RESPONSES TO REGULATORY AGENCY COMMENTS ON DRAFT REMEDIAL INVESTIGATION, INSTALLATION RESTORATION SITES WITHIN INVESTIGATION AREA F1, MARE ISLAND, VALLEJO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the U.S. Environmental Protection Agency (EPA) Region IX and the California Department of Toxic Substances Control (DTSC) on the "Draft Remedial Investigation Report, Installation Restoration Program Sites within Investigation Area F1, Mare Island, Vallejo, California," dated February 2005. The Navy received the comments from the EPA on November 28, 2005 and from DTSC on May 9, 2006.

RESPONSES TO EPA COMMENTS
(Comments Provided by Carolyn D'Almeida, RPM)

General Comments

G1. Comment: **The RI report summarizes available data for certain areas within Investigation Area F1. EPA has requested additional investigation and characterization of remaining buildings on this parcel; the RI report is incomplete, and conclusions are preliminary until all of the work has been completed and compiled for consideration.**

Response: The Navy considers the subject document complete in that it covers subareas 1 through 6 of investigation area (IA) F1, not the entire geographical footprint of the area. The title of the document will be changed to reflect this. The selection of the subareas included in the draft remedial investigation (RI) report for IA F1 (draft RI report) was based on a preliminary assessment/site assessment ([PA/SI] PRC 1995). Sampling outlined in the revised draft final sampling and analysis plan (SAP) for IA F1 (revised draft final SAP) was completed to address any outstanding data gaps previously identified by the Navy and regulatory agencies (Sullivan and Tetra Tech 2003).

In order to address the above comment, the Navy further investigated fifteen buildings/sites. The locations of these buildings/sites were based on agreements and discussions with the regulatory agencies. Sampling was conducted at five existing buildings (A-280, A-278, A-266, A-288, and A-258) and 10 other buildings and/or locations of former buildings (A-190, A-15, A-53, A-62, A-73, A-198, A-31, A-54, A-226, and A-228).

Only one sample (taken at building/area A-62) had chemicals detected at levels exceeding EPA industrial Preliminary Remediation Goals (PRG). Therefore, the additional sampling supports the findings of the original PA/SI investigation, which did not recommend a remedial investigation at these previously uninvestigated areas. Since land use controls are already planned to restrict residential development across

all of IA F1, the IA F1 feasibility study will address the need for land use controls to restrict residential land use at the PA/SI sites that were not included in the more extensive RI. These results will be presented in more detail in a new appendix to the draft final RI report, with a short summary of the work added to the main text.

Additional sampling was also conducted for the two remaining UST and 15 PCB sites within IA F1. The results of the UST investigation did not reveal soil or groundwater contamination above the applicable comparison criteria. As part of the PCB program, 15 buildings/sites within area F1 were assessed, and eight were determined to require no further PCB characterization or abatement.

G2. Comment: **The Human Heath Risk Assessment (HHRA) discusses potential exposures under industrial reuse, although residential use has been considered for this property in the past. The HHRA is not complete without a realistic and thorough evaluation of human health risks under the residential exposure scenario. If the property is unsuitable for future residential use, the HHRA should reflect that to rule out residential land use in the future.**

Response: Per the "Mare Island Final Specific Plan Amendment and Restatement" (City of Vallejo 2006), the planned reuse for IA F1 is industrial/open space (regional park). Evaluation of the potential cancer risks and noncancer hazards for hypothetical residential receptors is presented in Attachment I7.

G3. Comment: **Based upon the data provided in this Draft Remedial Investigation Report for Investigation Area F1 (the Report) it is not clear that the Data Quality Objectives (DQOs) for this investigation have been fulfilled. Section 1.3.5, Step 5 - Develop Decision Rules, states that, "If contamination is not bounded by concentrations below comparison criteria, additional sampling may be required." The empirical data provided for the investigations areas, Subarea 1 through Subarea 6, does not appear to support the statements that both the vertical and lateral extent of contamination at the sites has been defined. There are numerous sample locations where contaminants were detected above comparison criteria and it is not clear that the extent of contamination is bounded. Further, it is premature to recommend that no further action (NFA) is warranted at Subareas 2 and 3, and that only hot spot removal is warranted at Subarea 1 and 4. Please revise the Report to indicate that further investigation is necessary at these sites, or, if more data is available to define the extent at these sites, please revise the Report to include data to support the recommendations.**

Response: As discussed in the Navy's response to EPA General Comment 1 above,

additional sampling at IA F1 was conducted at five existing buildings and 10 additional buildings/locations. These results will be presented in more detail in a new appendix to the draft final RI report, with a short summary of the work added to the main text. The draft final RI report will describe the results of the contamination delineation and subsequent risk assessment to justify the recommended action per subarea.

G4. Comment: It should be noted that the most current version of USEPA Region IX Preliminary Remediation Goals (PRGs) has been published and available since October 2004. It is understood that this document was in progress prior to this date. In the next version please incorporate any revised PRGs in the analysis.

Response: The draft final RI report will include the most current PRGs where applicable (EPA 2004a).

Specific Comments

1. Comment: Section 2.3.3.2, Groundwater Results, Organic Compounds in Groundwater, VOCs in Soil, Page 2-9: It appears that the paragraph heading for this section is erroneous. This section of the Report discusses groundwater results for volatile organic compounds (VOCs) and it is likely that the heading needs to be corrected to state, "VOCs in Groundwater." Please revise this paragraph header in the next version of the Report.

Response: This report heading will be changed to "VOCs in Groundwater."

2. Comment: Section 2.4.3, Decision Summary, Last Bullet, Page 2-13: It is not clear how the determination was made that the lateral and vertical extent of total petroleum hydrocarbons (TPH) in soil has been adequately characterized for Subarea 1. There are numerous sampling locations, including but not limited to A215GB016, A220GB004, A220BG009, IR04GB222, IR04GB234, where TPH has been detected above comparison criteria and the extent of the contamination has not been adequately defined. Based upon the figures and data provided it is not apparent that further investigations (e.g., step-out, step-down sampling) have been performed at these locations to delineate the extent of TPH. If further investigations have been performed at this site or additional data is available to define the extent of TPH at Subarea 1 then it should be included in the Report to support that the extent of contamination has been determined. Otherwise, the Report should be revised to state that the extent of contamination has not been adequately characterized and additional investigation is warranted

to further characterize the extent of TPH at Subarea 1.

Response: TPH at the referenced sampling locations has been adequately characterized as follows:

1. A215GB016 and A220GB04. These locations are vertically and laterally defined by samples A215SS003 and IR04GB234, respectively.
2. A220GB009. While this location exceeds the comparison criteria for TPH-diesel range in soil and was not delineated vertically, samples were collected at various depths from 0 to 9 feet below ground surface (bgs). The depth of the water table is 9 feet bgs. Samples deeper than 9 feet bgs are not representative of soil conditions and were only collected at four discrete sample locations over the entirety of Subarea 1. Sample locations IR04GB327, IR04GB344, and A220GB007 delineate the lateral extent of TPH contamination.
3. IR04GB222. Contamination at this location is attributed to the asphalt paving that covers most of the site. This was determined during previous sampling investigations and stated in the revised draft final SAP.
4. IR04GB234. This location has been laterally and vertically delineated by sample A220GB004, which was advanced specifically because of the results obtained at IR04GB234.

3. **Comment:** **Section 2, Subarea 1 figures: Figures 2-2 through 2-5 show sampling locations for TPH in soil; please include figures showing metals hotspots and PAH and picric acid exceedances. What does Navy consider to be the source of TPH contamination in this area?**

Response: Sample locations where metals and picric acid concentrations exceeded comparison criteria (A215GB001 and 208UX4062) will be added to a TPH Figure 2-6. One PAH (benzo(a)pyrene) sample exceeded comparison criteria and will also be shown on the TPH Figures 2-2 through 2-5. Most of the PAH detections are associated with former pits where several drain lines were removed as part of the munitions of explosive concern (MEC) intrusive investigation.

