at Site 3 the exposure depth is 8 feet bgs. Please revise the FS to clarify how the exposure depth was determined.

67. **Page 4-5, first paragraph**. It is not correct to say that no further action is required because there are no COCs that exceed RGs for commercial/industrial reuse. There needs to be either cleanup to levels allowing unrestricted use, or there need to be ICs.

68. **Section 4.2, Page 4-2, second paragraph**: Confirmation sampling locations are typically decided in the Remedial Design document, and the regulators may decide a larger number

of samples is required than is listed in this section.

69. **Page 4-5, Sec. 4.3, first paragraph,** should remove "and groundwater", because the title of the table indicates that the GRAs only address soil.

70. **Page 4-5, chart of GRAs**. What is meant by "containment" here?

71. **Chapter 4, throughout, discussion of the IC to prevent growing produce (e.g. p. 4-6, Sec. 4.3.2.2 and p. 4-7 Sec. 4.4.2.).** EPA is concerned that a restriction of this type would be quite difficult to implement, more so than a restriction prohibiting residential use of the property. Especially where persons own the property, it is difficult to monitor whether produce is grown. Additionally, it is doubtful that deed restrictions would be sufficient to implement this restriction; there would have to be something additional, such as annual public awareness campaigns in the media to inform residents that they should not plant gardens. It is doubtful that EPA would be able to concur with selection of a remedy that included a prohibition on growing produce.

72. **Page 4-6, Sec. 4.3.2.2, second bullet.** Language should be added indicating that the LUC RD report is a primary document under the FFA.

73. **Page 4-6, 4.3.2.2, third bullet**. A deed notice is insufficient. There would also have to be deed restrictions. In addition, there would need to be something like annual public awareness campaigns in the media to inform people they should not plant gardens.

74. **Page 4-7, Sec. 4.4.2.** First sentence regarding ICs implemented "to prohibit unrestricted use of property, which includes planting vegetable or fruit gardens" is unclear. Is the contemplated IC only to prohibit planting vegetables or fruit? The language on page 4-9, par. 4.5.2, has the same lack of clarity.

75. **Section 4.4.3, Alternative 3: Excavation and Off-Site Disposal, for Unrestricted Reuse, Page 4-7:** It is unclear why the text states that confirmation sampling is only required to define the vertical limits of the excavation when the horizontal extent of cadmium contamination has not been determined. Sidewall sampling will also be required to confirm that sufficient soil has been removed. Please revise the text to include sidewall sampling to confirm that the horizontal limits of the excavation have been determined.

76. **Page 4-8, Sec. 4.5.1.1.** No-action alternative, overall protection criterion. EPA disagrees that the no-action alternative satisfies this criterion. A remedy is not protective if it leaves in place contamination at levels that don't allow unrestricted use, unless measures are taken (e.g. ICs) to prohibit unrestricted use.

77. **Page 4-8, Sec. 4.5.1.2.** No-action alternative, compliance with ARARs criterion. It is not correct to say that no ARARs are applicable with the planned commercial/industrial

reuse. At the very least, LUCs are needed, and LUC ARARs have been identified.

78. **Page 4-8, Sec. 4.5.1.3.** No-action alternative, long-term protectiveness criterion. The no-action alternative would not be effective in the long term. There need to at least be ICs. The discussion of this alternative/criterion in Table 4-1 is the preferable analysis.

79. **Page 4-8, Sec. 4.5.1.4.** No-action alternative, reduction of toxicity, etc., through treatment criterion. It is misleading to say that there are no contaminants that require treatment under the planned reuse. This criterion does not depend on the planned reuse. Again, the language in Table 4-1 is preferable to the language on page 4-8.

80. **Page 4-9, Sec. 4.5.2.1** Alternative 2 (LUCs), overall protectiveness criterion. (a) The second sentence does not make sense. How would Alternative 2 be protective "where vegetable or fruit gardens are planted" when the purpose of Alternative 2 is to prohibit such gardens? (b) Sentence three is confusing. Previously, the FS suggested that the risk is through ingestion of home-grown produce. This section suggests that the risk is from dermal contact. Which is it? Is there a risk to children or dogs digging in the dirt? Same confusion on page 4-11, par. 4.5.3.3, in reference to preventing human contact with soil. If the concern is dermal contact, prevention of fruit and vegetable gardening is not sufficient.

81. **Page 4-9, Sec. 4.5.2.2.** Alternative 2 (LUCs), ARARs criterion. The alternative would also have to comply with action-specific ARARs. (LUC ARARs have been identified as action-specific ARARs.)

82. **Page 4-9, Sec. 4.5.2.3.** Need to add "health" after "human" in first line.

83. **Page 4-9, Sec. 4.5.2.4.** Alternative 2 (LUCs), reduction of toxicity, etc., through treatment criterion. This section should simply state, "Alternative 2 would not reduce the toxicity, mobility, or volume of soils through treatment."

84. **Page 4-10, Sec. 4.5.2.6.** Alternative 2 (LUCs), implementability criterion. The LUC alternative would be difficult to implement if the prohibition is against planting gardens, especially for residents who own the property and have yards. This should also be noted in Table 4-1.