The Navy believes the source of TPH contamination is (1) incidental oil leakage from equipment and trucks used during past activities at the site and/or (2) releases from weathered and broken asphalt used to cover portions of Subarea 1. The suspected source of TPH contamination is discussed further in Section 2.3.3.3.

4. **Comment:** **Section 3, Subarea 2: Buildings A80 A187, A265 and A271 are described as having holes in the floors, clogged drains, floor stains**

which could indicate potential releases. It is not possible to tell from the figures provided if adequate sampling was conducted near floor drains or holes where materials could have been released.

Response: The locations of the holes in the floor, clogged drains, and floor stains will be presented in Figures 3-2 through 3-4 of the draft final RI report. This information was used to inform the selection of soil and groundwater sampling locations in Subarea 2.

5. **Comment: Section 3.3.3.2, Groundwater Results, Organic Compounds in Groundwater, Page 3-10: The first sentence of this paragraph discusses soil above comparison criteria and it is believed that the sentence should be discussing groundwater results in this section of the Report. Please revise the text to state that groundwater not soil above comparison criteria is being discussed in this section of the Report.**

Response: This sentence will be revised as requested.

6. **Comment: Section 3.3.3.3, Summary of Soil and Groundwater Sample Results, Soil Sample Results, First Paragraph, Pages 3-10 and 3-11: Based upon the data provided in the Report it does not appear that the extent of TPH, diesel range (TPH-dr) and total petroleum hydrocarbons, motor oil range (TPH-mr) has been adequately characterized at Subarea 2. There are numerous sampling locations, including but not limited to A080SS007, A187GB008, A187GB009, and A187GB010, where TPH has been detected above comparison criteria and the extent of the contamination has not been adequately defined in all directions. Sample location A187GB009 appears to have the vertical extent of contamination defined but the lateral extent is not defined to the north and west of the sample location. It has not been stated in the text whether additional sampling was performed at Subarea 2 (e.g., step-out, step-down sampling) to delineate the extent of TPH. If further investigations have been performed at Subarea 2 or additional data is available to help further define the extent of TPH then it should be included in the Report to support the statements that the extent of TPH has been adequately characterized. Otherwise, the Report should be revised to state that the extent of contamination has not been adequately characterized and further action is warranted at Subarea 2.**

It would be helpful to know where the RAOs come from -- risk calculations? water quality standards? The levels for arsenic and lead seem too high for aquatic and terrestrial ecological receptors. Please double check with the RWQCB to make sure that the RAOs are suitable for aquatic receptors.

Response: TPH at these sampling locations has been adequately characterized as follows:

1. A080SS007. A surface soil sample was collected at this location because staining was observed. The contamination present at this location is bounded laterally by sample locations A080SS008, A080GB002, and A080GB007. Sample location A080SS007 was not delineated vertically, but samples taken from location A080GB008 (advanced near this sampling location) showed detected concentrations below comparison criteria at 2 and 4 feet bgs.
2. A187GB008, A187GB009, and A187GB010. TPH has been vertically delineated at these locations, and laterally delineated by numerous hydraulically downgradient sample locations, including A187HA005, 208UX4172, and 208UX4174.

The human health comparison criteria for metals in water are derived from the Regional Water Quality Control Board's (Water Board) Environmental Screening Levels (ESL) for shallow soil. The Ambient Water Quality Criteria Saltwater Chronic concentration was used as the ecological comparison criteria. The comparison criteria used for lead and arsenic are correct (see Appendix A).

7. **Comment:** **Section 3.3.3.3, Summary of Soil and Groundwater Sample Results, Soil Sample Results, Second Complete Paragraph, Page 3-11: It has not been clearly demonstrated that the extent of trichloroethene (TCE) in soil has been adequately characterized at Subarea 2. There are numerous sampling locations, including but not limited to A187HA002, A187HA005, and 208UX4191, where TCE has been detected above comparison criteria and the extent of the contamination has not been adequately defined in all directions. Based upon the figures and data provided it does not appear that further investigation (e.g., step-out, step-down sampling) has been performed at these locations to further delineate the extent of TCE. If further investigations have been performed at Subarea 2 or additional data is available to help further define the extent of TCE contamination then it should be included in the Report to support the statements that the extent of TCE contamination has been adequately characterized. Otherwise, the Report should be revised to state that the extent of contamination has not been adequately characterized and further action is warranted at Subarea 2.**

Response: Based on the planned industrial reuse and the results of the HHRA, the Navy does not agree that additional vertical and/or horizontal delineation of TCE is warranted for Subarea 2. In Subarea 2, detected concentrations of TCE range from 0.001 to 2 mg/kg. The soil samples

with reported TCE concentrations above comparison criteria are bounded by samples A187HA001, A187HA004, and 208UX4094. The HHRA results show that concentrations of TCE in soil at Subarea 2 contribute to the estimates of cancer risk within or below the risk management range for commercial/industrial workers exposed to surface and subsurface soil.

8. **Comment:** **Section 3.4.3 Decision summary page 3-14. The statement "Based upon the results of this study, contaminants in soil have not migrated to groundwater" is incorrect, because the data indicates that there is TCE, TPH and explosives in both soil and groundwater. Please remove this statement. TCE has been detected at 4,300 µg/l in shallow groundwater; the potential impacts on indoor air quality must be assessed in the RI/FS to evaluate what actions, including institutional controls are appropriate and necessary for future reuse.**

Response: The statement "Based upon the results of this study, contaminants in soil have not migrated to groundwater" will be deleted.

Volatile organic compounds (VOCs) were not present above Water Board ESLs, which are protective of overlying indoor air, and therefore were not selected as COPCs in groundwater within Subarea 2. The cancer risk for TCE in groundwater at Subarea 2 for the commercial/industrial receptor is 5.9×10^{-7}, and the noncancer hazard index is 0.00013. TCE emissions from groundwater will not impact indoor air quality and do not pose an unacceptable cancer risk to future occupants of commercial/industrial buildings at Subarea 2. The total cancer risk for indoor inhalation for all of Subarea 2 is 6.0×10^{-7} and the total noncancer hazard index is 0.0005 (see Table I2-3.2 in Appendix I).

9. **Comment:** **Section 4, page 4-1 indicates that "dry cleaning solvents" were used in Building A76 and that a strong solvent odor was noted on a 1997 inspection report of the building. It is not clear from the text that follows whether the source of odor or possible releases of solvents to the environment was specifically investigated during the field work.**

Response: The solvent odor and the note, "contains dry cleaning solvents" were observed above one paint drying oven. The ovens are located along the eastern side of Building A76. Soil samples were collected in the area of these ovens and their associated piping at 1 to 2.5 feet bgs at sampling locations A076HA001, A076HA002, A076HA003, and A076HA004. Additionally, sediment samples were collected at locations A076SD001 and A076SD002. None of these samples had detectable concentrations of VOCs in soil. Additionally, three hydraulically downgradient grab groundwater samples collected at locations A076GB001, A076GB002, and A076GB003 did not have detectable concentrations of VOCs in

groundwater above the comparison criteria. This information was previously presented in the revised draft final SAP for the F1 RI (Sullivan and Tetra Tech 2003).

10. **Comment:** **Section 4.3.3.3, Summary of Soil and Groundwater Sample Results, Soil Sample Results, Page 4-8: This section of the text states that there is one exceedance of vinyl chloride (VC) in soil at Subarea 3 but does not state where the exceedance occurred. Without the sample location, the reviewer can't evaluate whether the extent of VC contamination has been adequately defined. For clarity and completeness, please revise this section to include the sampling location where the exceedance of VC in soil occurred in Subarea 3 or indicate the location on a figure in the next version of the Report.**

Response: VC was detected at 51 mg/kg at location 208VX4261 at 10 feet bgs. This sampling location will be added to Figure 4-2.

11. **Comment:** **Section 4.4.1, Soil Investigation, Page 4-10: The text appears to be misleading in this section of the Report. This section states that because there was only one soil sample with a detection of VC above comparison criteria, the soil in Subarea 3 does not pose a risk to human health or the environment. VC was detected at 51 mg/kg in soil and the comparison criterion is 0.75 mg/kg, which is the EPA Industrial Preliminary Remediation Goal (PRG) for VC. This detection of VC is 68 times greater than the comparison criteria. Furthermore, it is not clear from the information presented whether the extent of VC had been defined. Please revise the text to state that VC has exceeded comparison criteria at this site and clarify the extent of VC contamination and how it was concluded that the exceedance does not affect human health and the environment.**

Response: Section 4.4.1 will be revised to state that VC was detected above the comparison criteria at sampling location 208UX4261, and that adjacent sampling locations A216GB019, A216GB011, and A216GB018 define the lateral extent of VC contamination in soil.

12. **Comment:** **Section 4.4.3 Decision Summary, Page 4-11. The statement "No chemicals were significantly detected above comparison criteria in soil samples from Subarea 3" is incorrect and misleading based upon comment #11 above. Please remove this statement.**

The groundwater results indicated cis-1-2 DCE was found in groundwater as high as 6,500 µg/l and vinyl chloride as high as 8,400 µg/l. Although Navy may consider this contamination to have been removed, 2003 groundwater sampling results indicated fairly significant concentrations of 1-2 DCE and vinyl chloride still remain in groundwater, and should re-sampled. The statement regarding

indoor air risks from VOCs in groundwater should be revised to reflect unreliability of the Johnson-Ettinger model for estimating indoor air risk under shallow groundwater conditions. It is unclear from the information presented that no further action is appropriate for this site.

Response: The statement will be revised to read, "In Subarea 3, there were no detections of chemicals above comparison criteria except for one detection of VC."

The majority of VC and *cis*-1,2-dichloroethene (1,2-DCE) detections occurred in samples along a former sewer line which was excavated in 1999 and 2000 as part of the munitions of explosive concern (MEC) intrusive investigation. The sewer and associated soil were excavated to approximately 10 feet below ground surface (bgs). It appears that the sanitary sewer line and surrounding fill were acting as a preferential pathway for VOCs generated in the vicinity of Building A216. As described on Page 4-7, the concentrations of VC and 1,2-DCE in the impacted monitoring wells have decreased significantly since the original samples were collected. The most recent sampling results from 2003 indicated that VC concentrations exceeded the comparison criteria in only two samples, one collected from a monitoring well and one grab groundwater sample, both of which were collected from the area around the sewer line. Groundwater samples from hydraulically downgradient wells suggest that the VC contamination has not migrated across the site. Importantly, the 2003 results did not report concentrations of 1,2-DCE exceeding Environmental Screening Levels (ESL), and consequently, 1,2-DCE was eliminated from the list of chemicals of potential concern (COPC) in the HHRA.

The indoor air modeling completed for this draft RI report and uncertainties with the Johnson-Ettinger model are presented in Attachment I2. The text in Section 4.4.3 will be modified to note that significant uncertainties exist with the model, with a reference to Attachment I2.

Because of these limitations, soil gas samples were collected in this area and the results are presented in the draft RI report. VC was the only chemical detected in one of two soil gas samples collected in the area, and the detected concentration was below the Water Board's ESL.

Even though there is significant uncertainty surrounding the indoor air modeling results, the Navy recommends no further action at Subarea 3 because: (1) the 1999-2000 removal decreased 1,2-DCE and VC concentrations in groundwater such that 1,2-DCE is no longer a subarea COPC; and (2) concentrations of VC in area soil gas samples were below the Water Board's ESL.

13. **Comment:** **Section 5, Subarea 4, page 5 indicates that there are numerous floor drains and seven pipes which protrude from the building, 2 of which drained to bare soil. It is unclear from the data presentation whether or not soil samples were collected to evaluate if any releases had occurred from these buildings.**

Response: Soil samples were previously collected at 12 locations around the south side of Building 75, where the pipes protruded from the building. The original three samples had detectable soil concentrations of metals, benzo(a)pyrene (B(a)P), and TPH-motor oil that exceeded comparison criteria. Most of the detections came from surface or near-surface samples. The samples also contained one detection of VOCs (1,3-dichlorobenzene) that exceeded groundwater comparison criteria. Six additional sampling locations were advanced to delineate the extent of the contaminants above comparison criteria. Soil results indicated that concentrations of cadmium were above comparison criteria in two soil borings. No VOCs or TPH were detected above comparison criteria in groundwater. Three additional borings were advanced to delineate the extent of cadmium in soil, but cadmium was not detected in any of the samples. One exceedance of lead occurred in one of the soil borings, but because the lead concentration only slightly exceeded comparison criteria in a single sample, no further investigation for soil or groundwater is warranted. This information is contained in Appendix A2 of the revised draft final SAP.

14. **Comment:** **Section 5.3.3.2, Organic Compounds in Groundwater, Page 5-10: The table in this section of the text lists the locations where TPH-dr was detected above comparison criteria, but the table does not include the detection of TPH-dr at sample location 191TN-A190-W-05-00-R which exceeded the comparison criteria. Table G-8, Summary of Complete Analytical Results for Aqueous Samples, Subarea 4, and Figure 5-6, TPH-dr Concentrations in Groundwater, Subarea 4, both state that TPH-dr was detected in ground-water at 2.7 milligrams per liter (mg/L) at sample location 191TN-A190-W-05-00-R, which exceeds the comparison criteria of 0.64 mg/L. In the next version of the Report please revise this table to include all sample locations where TPH-dr exceeded screening criteria.**

Response: The table will be revised to include all sample locations where TPH exceeded screening criteria, including sampling location 191TN-A190-W-05-00-R.

15. **Comment:** **Section 5.3.3.3, Summary of Soil and Groundwater Sample Results, Soil Sample Results, Page 5-11: Based upon the data provided in the Report it does not appear that the extent of TPH in soil has been**

adequately characterized at Subarea 4. There are numerous sampling locations, including but not limited to A190W02, A075GB016, A075GB017, and A159GB001, where TPH has been detected above comparison criteria and the extent of the contamination has not been adequately defined. For example, it does not appear that either the vertical or lateral extent of TPH-dr contamination was investigated at sample location A190W02. There was a detection of 620 mg/kg of TPH-dr at 1.5 feet below ground surface (ft bgs) but it does not appear that step-down samples were taken to determine whether TPH-dr is above comparison criteria at depths greater than 1.5 ft bgs, nor does it appear that step-out samples were performed at this sample location to determine the lateral extent of TPH-dr contamination. The closest sample locations that are below comparison criteria are UST190-PT-19, which is approximately 165 feet to the northeast, and location 208UX4040, which is approximately 110 feet to the southwest. Figure 5-2, TPH-dr Concentrations in Soil, Subarea 4, 0 to 2 feet bgs, does not show any sample location to the north, northwest and west of sample location A190W02. It has not been stated in the text whether additional sampling was performed at Subarea 4 (e.g., step-out, step-down sampling) to further delineate the extent of TPH. If additional investigations have been performed at Subarea 4 or additional data is available to help further define the extent of TPH then it should be included in the Report to support the statements that the extent of TPH has been adequately characterized. Otherwise, the Report should be revised to state that the extent of contamination has not been adequately characterized and further action is warranted at Subarea 4.

Response: TPH at these sampling locations has been adequately characterized as follows:

1. A190W02. This sample location was delineated laterally and vertically by sample location A075GB018, which was advanced specifically to address the contamination associated with A190W02. Contamination found at 1.5 feet bgs at A190W02 appears to be attributable to the asphalt paving of Blake Avenue, and is not migrating downward.
2. A075GB016 and A075GB017. These locations have been fully delineated vertically and laterally by 208UX4042, 2078UX4045, and 208UX4049 located hydraulically downgradient of the contamination.
3. A159GB001. This location has been fully delineated laterally by sample location A159GB002.