85. **Section 4.5.3.1, Overall Protection of Human Health and the Environment, Page 4-10:** The last sentence in this section appears to contain a typographical error. It appears that removing any soil that contains cadmium would *allow* rather than prevent planting vegetable or fruit gardens.

86. **Page 4-11, Sec. 4.5.3.4.** Alternative 3 (excavation), reduction of toxicity, etc., criterion. This appears to be the first mention of treatment of the excavated soil at the off-site

facility. Is that in fact contemplated? If so, that should be noted in Page 4-13, Sec. 4.6.1.5, and in Table 4-1. If this is not contemplated, than this alternative will not reduce toxicity, etc., through treatment. Merely putting contaminated soil in a different place does not reduce toxicity, etc. through treatment.

87. **Page 4-12, Sec. 4.6.1.1.** Comparative analysis, overall protectiveness criterion. This paragraph needs to be re-written An alternative is not protective "for a use." The alternative either needs to achieve levels of the contaminant that allow unrestricted use, or unrestricted use needs to be prohibited via LUCs. Additionally, the second sentence doesn't make sense for the same reason discussed above regarding Section 4.5.2.1.

88. **Page 4-12, Par. 4.6.1.4.** Comparative analysis, long-term effectiveness criterion. The no action alternative is not effective in the long term, as discussed above. Second paragraph, first sentence is written poorly, as discussed above regarding Sec. 4.6.1.1 and 4.5.2.1; the ICs are not written "for the unplanned unrestricted use" but to prohibit gardens. Discussion of this criterion and alternative on Table 4-1 is the preferred analysis.

89. **Section 4.6.1.5, Reduction in Mobility, Toxicity, or Volume through Treatment, Page 4-13:** The mobility of cadmium will not be reduced by simply relocating it to an off-site facility; some form of treatment is required to ensure that the mobility of this metal is reduced. Please revise the text to delete this statement or revise it to state that soil containing cadmium will be stabilized at an off-site facility to reduce the mobility of this metal.

90. **Table 4-1, Summary of Comparative Analysis of Remedial Alternatives Site 4:** The ranking of alternatives under the criterion "cost effectiveness" is backwards.

Section 5.0:

91. **Section 5.0, Feasibility Study Evaluation for Site 11 Soil, Page 5-1:** The first paragraph appears to be misplaced. It refers to the "data and risks discussed above", but the discussion of data and risk follows.

Section 6.0:

92. **Section 6.0, Feasibility Study Evaluation for Site 21 Soil, Page 6-1:** The first paragraph appears to be misplaced. It refers to the "data and risks discussed previously", but the discussion of data and risk follows.

93. **Section 6.0, Feasibility Study Evaluation for Site 21 Soil, Page 6-1:** Arsenic, chromium, lead, and benzene were detected in Site 21 soil at concentrations that exceed their respective residential PRGs, so these analytes should be retained as COCs. Please revise the FS to retain these analytes as COCs.

Further, it is inappropriate to conclude that no further evaluation should be conducted when there are data gaps. The extent of PAHs, lead, and copper in site soil has not been determined. Also, there are numerous data gaps where samples have not been collected. Samples have not been collected from the drum storage area west of Building 398, or beneath Building 162 where solvent and hazardous waste were stored. The extent of mercury beneath the northeast part of Building 398, where mercury spills were noted to have occurred, has not been determined.

94. **Page 6-2, Chart and Discussion Following**: The risk level presented for arsenic is an order of magnitude higher than that for background risk for arsenic for the rest of the base. In addition, it is stated in the paragraph following the chart that arsenic is not attributed to background by the background comparison. The argument that arsenic appears uniformly distributed and so is not selected as a COC is weak. Better justification is needed, or arsenic in soil at this site should be considered for remediation. Furthermore, even without the arsenic, the HI is too high at this site to justify no action.

Section 7.0:

95. **Section 7.1.1, Chemicals of Concern for the OU-Wide Groundwater Plume**. It is not necessarily appropriate to use a risk management approach to evaluate COCs for the groundwater plume. Since MCLs are ARARs for the all groundwater beneath OU 2B, all chemicals should be screened against the MCLs. In some cases, it may be beneficial to treat the groundwater below the MCLs to provide protection to receptors from the inhalation pathway. Mostly, MCLs will be the more conservative value to screen against.

96. **Section 7.1.1.1, Risk Management Decisions for OU-Wide Groundwater Plume, Page 7-1:** The maximum concentrations used in the HHRA for OU-Wide groundwater were as much as two orders of magnitude less than the maximum detected concentrations, so it is not appropriate to use the HHRA to screen groundwater to develop COCs. In addition, groundwater from OU-2B discharges to SPL, so the national ambient water quality criteria (NAWQC) and/or California Toxics Rule (CTR) also should be used to screen groundwater to protect aquatic life in the SPL and in San Francisco Bay. Please screen groundwater against MCLs and against the NAWQC and CTR.

97. **Section 7.1.1.1, Risk Management Decisions for OU-Wide Groundwater Plume, Page 7-2:** This section states that no engineering controls are needed for any existing buildings on site to protect current tenants. However, the basis for this conclusion is not clear . The risk to the commercial/industrial worker from the vapor intrusion pathway is at the high end of the risk management range and the RAOs for groundwater at OU-2B include preventing exposure of commercial/industrial workers to indoor air from concentrations of TCE that exceed the maximum contaminant level (MCL); therefore, it appears that there is a risk to current tenants. Please revise the FS to clarify the basis for

the conclusion that no engineering controls are needed for existing buildings, or revise the alternatives to include engineering controls for existing building to protect current tenants from the vapor intrusion pathway. Also, please include the results of the recent soil gas sampling in the revised draft feasibility study.

98. **Section 7.1.1.1, Risk Management Decisions for OU-Wide Groundwater Plume, Pages 7-3 and 7-4:** Although the text and table indicate that metals concentrations are attributed to background, the maximum concentrations of antimony, arsenic, cadmium, hexavalent chromium, manganese, and thallium in OU-2B groundwater exceed both the mean and the 95 percent upper confidence limit (95 UCL) of the ambient groundwater data set for Alameda Point by one to three orders of magnitude. Therefore, the concentrations of these metals cannot be attributed to background. Further, the maximum concentrations of arsenic, cadmium, copper, hexavalent chromium, lead, manganese, molybdenum, nickel, thallium, vanadium, and zinc exceed the NAWQC and/or CTR criteria for discharge into San Francisco Bay and may pose a risk to ecological receptors. Groundwater from OU-2B discharges into the SPL. Therefore, please retain antimony, arsenic, cadmium, copper, hexavalent chromium, lead, manganese, molybdenum, nickel, thallium, vanadium, and zinc as COCs and develop RGs, remedial action objectives, and alternatives to minimize the amount of metals that are discharged to SPL.

99. **Section 7.1.1.1, Risk Management Decisions for OU-Wide Groundwater Plume, Pages 7-3 and 7-4:** It is not appropriate to dismiss methylene chloride as a COC by claiming that the data do not represent site conditions and that methylene chloride is a common laboratory contaminant. If methylene chloride was detected in laboratory or field blanks, it would have been qualified during data validation. In addition, methylene chloride is a common solvent that may have been used in industrial processes conducted at OU-2B. Similarly, bromodichlomethane and chloroform should be retained as COCs because they are produced when chlorinated or bromated water interacts with chlorinated solvents. Please retain methylene chloride, bromodichloromethane, and chloroform as COCs and develop RGs and remedial action objectives for these COCs.

100. **Section 7.1.2, Potential Receptors and Exposure Pathways, Page 7-5:** The FS concludes that, because there are no drinking water wells in the areas of groundwater contamination at OU-2B, no humans are exposed to contaminated groundwater; however, Section 2.3 of the FS describes the connection of the first water bearing zone (FWBZ) to another Class II aquifer (Merritt Sand) that is a source of drinking water for off-base wells. The FS states that plume capture at an off-base well is possible and that groundwater beneath Sites 3, 4, 11, and 12 is a potential and possibly current source of drinking water. The FS does not discuss the potential exposure pathway through plume capture at an off-base well. This potential exposure pathway should be discussed during the development and screening of alternatives, since alternatives which do not actively treat or contain the plume, such as ICs, will not prevent migration of the plume to off-base wells. Please revise the FS to include a discussion of this potential exposure

pathway.

101. **Section 7.1.2, Potential Receptors and Exposure Pathways, Page 7-5**: Naphthalene should be marked as an indoor vapor intrusion pathway.

102. **Section 7.1.3, Potential Applicable or Relevant and Appropriate Requirements, Page 7-6:** The commingled TPH plume is addressed in the FS, but TPH is not included in the table in this or other sections. For clarity and completeness, please include TPH in the lists of COCs and include the remedial action objective for TPH and its source in the tables.

103. **Page 7-7, Sec. 7.1.4, RGs:**
(a) In the table under 7.1.4, it appears that the first column contains the numbers selected as the RGs. Specifying that up front would save the reader some time.
(b) For some COCs, the table indicates that the selected number is the federal number, while the last paragraph on the page indicates that California MCLs are selected. This should be consistent, and, where the numbers are the same, the ARAR should be considered to be federal since the State number is not more stringent.
(c) The chart on page 7-7 should identify that tetrachloroethene is PCE and trichloroethene is TCE, as done in the chart on page 7-5.
(d) To what level will the Navy clean up naphthalene, which does not have an MCL, yet has a fairly low target groundwater concentration to protect indoor air?

104. **Section 7.1.5, Remedial Action Objectives, Page 7-8**: The first sentence in this section appears to be incomplete. Also, the second paragraph appears to be the first item in the bullet list, but the bullet is omitted. For clarity and completeness, please correct these paragraphs as appropriate.