16. **Comment:** **Section 5.3.3.3, Summary of Soil and Groundwater Sample Results, Groundwater Sample Results, Page 5-11 and Section 5.4.2, Groundwater Investigation, Page 5-14: TPH-dr was detected above comparison criteria in grab groundwater samples but the data from these sample locations were not included as a decision factor regarding TPH-dr contamination in groundwater. The text states that, "because none of the monitoring wells had elevated TPH concentrations, TPH is not considered a significant contaminant at Subarea 4." These sections of the Report should be revised to include all groundwater data collected at Subarea 4 in support of this RI, or include a more detailed discussion in the text as to why the groundwater grab samples were removed from consideration at Subarea 4.**

Response: TPH was detected at Subarea 4 in areas associated with former underground storage tanks (UST). Investigations at these USTs were conducted during the 1990s. Data from grab groundwater samples were used in the phased investigation approach to collect additional data in areas where concentrations exceeded comparison criteria. Monitoring wells were installed in these areas and groundwater sampling data from the wells are reported in Section 5.3.3.3. These USTs will be addressed separately under the UST program.

The following text will be added to the subsection. "The detected concentrations of TPH-dr found in grab groundwater samples are relatively low – ranging from 0.68 to 2.7 mg/kg – and detections appear to be localized around former UST investigations based on monitoring well sampling data through 2003. Monitoring well data is typically preferred over grab groundwater data as it captures seasonal fluctuations and reduces the amount of sediments in groundwater samples. Grab samples were used only to substantiate monitoring well results." Additional specifics concerning analytical sampling for each subarea are provided in Section 5.3 of Appendix I.

17. **Comment:** **Figure 5-6, TPH-dr Concentrations in Groundwater, Subarea 4: There appear to be a few minor editing errors in the legend on this figure. First, the screening criterion has been incorrectly listed as 640 mg/L and should correctly be listed as 640 micrograms per liter (µg/L). Also, the acronym for µg/L should be defined in the "Notes" section of the legend. Secondly, the units of the data provided in the figures are not clearly stated. In Table G-8, Summary of Complete Analytical Results for Aqueous Samples, Subarea 4, the results for TPH-dr in groundwater are provided in mg/L but the legend on this figure leads the reader to believe that the data has been provided in mg/kg. It would be helpful if units associated with the data provided in the figure and the comparison criteria were correctly**

listed in the legend of this figure.

Response: Figure 5-6 will be edited accordingly.

18. **Comment:** **Section 6.4.2 Groundwater Investigation, Page 6-14, first paragraph, last sentence: the statement "Fate and transport modeling indicated that concentrations at the POE would not exceed comparison criteria." directly contradicts the previous statement in Section 6.3.4 Fate and Transport modeling on page 6-11 which states that the model predicted concentrations of mercury and nickel would exceed ESL or AWQC at the POE; the final statement of that paragraph states that by incorporating retardation into the model, the concentrations would continue to exceed comparison criteria after a period of thousands of years. The conclusion is inconsistent with the reported modeling results.**

Response: Section 6.3.4 states that, "Fate and transport modeling predicted concentrations of mercury and nickel would exceed ESL or AWQC concentration at the POE. The estimated maximum concentration of mercury was 0.074 μg/L, which exceeds the ESL concentration of 0.012 μg/L. The estimated maximum concentration for nickel was 9.3 μg/L, which exceeds the AWQC of 5.2 μg/L. The predicted concentrations of these chemicals of potential ecological concerns (COPEC) are likely overestimated due to conservative assumptions used in the modeling. A sensitivity analysis was performed using EPA's retardation coefficient. Results indicate that incorporation of retardation into the model would cause mercury and nickel concentrations at the POE to exceed comparison criteria only after a period of thousands of years at Subarea 5."

The following sentence will be added to the end of Section 6.3.4: "In light of the findings of the sensitivity analysis, the incorporation of retardation prevents concentrations of mercury and nickel from exceeding criteria within the 100-year modeling period, the discharge of these dissolved metals from groundwater is not considered to present a significant threat to aquatic receptors in Mare Island Strait."

The last sentence of Section 6.4.2 will be revised to read as follows: "Fate and transport modeling including retardation indicated that concentrations of dissolved mercury and nickel in groundwater in Subarea 5 do not present a significant threat to aquatic receptors in Mare Island Strait."

19. **Comment:** **Section 8.2, Site-Specific Conclusions and Recommendations, Pages 8-2 and 8-3: We do not agree with the NFA recommendations for Subareas 1, 2, 3, and 4. Based upon our comments above regarding the lack of defined extent of TPH, TCE, and VC contamination, it**

appears that NFA recommendations are premature for Subareas 2 and 3 and NFA with hot spot removal recommendations are premature for Subareas 1 and 4. Without the extent of TPH, TCE, and VC clearly defined in this document the conclusions and recommendations should be revised to state that further investigation is necessary at these sites, or if more data is available to define the extent at these sites then it should be included in the Report to help support the NFA recommendations.

Response: Please refer to the Navy's responses to EPA General Comments 1 and 3, as well as EPA Specific Comments 2, 3, 4, 6, 7, 8, 10, 11, 12, 15, and 16 for specific information on these contaminants. As described in the responses to these comments, the TPH, TCE, and VC contamination has been adequately defined, and the risk to potential receptors is acceptable for the proposed reuse of the site.

20. Comment: Section 6.3.3.1, Soil Sample Results (Subarea 5), PAH Compounds in Soil, Page 6-7: It is stated in this section that, "none of the PAHs detected exceeds the 95th percentile of the ambient data set for Mare Island fill." This is in direct conflict with the description of the ambient analysis comparison presented in Appendix I of the Report, which states that the ambient analysis was conducted only for inorganic chemicals (please refer to Appendix I, Section 6.1.3, Ambient Analysis, page I-23). Please revise the description of the ambient analysis in Appendix I and/or the discussion in Section 6.3.3.1 to clarify how the ambient analysis was conducted. In addition, the Regulatory Agencies have never approved an ambient concentration for PAHs, so it is unclear how this background PAH values were determined. Please revise the Report to show where the background PAH values were developed and provide some indication that the values have been approved by the regulatory agencies.

Response: The ambient analysis for inorganic compounds (see Appendix I) was used as screening criterion for COPC selection for the HHRA. In contrast, the PAH ambient dataset was not used as screening criterion, but presented to support risk management decisions. The text in Section 6.3.3.1 shall be changed to clarify that the ambient levels for PAHs were not used as a screening criterion.

The estimated potential cancer risks from PAH concentrations present in surface and subsurface soil at the site are either below or at the low end of the risk management range. BaP accounts for 100 percent of the estimated incremental cancer risks from PAHs. The California Air Resources Board (ARB) and the Office of Environmental Health Hazard Assessment (OEHHA) have reviewed the available scientific evidence

on the presence of BaP in the atmosphere of California and the potential adverse effects on public health (ARB and OEHHA 1994). ARB determined that BaP is emitted from a variety of sources, can be detected in the ambient air throughout California, and is highly mobile in the environment. OEHHA estimated that there are 0.6 to 1.7 potential cancer cases per million people exposed to ambient levels of PAH (ARB and OEHHA 1994). DTSC has recommended a screening level of 0.62 to 0.9 parts per million (ppm) based on BaP equivalents. Areas with PAH concentrations below 0.62 ppm are suitable for unrestricted use (DTSC 2003).

As stated in the draft RI report, there is no known source of PAHs associated with Navy activities at IA F1. The Navy has determined that the estimated risk is driven by ambient PAH and recommends no further action to address PAH.

21. Comment: **Section 6.3.5, HHRA Summary, page 6-12 and Appendix I, Section 10.0, Results of the HHRA, pages I-41 through I-49: The results of the incremental risk assessment are presented in the results section of the text of the Report and Appendix I. This incremental risk evaluation assesses risks from potential exposures to the subset of chemicals detected at concentrations above ambient concentrations and with maximum chemical concentrations above residential risk-based screening concentrations. It is suggested that the results discussion for each subarea be revised to include the results of the ambient analysis. This revision would provide information about both the total site risk from all detected chemicals, as well as the risk from only those detected chemicals, which are considered to be site related. In addition, the results section in Appendix I does not include a discussion of risks from inhalation of volatile organic compounds (VOCs) in indoor air.**

Response: Comment noted, however no text will be revised. The results of the ambient risk analysis are provided in Attachment I6 and an evaluation of total risk is provided in Attachment I5 (Appendix I). A discussion of risks associated with VOCs in indoor air is provided in Attachment I2.

22. Comment: **Appendix I, Section 6.2, Groundwater, page I-23: Since groundwater at IA F1 is not a current or future drinking water supply, the only potentially complete exposure pathway to chemicals in groundwater is identified as the inhalation of VOCs released to outdoor and indoor air. However, it is reasonable to expect that, since groundwater is detected at less than ten feet below ground surface (bgs), a future construction worker receptor could come into direct contact with chemicals in groundwater during excavation activities. Stating that the dermal pathway is**

"negligible" is not adequate justification or substantiation as certain trench activities could involve prolonged exposures of a construction worker to shallow groundwater such as installation of utility lines (see Page I-13, Section 5.3, second paragraph, last sentence). Please revise the Report (including any related sections of Appendix I) to provide an evaluation of direct contact with groundwater for a future construction worker receptor. In addition, Table I-1, Selection of Exposure Pathways needs formatting, as rationale for this pathway cannot be seen due to a narrow row height.

Response: The RI report and Appendix I have been revised to provide an evaluation of direct contact with groundwater for a future construction worker receptor. Table I-1 will be revised to identify dermal contact with groundwater as a complete and quantified exposure pathway for construction workers and will be reformatted for readability.

23. **Comment:** **Appendix I, Section 7.4.2.3 Exposure Parameters and Equation for Dermal Contact with Soil: This section cites an older version of the RAGS guidance (2001). Based on a more current version of this guidance some of the dermal adherence factors have changed. Please check the newest version of the document to ensure the most current factors are being used in the risk assessment: *Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*, USEPA, August 2004.**

Response: The more current RAGS Part E Guidance will be used for the draft final RI report (EPA 2004b).

24. **Comment:** **Appendix I, Section 8.2, Sfs: This section indicates that "as with dermal RfDs, dermal Sfs representing the toxicity of the absorbed dose were derived by multiplying the oral Sfs by an appropriate ABS_{GI} value. Please ensure this was actually done throughout the calculation tables.**

Response: Chemical-specific ABS_{GI} values were applied only to oral reference doses of certain inorganic compounds in this HHRA. The text in Section 8.2 will be revised to indicate that complete (100%) oral absorption was assumed for the remaining compounds, following EPA RAGS Part E guidance (EPA 2004b).

25. **Comment:** **Appendix I, Section 9.4, Risks and Hazards Associated with Exposure to VOCs in Indoor Air, Page I-40: It is stated in this section that, "it is likely that future on-site receptors will be exposed to either soil or to indoor air but not to both environmental media simultaneously," and therefore the potential risk from inhalation of volatile constituents in indoor air is not considered as part of the**

cumulative risk estimate. However, mutual exclusion of these pathways as part of a complete exposure pathway is highly unlikely, especially given that specifics regarding future use of the site are unknown. It is suggested that a cumulative risk, inclusive of risks from inhalation of VOCs in indoor air, be evaluated and discussed in the Report. This discussion can be supplemented by estimates of site risk excluding indoor air exposures. The discussion surrounding this supplemental evaluation can include the facility point of view regarding future exposure scenarios.

Response: As suggested, a presentation of the total cumulative cancer risk and noncancer hazard index inclusive of the indoor inhalation pathway will be added to Section 10 of Appendix I.

26. Comment: Appendix I, Table I-3.3: EPA RAGS Part D Table 3, Exposure Point Concentration Summary, Incremental Risk Estimate, Groundwater: Mean intra-well concentrations were used as exposure point concentrations (EPCs) for constituents detected in groundwater at Subarea 5 to calculate quantitative estimates of risk/hazard. Footnote (2) indicates that since there were less than ten measurements for each well, the mean instead of the 95% UCL of the mean was used. It is not clear why the maximum detected concentration of each chemical was not used as the EPC. Please revise the text in Appendix I to provide additional information regarding the derivation of EPCs for groundwater at Subarea 5. In addition, this table requires formatting since the footnotes are cut off by the margin.

Response: The text in Section I5.3.3 of Appendix I will be modified to further define "intrawell" and to discuss why the intrawell average was used instead of the maximum detected concentration. The maximum detected concentration value is not representative of current or future conditions because historical sampling results have demonstrated that the concentrations have been decreasing over time. Table I-3.3 will be reformatted for readability.

27. Comment: Attachment I8, Vapor Fate and Transport Modeling from Soil Gas for Indoor Ambient Air Exposure Pathways: The calculated attenuation factor for soil gas to indoor air concentrations (6300 µg/m^3/0.43 µg/m^3 = 14,651) is unusually high. For example, it is 29 times greater than observed radon gas attenuation factors (Little, et. al., 1992). Please revise the Indoor Ambient Air Exposure Pathways attachment to include a discussion of why the calculated attenuation factors are so much greater than empirical data would suggest is reasonable. Please include a sensitivity analysis of the parameters used in the modeling to support the discussion and

include a discussion of the applicability of the Johnson and Ettinger model to shallow groundwater contamination.

Response: As discussed in the Navy's response to DTSC Specific Comment 13 (from John Christopher), Attachment I8 will be revised to exclude Johnson and Ettinger modeling using the collected soil gas data; this attachment will be revised to present only the results of soil gas sampling. This is due in part to the subsurface conditions at IA F1 not likely matching the description of the vadose zone modeled by Johnson and Ettinger (Johnson 2002; DTSC 2005).

RESPONSES TO DTSC COMMENTS PROVIDED BY CHIP GRIBBLE, RPM

General Comments

G1. Comment: **A remedial investigation report should present a complete characterization and assessment of nature and extent of all contaminants. The RI report should include assessment of all sites, including but not limited to Groups I, II, and III sites, radiological sites, UXO/MEC sites, PCB program sites, UST program sites. The report should cover the entire geographical area known as IA-F1. In general, radiological sites, UXO/MEC sites, PCB program sites, and UST program sites should be effectively already remediated prior to issuance of the RI report so that the RI report then is limited to a summary of these sites, and integration of risk for these sites is simplified and manageable. This RI report is considered incomplete insofar as a PA/SI investigation for IA-F1 is ongoing, and this RI report also does not address the entire geographical area of IA-F1 and all sites within IA-F1. It also appears that this RI report is premature in that resolution of UST sites, PCB sites, and UXO/MEC sites has not been previously developed and therefore inadequately presented and integrated in the characterization and risk assessment in this report.**

Response: As stated in the Navy's response to EPA General Comment 1, the Navy considers the subject document complete in that it covers subareas 1 through 6 of IA F1, not the entire geographical footprint of the area. The selection of the subareas included in the draft RI report was based on a previous PA/SI (PRC 1995). Sampling outlined in the revised draft final SAP was completed to address any outstanding data gaps previously identified by the Navy and regulatory agencies (Sullivan and Tetra Tech 2003).

This draft RI report presented a complete characterization and assessment of the nature and extent of all contaminants in the subareas—including Groups I, II, and III sites; radiological sites; UXO/MEC sites; PCB sites; and UST program sites. This compilation of information is sufficient to support assessing the risk to human health and the environment, and to support the development, evaluation, and selection of the appropriate response alternatives at all investigated subareas. Any areas requiring further investigation will be addressed in separate studies, as needed.

As explained in the Navy's response to EPA General Comment 1, during the additional PA/SI sampling, only one sample (taken at building/area A-62) had chemicals detected at levels exceeding EPA industrial PRGs; the additional sampling supports the findings of the original PA/SI investigation which did not recommend a remedial

investigation at these buildings/areas. As land use controls are already planned to restrict residential development across all of IA F1, the IA F1 feasibility study will address the need for land use controls to restrict residential land use at the PA/SI sites that were not included in the more extensive RI. These additional PA/SI results will be presented in a new appendix to the RI, with a short summary of the work added to the main text of the draft final RI report.