105. **Section 7.1.5, Remedial Action Objectives, Page 7-9:** The first bullet on this page incorrectly lists the maximum contaminant level (MCL) for trichloroethene (TCE) as 6.9 ug/l, but the MCL is 5 ug/l.

The second bullet lists the lifetime health advisory for naphthalene as a remedial action objective, but the value is not provided.

106. **Section 7.2.2, Volume of Contaminated Groundwater Based on the Commercial/Industrial Reuse Scenario, Page 7-11:** The second paragraph on this page states that the RGs for the commercial/industrial scenario are the same as for the domestic reuse scenario (MCLs). One would therefore expect that the volume of contaminated groundwater needing treatment would be the same for both the commercial/industrial and the residential scenario.

107. **Page 7-17, Sec. 7.3.2.5.** The first reference to six-phase heating should be written out.

108. **Sec. 7.4, evaluation of treatment technologies.**
(a) Sec. 7.4.1, treatment of DNAPL, pages 7-24 and 7-25 regarding cost. Page 7-24, the discussion of cost for SPH, gives the cost for treating "one of the potential DNAPL plumes," whereas page 7-25, discussion of cost for ZVI, gives cost for "the potential DNAPL plumes." This is confusing, as it appears that different things are being compared.
(b) Sec. 7.4.4, treatment of benzene and TPH plumes, p. 7-29 and 7-30. For ORC, the cost section mentions "human health criteria." For ISCO, the term used is "domestic use." For MNA, the term is "residential." It would be preferable to use the same term in each section.

109. **Section 7.3.2.5, Pump and Treat, Page 7-18 and Section 7.4.3.1, Pump and Treat With Air Stripping, Pages 7-26 and 7-27:** Vinyl chloride and benzene may be released to the atmosphere if air stripping is implemented, but there is no discussion of Bay Area Air Quality Management District limitations on the release of these compounds to the atmosphere. It may not be possible to implement air-stripping without treating the effluent. Please discuss BAAQMD limitations for release of VOCs to the atmosphere and how effluent would be treated if treatment is required.

110. **Section 7.3.2.5, In-Situ Chemical Oxidation, Page 7-20 and Section 7.4.3.3, In Situ Chemical Oxidation, Page 7-28:** The text does not accurately describe the ISCO pilot study that was conducted at Site 4. ISCO was not effective in treating DNAPL at Site 4 because chemical concentrations rebounded. Please revise the text to more accurately describe the results of the ISCO pilot test.

111. **Section 7.4.1.2, Zero-Valent Iron Injection, Effectiveness, Page 7-24:** It is not appropriate to conclude that, "Domestic use RGs are likely not achievable with in [sic] the DNAPL plume by any technology, as previously discussed." Technical impracticability has not been rigorously discussed in this FS, so it is premature to conclude that residential reuse RGs cannot be reached using multiple technologies over a period of time. In addition, many technologies have not yet been tried in OU-2B. Please delete the quoted statement.

112. **Section 7.4.3.1, Pump and Treat With Air Stripping, Pages 7-26 and 7-27:** The text and title state that this section discusses treating extracted groundwater with air stripping, but the paragraph on implementability also discusses chemical/ultraviolet oxidation. Please resolve this discrepancy.

113. **Section 7.4.3.2, Hydrogen-Releasing Compounds, Page 7-27:** It is unclear why the paragraph on effectiveness states that enhanced bioremediation was successfully used in a pilot test at Site 4, and then recommends conducting a pilot test before full-scale operation. Please revise the FS to briefly describe the pilot test and its results and explain

why another pilot test is needed.

114. **Section 7.4.3.4, Monitored Natural Attenuation, Effectiveness, Page 7-28:** It is unreasonable to state that source removal will not impact the time to achieve unrestricted reuse goals; it is accepted science and written policy that the presence of sources significantly increases the time that is required for MNA to reduce contamination. We question the model inputs and interpretation of results that would lead to the conclusions presented in this section.

115. **Section 7.4.3.4, Monitored Natural Attenuation, Effectiveness, Page 7-28:** It is not clear why source removal will not impact the time to achieve unrestricted reuse goals; logically, the presence of sources should increase the time that is required for MNA to reduce contamination below unrestricted reuse goals. Please check model inputs and verify that the last sentence in this paragraph is correct. If it is correct, please explain why the presence of sources will not increase the MNA timeframe.

116. **Section 7.4.5.1, Effectiveness**: EPA disagrees with the assertion that residential RGs are likely not achievable by any technology. There have been two remedial technologies used at Alameda Point at Site 5 for treatment of DNAPL plumes, steam enhanced extraction and six phase heating. Both technologies have shown it is possible to treat groundwater to below MCLs in a short time frame.

117. **Section 7.4.5.3, Comparative Analysis of Technologies Retained for Treatment of the Potential Dissolved-Phase Chlorinated Plumes, Page 7-32:** This section uses the terms "air sparging" and "air stripping", but it appears that the technology intended to be evaluated in this section is pump and treat with air stripping. Please correct the references to "air sparging" as appropriate.

118. **Page 7-33, Sec. 7.4.5.4.** The heading of this section refers to the "Benzene and Soluble Light Nonaqueous-phase Liquid Plume." Elsewhere, however, the terms used are "Benzene and Residual TPH" (chart on page 7-23; page 7-29 sec. 7.4.4). Consistency would be helpful.

119. **Page. 7-33, Sec. 7.4.5.4, implementability**. Second line should say that ISCO would "require" access restrictions.

120. **Section 7.5, Remedial Alternatives for Groundwater OU-Wide**: It is unclear where each technology will be implemented within the plumes because this is not discussed and because separate figures are not provided for each technology. Consequently, it is not possible to evaluate whether the proposed coverage is adequate or whether the number of injection points or air-sparging points is sufficient for each alternative. Therefore, these comments do not address these issues. Please provide figures that show where the different technologies will be implemented for each alternative.

121. **Section 7.5, Remedial Alternatives for Groundwater OU-Wide, Page 7-34:** The text states that "all of the remedial alternatives will meet RAOs," but the no action alternative will not meet RAOs. Please revise the first sentence of the paragraph following the bullets to state that the no action alternative will not meet RAOs.

122. **Section 7.5, Remedial Alternatives for Groundwater OU-Wide, Page 7-34**: Since MCLs are ARARs for groundwater, it is not acceptable to have different sets of RAOs for different scenarios.

123. **Section 7.5.1, Alternative 1: No Action, Page 7-35 and Table 7-6, Summary of Comparative Analysis of Groundwater Alternatives for the OU-Wide Groundwater Plume:** The text states that "Modeling of natural attenuation in Appendix D indicates that up to 180 years may be required to achieve the remediation goals for domestic use," but this is MNA rather than no action. MNA is a remedy that requires groundwater monitoring, but groundwater sampling, by definition, is not part of a no action alternative, so there would be no way to verify that MNA is occurring. Therefore, a timeframe cannot be assigned to this alternative. Please delete the quoted statement from the text. Also, please delete the dates from Alternative 1 entry in the "Long-Term Effectiveness and Permanence" column of Table 7-6.

124. **Sec. 7.5.2, Alternative 2:**
(a) The third and fourth bullets regarding ECs and ICs are not entirely clear. Is the plan that there would be ICs requiring ECs in new buildings, and ICs prohibiting workers in existing buildings?
(b) The last bullet should add the prohibition of residential use of the property, consistent with discussion of ICs on page 7-36.
(c) Page 7-37, last bullet in this section, need to remove the word "and."

125. **Page 7-37, Sec. 7.5.3., Alternative 3:**
(a) Fourth bullet refers to "ICs," whereas for Alternative 2 the corresponding bullet was labeled "ECs."
(b) Fifth bullet mentions "removal and prohibition of commercial/industrial workers." Does this contemplate making current workers move? Also, this bullet is written differently than the corresponding bullet regarding Alternative 2 (page 7-35), which causes confusion.

126. **Section 7.5.3, Active Groundwater Treatment with ZVI, HRC, Air Sparging, ORC, MNA and ICs, Page 7-38:** The fourth bullet on this page refers to "soluble LNAPL". Since LNAPL is non-aqueous phase liquid, this terms appears to be contradictory. LNAPL appears to be used interchangeably with TPH in the FS. Please revise the FS to clarify what is meant by the term "soluble LNAPL" (e.g., dissolved TPH plume) and substitute a more descriptive term.

127. **Page 7-39, Sec. 7.5.4, Alternative 4:**
(a) Assuming this alternative is designed to achieve the RGs for consumption of groundwater, that should be stated in the first paragraph.
(b) EPA has the same questions regarding the sixth and seventh bullets as regarding the fourth and fifth bullets for Alternative 3 (previous comment).
(c) It's unclear how remediation goals for domestic use of GW will be achieved. Is it contemplated that this will be achieved through treatment and no MNA is necessary? The first bullet on page 7-40 indicates that treatment would last 10 years to reach RGs for domestic use, but if that is the case, why are 26 years of ICs contemplated? (page 7-39, fifth bullet). The description of this alternative does not include groundwater monitoring; however, groundwater monitoring will be required until RGs are achieved (if that is 26 years) and 26 years of groundwater monitoring is included in the cost estimate. Please revise the FS to clarify the duration of the remedy and include groundwater monitoring in the description of this alternative.
(d) On page 7-40, section entitled "ICs," the FS should also indicate that ICs would prohibit consumption of the drinking water and residential use of the property.

128. **Page 7-40, Sec. 7.5.5, Alternative 5:**
(a) Assuming this alternative is designed to achieve the RGs for consumption of groundwater, that should be stated in the first paragraph.
(b) P. 7-41, first two bullets at top of page, same questions as with other alternatives on EC v. IC and prohibition of workers.

129. **Section 7.5.5, Alternative 5: Active Groundwater Treatment with ZVI, SPH, ISCO and ICs, Page 7-41:** It is not clear why the second bullet under "Active Treatment" states that ZVI would be scaled back for one site. Please explain why this is necessary.