Additional sampling was also conducted for the two remaining UST and 15 PCB sites within IA F1. The results of the UST investigation did not reveal soil or groundwater contamination above the applicable comparison criteria. As part of the PCB program, 15 buildings/sites within area F1 were assessed, and eight were determined to require no further PCB characterization or abatement.

General Comments

G1. Comment: **Comprehensiveness of the RI report. The RI Report breaks apart Investigation Area F1 into six sectors. Some areas and sites remain unassigned to a sector. Summary data for the six sectors is provided. However, no information is provided for the remaining sites outside these six sectors. The RI report does not state why these areas were not investigated or when will be addressed. DTSC considers the RI Report to be incomplete without the evaluation of these sites.**

Additionally, the RI Report does no provide data or rational for eliminating buildings/Areas for further investigation within the sectors. The RI should either present the historical data and rational for eliminating these buildings/area for further evaluation or should be listed as areas of concern for future investigation.

Response: Please see the Navy's response to DTSC General Comment 1 (from Chip Gribble).

G2. Comment: **Scope of the RI Report: The executive summary states that "the primary objective of the RI for Investigation Area F1 is to characterize the nature and extent of the contamination resulting from past activities at the site." We agree with the above objectives. However the RI report limits its scope to chemical investigation and does not address or leaves out certain parts including radiological sites, munitions, and explosives of concern (MEC), polychlorinated Biphenyl sites, and underground tanks.**

We understand that some of the above issues are being addressed in separate programs. The final determination of these programs including the risk hazards should be presented in the RI for

evaluation or present a process for incorporating these programs into the process.

Response: Please see the Navy's response to DTSC General Comment 1 (from Chip Gribble).

G3. Comment: Human Health Risk Assessment: The RI Report should present the risk data for potential future residents along with the construction and commercial/industrial worker. This information will be needed to complete the feasibility study and determine if cleanup to unrestricted reuse is necessary.

Response: As indicated in the Navy's response to EPA General Comment 2, evaluation of potential cancer risks and noncancer hazards for hypothetical residential receptors is presented in Attachment I7 (Appendix I) of the draft RI report. The evaluation of potential cancer risks and noncancer hazards was done under Attachment I7 to separate the presentation of the likely receptors (industrial based on the current reuse plan) from the supplemental analysis of the residential receptors. Attachment I7 presents incremental risk results for both RME and CTEs. The steps used to derive the results are consistent with Navy, state, and federal guidelines.

G4. Comment: Risk Management Range: The RI Report states that the risks between one in ten thousand (10^{-4}) and one in one million (10^{-6}) is in the risk management range and risk management decisions or an evaluation of remedial or removal action alternatives may be warranted. DTSC policy is that a remedy resulting in cumulative site risk of lower than or equal to 10^{-6} is acceptable for unrestricted use. A remedy resulting in a cumulative site risk between 10^{-6} and 10^{-4} may be acceptable, with justification acceptable to DTSC, for unrestricted use. Each remedy proposed within that risk range must be evaluated individually to ensure that it is acceptable with regard to human health and the environment. The individual risks of all the contaminants of concern are used to calculate the cumulative risk for a site. DTSC is conservative in making risk management decisions, and requires substantial justification to accept a cumulative site risk of more than one in one million (10^{-6}).

Additional evaluation and justification is required for sites that have risks that fall within the risk range 10^{-6} and 10^{-4}. Depending on the evaluation in the Feasibility Study stage, remediation measures maybe required for the protection of the human health. Sites can not be eliminated in the RI stage.

Response: The Navy disagrees with the statement that "Sites can not be eliminated in the RI stage". It is the Navy's position that feasibility studies (FS) are performed only for sites which require remedial action and that no-

action records of decision can be developed based solely on the findings of an RI. Only sites where cancer risks exceed 10^{-4} or hazard indexes exceed 1 require that remedial action be considered in an FS. Sites where cancer risks are within the risk management range (10^{-6} to 10^{-4}) do not automatically move to evaluation of remedial action in an FS, rather a risk management decision is made as to whether or not this is warranted.

Specifically, the Navy will consider the provisions of the National Contingency Plan (NCP), at 40 *Code of Federal Regulations* (CFR) 300.430(e)(2)(i)(A), which describe how Applicable or Relevant and Appropriate Requirements (ARAR) and five other factors should used to develop *"acceptable exposure levels that are protective of human health and the environment."* The second factor (40 CFR 300.430(e)(2)(i)(A)(*2*)) addresses the acceptable exposure levels for known or suspected carcinogens:

> *"(2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure;"*

In accordance with the NCP, preliminary remediation goals for carcinogens will be set at a 10^{-6} excess cancer risk as a point of departure, but may be revised to a different risk level within the acceptable risk range based on the consideration of the appropriate factors including but not limited to exposure factors, uncertainty, and technical limitations (NCP preamble at 55 Federal Registry 8717, March 8, 1990). When there is a high level of confidence that the cancer risks are representative of the site conditions, then decisions at the 10^{-4} risk level may be acceptable.

As the reuse plan for IA F1 includes industrial and recreational park space, no part of IA F1 is planned for unrestricted use. The Navy adheres to the basic Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) tenet of cleaning up for planned reuse. The findings of this draft RI report are consistent with this approach.

G5. Comment: Data and figures from previous investigations: The RI Report provides a summary discussion of the previous investigations.

However, data and figures from these investigations are not presented. Historical information should be presented in the RI Report as it aids the reader in understating the rational used for choosing the sampling locations in the RI.

Response: Pertinent data and locations of previous sample locations from prior investigations are included in the text, tables, and figures of the draft RI. Additionally, the proposed sample locations and previous analytical results are also presented in the revised draft final SAP (Sullivan and Tetra Tech 2003).

G6. Comment: Decision Summary and Data Gap Evaluations: One of the key questions identified in data quality objectives is to answer whether the lateral and vertical extent of contamination is adequately defined. In all cases for each section, the RI Report provides a generic statement that the chemicals of concern within the sector are adequately characterized. DTSC disagrees with this conclusion that the contaminate plumes have been adequately characterized. For example in Sector 2, TCE was detected at 4,300μg/L and the source and the extent was not adequately explained. The RI Report must thoroughly check whether each contaminant of concern has been adequately characterized to make a risk management decision.

Response: The one detection of TCE in groundwater was taken from sample location A187GB007. The suspected source of VOC contamination in Subarea 2 has been attributed to former activities at Building 187. The one detection of TCE is bounded by the downgradient groundwater samples collected from locations A187GB016 to the east and A271GB001 to the northeast. Therefore, the draft RI report rationalized that the extent of groundwater contamination in Subarea 2 had been adequately defined. Additionally, the cancer risk for TCE in groundwater at Subarea 2 for the commercial/industrial receptor is 5.9 x 10^{-7}, and the noncancer hazard index is 0.00013. TCE emissions from groundwater will not impact indoor air quality and do not pose an unacceptable cancer risk to future occupants of commercial/industrial buildings at Subarea 2.

G7. Comment: Conclusions and recommendations: DTSC will not comment on the conclusions and recommendations portion of the RI Report until the additional information is provided and included as part of the RI.

Response: As described in the Navy's response to EPA General Comment 1, the results of additional sampling show that only one sample (taken at building/area A-62) had chemicals detected at levels exceeding EPA industrial PRGs; therefore, the additional sampling supports the findings of the original PA/SI investigation which did not recommend a remedial

investigation at these sites. As land use controls are already planned to restrict residential development across all of IA F1, the IA F1 feasibility study will address the need for land use controls to restrict residential land use at the PA/SI sites that were not included in the more extensive RI.

Additional sampling was conducted for the two remaining UST and 15 PCB sites within IA F1. The results of the UST investigation did not reveal soil or groundwater contamination above the applicable comparison criteria. As part of the PCB program, 15 buildings/sites within area F1 were assessed, and eight were determined to require no further PCB characterization or abatement.

Specific Comments

1. **Comment:** **Section 1.0, Introduction, Page 1-2: The text states "Results of the Group II/III accelerated study identified 39 buildings that either were not recommended for further investigation under the RI or warranted no further action. These buildings, along with the buildings identified during the PA/SI for ordnance sites that did not warrant further investigation, were excluded for investigation under this RI. These buildings will be addressed separately under a PA/SI." The above text is not clear if all buildings are accounted for. State whether further investigation is warranted or closure documentation exist stating that they require no further action. At a minimum, the RI Report should have a complete listing of all buildings/areas of concern within the IA-F1. The list should indicate the status of each building/area.**

   Response: The Navy reached an agreement with DTSC, EPA, and the San Francisco Bay Regional Water Quality Control Board (Water Board) on the extent of additional site investigation to be performed at IA F1. The results of this additional site investigation indicated that only one sample (taken at building/area A-62) had chemicals detected at levels exceeding EPA industrial PRGs; therefore, the additional sampling supports the findings of the original PA/SI investigation, which did not recommend a remedial investigation at these sites. As land use controls are already planned to restrict residential development across all of IA F1, the IA F1 feasibility study will address the need for land use controls to restrict residential land use at the PA/SI sites that were not included in the more extensive RI.

2. **Comment:** **Section 1.4.4, Selection of Comparison Criteria, Page 1-26: The text states that only those chemicals detected above comparison criteria are discussed in the RI Report and chemicals detected below**

comparison criteria are not discussed because they are not expected to pose a significant risk to human health or the environment. It is necessary to include, discuss and post all the data on maps so that the reader can analyze the data and determine if adequate investigation is provided.

Response: All chemicals detected were evaluated in the HHRA and SLERA without any screening against comparison criteria, and the results are presented in Appendix I and Appendix J, respectively. The posting of chemical concentrations on the graphics is limited to only those values exceeding criteria in order to clearly identify the locations of areas of greatest concern. By use of color-coded symbols, the chemical concentration maps additionally indicate the locations at which all samples were taken and whether chemicals were (1) non-detect, (2) detected, or (3) detected above comparison criteria. A decision was reached not to post all concentration data as a presentation approach because this would obscure locations of the higher detections. All analytical data are presented in the data tables for readers needing more detailed information.

3. **Comment:** **Section 1.2.3.11, Additional Sampling at IA F1, 2003: The results of the additional sampling from the PA/SI should be incorporated in the RI Report. DTSC considers the RI Report as incomplete without the PA/SI being incorporated.**

Response: Please see the Navy's response to DTSC Specific Comment 1 (from Rizgar Ghazi).

4. **Comment:** **Section 1.8, Applicable or Relevant and Appropriate Requirement (ARARs) Page 1-40: DTSC will submit the ARARs in a separate submittal for IA F1.**

Response: Comment noted.

5. **Comment:** **Section 3.3.3.3, Summary of Soil and Groundwater Sample Results: The extent of the trichloroethene (TCE) contamination in soil has not been adequately characterized. Additional sampling may be required along the areas north and south of the eastern portion of the building. It is not clear if any samples were taken along the floor drains and exit points.**

Response: The locations of holes in the floor, clogged drains, and floor stains are shown in the revised draft final SAP. The report also contains analytical results from previous samples that were collected in these areas. This information was used to determine the locations for additional soil and groundwater sampling locations. Where applicable, holes, clogged floor drains, pipes, and floor staining will be represented on the RI figures. Please refer to the Navy's response to EPA General Comment 7

regarding further TCE characterization in Subarea 2.

6. **Comment:** **Section 3.4.2, Groundwater Investigation, Page 3-13: Please revise the error on this page. Last sentence of the page should state "Groundwater in Subarea 2 does not pose risk to ecological receptors."**

   Response: The sentence will be revised to read, "Groundwater in Subarea 2 does not pose a risk to ecological receptors."

7. **Comment:** **Section 3.4.3, Decision Summary: DTSC disagrees that the extent of the TCE contamination is adequately characterized in soil and groundwater. Lateral extent of TCE in soil must be bounded and the single hit of high concentration of TCE in the groundwater grab sample must be further explained.**

   Response: Please see the Navy's response to EPA Specific Comment 7 and DTSC Specific Comment 6 (from Rizgar Ghazi).

8. **Comment:** **Section 4.3.3.1, Soil Sample Results, Page 4-6: The test states that vinyl chloride was detected in soil sample collected during the MEC intrusive investigation. The report does not discuss in detail the scope of the sampling used during the MEC excavations. Please clarify if volatile organic compounds (VOCs) sampling was conducted all along the bottom and sidewalls of the excavations. If this was done, please present this information in the RI Report.**

   Response: The VC detection occurred along a former storm drain line. This area was excavated in 1999 and 2000. The soil sample was collected from approximately 10 to 10.2 feet bgs. The sample was collected from within the saturated groundwater zone and is most likely attributable to groundwater contamination in the area. Specific details and methodology used during the MEC excavations could not be found during the preparation of the RI report. This is supported by the most recent groundwater sampling results from 2003 which indicated that VC concentrations exceeded the comparison criteria in only one sample from a monitoring well and one grab groundwater sample. Both samples were taken from the area around the storm drain line. Groundwater samples from hydraulically downgradient wells suggest that the contamination has not migrated across the site.

   The Navy recommends no further action at this subarea because of decreasing concentrations of these contaminants in groundwater as well as soil gas concentrations detected at the site.

9. **Comment:** **Section 4.3.3.3, Summary of Soil and Groundwater Sample Results: The text states that the extent of vinyl chloride is delineated in soil and groundwater. DTSC can not make this determination based on the information provided. The report should present all data for**

soil and groundwater including maps indicating locations of the detected hits.

Response: VC was detected at one location only (208VX4261), at a reported concentration of 51 mg/kg at 10 feet bgs. The comparison criterion for VC in soil is 0.75 mg/kg. The sample was collected during confirmation sampling for the MEC removal action. Maps are typically not generated if just one sample exceeds the screening criteria; however this sample location will be added to Figure 4-2.

10. Comment: Section 4.4.2, Groundwater Investigation, Page 4-10: Please discuss how the risks to future commercial/industrial worker for indoor air were calculated.

Response: A detailed description of the methodology used to evaluate vapor intrusion and its associated cancer risks and health hazards is presented in Appendix I, Attachment I2.

11. Comment: Section 5.4.3, Decision Summary, Page 5-15: The text states that no further action is required to address the human health risks even though the risk for the Subarea 4 is greater than 10^{-6}. DTSC requires additional measures to be taken when risk are greater than 10^{-6}. Please review general comments for more details.

Response: See the Navy's response to DTSC General Comment 4 (from Rizgar Ghazi). The text in Section 5.4.3 will be revised to indicate that this recommendation results from the consideration of the contribution of arsenic and BaP to the incremental risk.

Arsenic and BaP contribute to 84% of the cancer risk, but none of the 40 samples with detectable arsenic had concentrations exceeding the 95th percentile ambient value. In addition, no BaP concentrations exceeded the industrial PRG. These two key risk-related findings are considered instrumental in supporting the recommendation for no further action.

12. Comment: Section 6.3.3.3, Summary of Soil and Groundwater Sample results, Page 6-11: The text on top of the page erroneously states that lead was above comparison criteria in two soil samples. The table on Page 6-7 indicates that four different locations had soil sample results above the comparison criteria. Please conduct a review of the data and present the accurate information. Also, review the Human Health Risk Assessment Summary section regarding the number of lead hit occurrences and its impact for human risks.

Response: The table on Page 6-7 summarizes lead detections in both soil and residue samples taken from the drain line in Building A17. This table does show that four samples exceed the comparison criteria for lead; however, it also indicates that two of these samples are residue samples taken in the drain line at Building A17. The line was cleaned in

November 2004 and these residue locations have subsequently been removed. Therefore, the text on the top of Page 6-11 which states that two soil samples exceeded the comparison criteria is correct. The HHRA will be reviewed with respect to the number of lead detections and their impacts on human health.