130. **Section 7.6.1.1, Overall Protection of Human Health and the Environment, Page 7-42:** The text only discusses whether Alternative 1 will protect the environment by preventing exposure of ecological receptors to TPH, but groundwater also contains concentrations of metals that exceed the NAWQC and CTR requirements. Please revise the text to state that ecological receptors would be exposed to both TPH *and metals* at concentrations above surface water quality criteria.

131. **Page 7-44, Section 7.6.2.2, Alt. 2, compliance with ARARs**. The text states that the alternative would comply with chemical-specific ARARs "for any soil and GW generated that constitutes a hazardous waste." It should also say whether it will comply with ARARs by achieving MCLs in the aquifer. This is confusing, also, because of the statement on page 7-46 that Alternative 2 will meet potential chemical-specific ARARs, but the title of the section is "Compliance with Potential Action-Specific ARARs." Same comment regarding corresponding sections of 7.6.3 regarding Alt. 3 and corresponding sections of 7.6.4 regarding alternative 4. [Note that Sec. 7.6.5.2 regarding Alt. 5 has a simple statement that this alternative will comply with all ARARs.]

132. **Page. 7-46, Section 7.6.2.5. Alt. 2, short-term effectiveness**. Given that a component of this criterion is length of time to achieve the remedy, the discussion should also note that the time it will take to achieve RGs. Same comment regarding Sec. 7.6.3.5 regarding Alt. 3. [Note that the FS does include this in section 7.6.4.5 regarding Alternative 4.] This should also be included in the comparative analysis in section 7.7.5.

133. **Page. 7-47, Section 7.6.2.6, Alt. 2, Implementability**. This section should discuss technical implementability as well as administrative.

134. **Section 7.6.3.1, Overall Protection of Human Health and the Environment, Page 7-47:** This section states that reduction of total VOCs to 1,000 ug/L will be protective of human health, but it is not clear how this value was determined or what relationship it bears to the RAOs described in Section 7.1.5. Please revise this section to be consistent with the RAOs or clarify the source of the 1,000 ug/L total VOCs value.

135. **Page 7-53, Sec. 7.7.1, overall protection**. It is unclear whether the Navy is concluding that Alternative 2 meets the first criterion, given the first paragraph on page 7-53. This needs to be clarified here and also in section 7.6.2.1 and 7.7.8.

136. **Page 7-54, Sec. 7.7.3, long term effectiveness**. Last sentence in this section should be removed. Even if site will not be used for unrestricted reuse, the groundwater is potential drinking water and needs to be remediated to MCLs.

137. **Page 7-55, Sec. 7.7.8, Comparative analysis summary, third paragraph**. We disagree that Alternative 1 would meet potential ARARs requiring cleanup to MCLs.

138. **Page 7-55, Sec. 7.7.8.** Last paragraph (regarding cost) indicates that Alternative 4 will achieve residential RGs within 10-12 years, while Section 7.6.4.3 says there will be active treatment for 26 years. Please clarify.

139. **Section 7.7.1, Overall Protection of Human Health and the Environment, Page 7-53:** The first paragraph references ecological risk criteria, but there are no criteria in Section 7 for protection of ecological receptor. Please resolve this discrepancy.

140. **Section 7.7.1, Overall Protection of Human Health and the Environment, Page 7-53:** This evaluation concludes that Alternatives 4 and 5 would prevent risk to human health by actively treating the plume to RGs for unrestricted domestic reuse; however, the descriptions of both these alternatives include treatment to achieve unrestricted reuse goals for vapor intrusion and ICs until MCLs are met. Please revise this section to clarify that Alternatives 4 and 5 actively treat the plume until RGs for unrestricted reuse for vapor intrusion are met.

141. **Section 7.7.5 Short-Term Effectiveness, Page 7-54:** The evaluation of short term

effectiveness should include a comparison of the time-frame to achieve RGs. For clarity and completeness, please revise this section to include the estimated time-frame to achieve RGs for each alternative.

142. **Table 7-1, Chemical-specific ARARs:**
(a) Why are 40 CFR 141.11-13, .15 and .16 included? (Same comment for Table B-1, pate 1).
(b) Table 7-1, page 1, Basin Plan. There needs to be more specificity as to what specific requirements in the Basin Plan are considered to be ARARs.
(c) Resolution 88-63, under Requirement, following "3,000 ppm" should add "and it is not reasonably expected by Regional Boards to supply a public water system." Same comment for Table B-1, page 2.

143. **Table 7-4, Preliminary screening**:
(a) Table 7-4, page 7, footnote b. Definitions of short, medium and long term are not helpful here since all the remedies are long term, and within the category of long-term there are huge variations.
(b) Table 7-4, page 1. MNA should not be considered in-situ "treatment" as there is no treatment of contamination.
(c) Table 7-4, page 1, Governmental controls, GW use restrictions. EPA questions how "effective, readily implementable, and low cost" use restrictions would be. If reuse were to be residential and wells were to be nearby, implementing and monitoring "don't drink" ICs would not be easy.

144. **Table 7-6, Summary of Comparative Analysis of Groundwater Alternatives for the OU-Wide Groundwater Plume:** Why is alt. 5 rated differently than alt. 3 for cost effectiveness, when the costs are so similar? Evaluating total cost as well as net present value would be helpful.

Section 8:

145. **Section 8.0, Feasibility Study Evaluation for the OU-Wide Oil Separators, Page 8-1:** Why does the list of OWSs not include all of the OWSs at each site? In EPA's June 20, 2005 letter, it was clearly stated that soil and groundwater sampling beneath and adjacent to all OWSs is needed. Missing OWSs at site 4 include OWS 372B, where no sampling has been done at all, and OWS 414, which was mentioned in the text of the OU-2B Remedial Investigation Report, but is not shown on Figure 4-1. Missing OWSs at Site 11 include OWS 14B, OWS 14C, and OWS 14E. At Site 21, OWS 162, where hazardous materials were discharged, is missing. Please add OWS 372B, OWS 414, OWS 14B, OWS 14C, OWS 14E, and OWS 162 to the list of OWSs that require investigation and potential remediation.

146. **Section 8.1.1, Chemicals of Concern, Page 8-1:** The text only includes soil sampling adjacent to the OWSs and does not include soil sampling beneath the OWSs and

groundwater sampling as requested by EPA in the June 20, 2005 letter. Please add soil and groundwater sampling beneath the OWSs to the FS.

147. **Section 8.1.4, Remediation Goals, Page 8-2:** It is not correct to state that "there are no remediation goals for the OWSs at OU-2B because the COCs identified during the RI do not pose significant risk to human health or the environment" when there has been little or no sampling in the vicinity of the OWSs. Instead, the text should state that the extent of soil and groundwater contamination in the vicinity of the OWSs has not been determined. Please delete the quoted statement and state that there are no remediation goals for the OWSs because the extent of soil and groundwater contamination in the vicinity of the OWSs has not been determined.

148. **Section 8.2, Volume of Contaminated Media, Page 8-3:** The basis for assuming a removal depth of 5 ft bgs is not stated and it is not clear that all of the OWSs in OU-2B are less than 3 or 4 feet deep. The removal depth should be the depth of each OWS plus 2 or 3 feet. Please revise the volume estimate to include the depth of each OWS plus the removal of 2 to 3 feet of soil beneath the OWS.

149. **Section 8.4.3, Alternative 3 3: (Unrestricted Use) Soil Sampling, Excavation, Off-site Disposal, and ICs, Page 8-4 and Section 8.5.3, Alternative 3: (Unrestricted Use) Soil Sampling, Excavation, Off-site Disposal, and ICs, Page 8-8:** Why is groundwater sampling not included in the description of this alternative? Since it was specifically requested by EPA, please revise the description of this alternative to include groundwater sampling at each OWS.

150. **Section 8.5.1.1, Overall Protection of Human Health and the Environment, Page 8-5:** It is not correct to state that, "The no-action alternative provides little or no decrease in the risk to human health" since the risk will not decrease at all under this alternative. Please delete the words "little or" from the quoted statement.

151. **Section 8.5.3.4, Reduction of Mobility, Toxicity, or Volume through Treatment, Page 8-10 and Section 8.6.2.2, Reduction in Mobility, Toxicity, or Volume through Treatment, Page 8-11 and Table 8-5, Summary of Comparative Analysis of Remedial Alternatives OU-Wide Oil-Water Separators:** The text in both sections and in Table 8-5 states that "Alternative 3 would reduce the mobility of contaminants by relocating them at an off-site facility," but relocation is not treatment and is not sufficient to reduce contaminant mobility; treatment is required for this criterion. Please delete the quoted statement from the FS.

152. **Page 8-11, Sec. 8.6.1.2, compliance with ARARs.** MCLs should be included as chemical-specific ARARs. The Navy apparently acknowledges this in Sec. 8.1.3.1, where chemical-specific ARARs from Sec. 3.1.3, which include MCLs, are incorporated for the OWSs. It is unclear how the alternatives analyzed in this section would achieve MCLs.

153. **Table 8-2**. Table of chemical-specific ARARs should include MCLs and the PCB ARARs including in the Section 3 ARARs table.

Appendices:

154. **Appendix B, Page B-13, MCLs table**. This table isn't consistent with tables on pages 7-7 and 7-8, which leads to confusion. Please make them consistent.

155. **Appendix B, Page B-13, last paragraph**. Please remove the second and third sentences. There is no basis for the statement that the Water Board will remove the drinking water designation for this groundwater, or that it will be classified as an EPA class III aquifer.

156. **Appendix B, Page B-22, action-specific ARARs for excavation**. Would substantive portions of State general permits for stormwater runoff from construction sites be ARARs for the excavation alternative?

157. **Appendix C, Table C-1A: Site 3 Alternative 2: Remedial Cost:** The cost estimate for Alternative 2 does not include long term monitoring; however, the description of the alternative on Page 3-17 of the FS indicates that long-term groundwater monitoring would be performed to verify decreases in lead concentrations. Please revise the cost estimate to include long-term groundwater monitoring. Furthermore, the cost estimate includes only one 5-year review, but since ICs are expected to be in place for 100 years, it appears that up to twenty 5-year reviews will be done. Please clarify the basis for including only one 5-year review in the cost estimate, or revise the cost estimate to include 5-year reviews throughout the duration of the alternative.

158. **Appendix C, Table C-1B: Site 3 Alternative 3: Remedial Cost:** The cost estimate for Alternative 3 does not include ICs or monitoring; however, the description of Alternative 3 on Page 3-17 of the FS includes ICs to prevent domestic use of groundwater, and long-term groundwater monitoring. Please revise the cost estimate for this alternative to include IC and monitoring and other operation and maintenance costs as appropriate (e.g., 5-year reviews).

159. **Appendix C, Table C-2A: Site 4 Alternative 2: Remedial Cost:** The cost estimates for Site 4 include a 25% contingency, but the cost estimates for Site 3 include a 15% contingency. Please revise the cost estimates for Site 4 to include only 15% contingency or clarify the reason for the additional contingency at Site 4.

160. **Appendix C, Table C-4B: Oil-Water Separators Alternative 3: Remedial Cost (Unrestricted-Use):** It is unclear why groundwater sampling is not included in this alternative, as requested by EPA. In addition, the description of this alternative in Section 8 includes ICs, but costs for ICs are not included Please revise the cost estimates for this

alternative to include groundwater sampling and ICs.

161. **Appendix D, Section D3.0, Description of Model, Page D-2:** Since the natural attenuation software (NAS) model was designed for petroleum hydrocarbons and chlorinated ethenes, it is unclear how effective it is at modeling the degradation of chlorinated ethanes, chlorobenzenes, and dichlorobenzenes, since the degradation rates of these compounds are different than the degradation rates of TCE, vinyl chloride, and benzene. Please discuss the effectiveness of the NAS model in estimating the degradation of chlorinated ethanes, chlorobenzenes, and dichlorobenzenes.

162. **Appendix D, Section D4.0, Model Setup and Assumptions, Page D-4:** The text indicates that since there is little data on redox parameters, the presence of petroleum hydrocarbons and TCE daughter products were used to estimate reducing areas and that sulfate reducing or ferrogenic conditions were assigned downgradient, but these assumptions need to be tested against field data. Natural attenuation data has been collected during groundwater monitoring events, so it should be used to test these assumptions. Please include a section that discusses whether the natural attenuation data collected during groundwater monitoring events confirms the assumptions made in the model about the presence and strength of reducing groundwater conditions within each of the plumes.

163. **Appendix D, Section D5.1, Chlorinated Ethenes:** It is unclear if the model considered the depletion of petroleum hydrocarbons (electron donors) over time. In Scenario 1, this will likely occur before the chlorinated DNAPL is fully depleted This depletion is confirmed by the discussion on page D-12, where it is stated that the source of benzene as NAPL in plume B-1 has declined. When depletion of petroleum hydrocarbons occurs, MNA processes for chlorinated ethenes will slow and the time to achieve RGs will increase. If depletion of the petroleum hydrocarbons was not considered in the model, the 180 year estimate for MNA is optimistic. In general, comparisons of historic modeling results with actual conditions, have shown that the amount of DNAPL is generally underestimated, as is the amount of time for MNA to achieve RGs. Further, other COCs will compete for electron donors. Please clarify whether depletion of the petroleum hydrocarbon plume was considered in the model and the associated uncertainties for each plume with DNAPL. Also, please discuss the uncertainties in the timeframe to achieve MNA associated with the presence of competing COCs for all plumes.

164. **Section D5.2, Benzene, Plume B-2, Page D-13 and Figure D-20, Distribution of Benzene Concentrations along Plume B-2 Centerline:** The trendline begins more than 100 feet from the source and does not appear to fit the data very well. It appears that an alternate trendline beginning at the data point located about 50 feet from the source would result in a lower attenuation rate and a longer time frame for MNA. Please run the model using a trendline that begins at the data point located about 50 feet from the source and discuss the impact of this alternate attenuation rate on the timeframe for MNA.

MINOR COMMENTS

165. **Section 1.1, Purpose, Page 1-1:** It appears that the word "in" is missing in the second paragraph, "...conducted for OU-2B the southern area....."

166. **Section 2.1.1, Page 2-1, third bullet and two sentences after bullet**: The word "ordnance" should be replaced with "ordinance".

167. **Section 3.1.1, Chemicals of Concern Site 3 Soil and Groundwater, Page 3-2:** The last sentence on this page appears to be the title of the table on the following page. For clarity, please move the sentence to the appropriate location.

168. **Section 3.2, Volumes of Contaminated Media at Site 3, Page 3-9:** The areal extent of groundwater contamination is given in this section as both 0.7 acres and 0.66 acres. Please revise the text to be consistent.

169. **Section 4.3.2.1, No Action, Page 4-6:** The FS refers to Section 3.3 for a discussion of the no-action response, but the discussion is presented in Section 3.4.2.1. Please correct this reference.