RESPONSES TO DTSC COMMENTS PROVIDED BY JAMES M. POLISINI

General Comments

G1. Comment: **This memorandum address only the Ecological Risk Assessment (ERA) portions of the IA-F1 Draft Remedial Investigation Report. HERD comments on the Human Health Risk Assessment (HHRA) will be furnished in a separate memorandum.**

Response: Comment noted.

G2. Comment: **HERD is participating in development of the Offshore Data Gaps work plan and Data Quality Objectives (DQOs) for MINSY. Subarea 6 within IA-F1 is an area HERD has identified as requiring additional vertical sediment characterization to investigate deposition over time. No final decision should be made on IA-F1 Subarea 6 until this additional characterization is finished and evaluated.**

Response: The Subarea 6 sampling was designed to assess potential contamination of the wetland sediments as a result of discharge at outfalls from upland sources. The draft RI report findings indicate that the outfall locations are not associated with extensive contamination and that potential upland contamination sources have been removed. The Navy believes that there is value in determining if the existing data warrant remedial action even if this may later be revised based on the findings of the Offshore (IA K) Data Gaps investigation. Because several chemicals are detected at levels above ambient and toxicity benchmarks at sample point SM44o, this point may be re-evaluated when data from the IA K investigation are received.

G3. Comment: **Ecological ARARs have apparently not been submitted for IA-F1. Ecological ARARs for upland and non-tidal wetlands have been submitted for IA-H1. These ecological ARARs would seem applicable to IA-F1.**

Response: The Navy will review the recently issued ARARs for IA H1 and adopt any relevant information into the ARARs section of the IA F1 RI.

G4. Comment: **Several issues in the ERA methodology for vertebrate representative species require revision or further justification.**

Response: Please see responses to DTSC Specific Comments on the SLERA, below.

G5. Comment: **An additional set of Hazard Quotients (HQs) for vertebrate receptors is presented based on attempts to estimate the "bioavailable" fraction of Contaminants of Ecological Concern (COECs) rather than total concentrations. HERD recommends that the "bioavailable" estimate be used as additional information and not be the sole basis for IA-F1 remedial decisions.**

Response: The Navy agrees with this comment. The bioavailability-adjusted HQs were calculated to compliment the unadjusted HQ calculations. The Navy recommends, in the draft RI report, that the results of both the unadjusted and bioavailability-adjusted HQs "should be considered when making future risk management recommendations for the site" (Appendix J, Section J8.3.8, page J-109, end of second paragraph).

Specific Comments

1. Comment: **In 2004, the Navy conducted data gap assessments of the presence of PCBs in 67 buildings at Mare Island. The goal of the PCB assessments was to evaluate the past PCB investigations and cleanups at these sites. Twenty-two of these sites are within the boundary of IA F1, and 13 of the 22 sites were recommended for further assessment. A summary table of the results of PCB confirmation sampling (SULLIVAN and Tetra Tech 2004) is contained in this document (Section 1.2.3.12, page 1-13). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Additional sampling was conducted at the 13 PCB sites identified for further investigation in Section 1.2.3.12 and at two additional potential PCB sites within IA F1. The results of the sampling indicated that eight of these sites require no further PCB characterization or abatement. This information will be presented as an appendix to the draft final RI.

2. Comment: **Nineteen USTs were suspected of being within IA F1. Of those 19 tanks, twelve were removed, 5 were not located, and 2 were concluded to not be USTs. Five of the 19 sites were designated closed (Section 1.2.3.2, page 1-9). Ordnance-related buildings originally in Investigation Area (IA) F2 were transferred to IA F1. Samples originally collected as site characterization for IA F2 were used in the risk assessment of IA F1 (Section 1.2.3.3, page 1-10).**

This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.

Response: Two UST sites were identified by the Navy as needing additional assessment prior to closure. The Navy installed two additional monitoring wells at the former locations of USTs A-225 and A-267 to further assess soil and groundwater in these areas. The results of the UST investigation did not reveal soil or groundwater contamination above the applicable comparison criteria. This information will be presented as an appendix to the draft final RI.

3. **Comment:** **Although a HHRA comment, the current release, dated 2004, of the U.S. EPA Region 9 Preliminary Remediation Goals (PRGs) should be utilized rather than the 2002 release (Section 1.4.4.1, page 1-27). The 2002 trivalent and hexavalent chromium residential and industrial PRGs referenced were checked and found to be identical to those listed in the 2004 release. Please amend the citation in the text.**

Response: The specific citation for trivalent and hexavalent chromium residential and industrial PRGs will be updated.

4. **Comment:** **IA F1 is located predominately on filled land. Ambient concentrations for fill soils were defined as the 95th percentiles of concentrations within a data set of ambient soil concentrations (Section 1.4.4.1, page 1-27). Please document the inclusion of filled land samples in the Mare Island Naval Shipyard soil background investigation (Tetra Tech 2002) as justification for using soil background concentrations for all fill materials whether terrestrial or intertidal (i.e., sediment).**

Response: Discussion of the inclusion of filled land samples from the soil background investigation as justification for using soil background concentrations for all fill materials will be included in Section 1.4.4.1 of the RI report.

5. **Comment:** **Ecological Applicable or Relevant and Appropriate Requirements (ARARs) have apparently yet to be furnished for IA F1 by the State regulatory agencies and resource trustees (Section 1.8, page 1-40). ARARs have been furnished for the Ecological Risk Assessment (ERA) for the IA H1 Feasibility Study (FS). Ecological habitats at IA H1 include upland and non-tidal wetland habitats. These ARARs should be applicable to IA F1.**

Response: Please see the Navy's response to DTSC General Comment 3 (from James Polisini).

6. **Comment:** **Aerial photographs of Mare Island Strait indicate that IA F1, Subarea 6 (Figure 1-2), is a mudflat which appears to have**

developed by deposition in the period between World War II and 1970. This mudflat is directly down stream from IR Site 04, the former sand blast area. HERD has identified Subarea 6 for further sediment investigation via coring in the Offshore Data Gaps Investigation.

Response: Please see the Navy's response to DTSC General Comment 2 (from James Polisini).

7. **Comment:** **Ten of 24 species of bats extant in California are California Species of Special Concern (CSSC) (http://www.dfg.ca.gov/hcpb/species/ssc/sscmamm/sscmamml.shtml)**

Abandoned buildings, hillside shelves and upland trees in IA F1 would appear to offer significant bat roosting potential. Bats should be listed as potentially present in IA-F1 (Table 1-1 and J-1).

Response: Bats have been listed in these tables as special status mammals observed or potentially present at IA F1.

8. **Comment:** **The term residue is applied to residue in drains (Section 5.1.1, page 5-1, Building A75) or explosive powder residue (Section 6.1.1, page 6-1). Some contaminants appear to be extremely elevated in these "residue" samples. For example the lead concentration in residue samples from IA-F1 Subarea 2 (e.g., A080SD001, Table G-3, page 181) range to 73,700 mg/kg. These lead concentrations would pose an obvious ecological hazard, but residue concentrations do not appear to be discussed. Some global statement should be made regarding the samples identified as "residue" in IA-F1 and how these samples enter into or are excluded from the ERA.**

Response: A definition of the term "residue" will be added to the text in Sections 5.1.1 and 6.1.1. Residue samples were not included in the SLERA because the residue samples were taken indoors and any detected contamination is contained within the structure and therefore not available to ecological receptors.

Specific Comments: Appendix J – Screening Level ERA (SLERA)

9. **Comment:** **HERD disagrees with the characterization of IA-F1 Subarea 6 sediments as "transient" as stated (Section 2.1.2, page J-6): "The transient nature of the sediments means that they are more likely to be affected by upstream sediments associated with Mare Island Strait then affected by surface soils from Mare Island." Even given the reversal of flow due to extreme high tides, during the usual flow in the Mare Island Strait IA-F1 Subarea 6 is immediately downstream of Installation Restoration (IR) Site 04, the green sand**

beach in IA-F2. Aerial photographs presented during the October 21, 2005 Offshore ERA meeting indicate that significant sediment accretion occurred in Subarea 6 during the period from World War II through the 1970's. This was the period of IR 04 sand blasting operations and disposal of sand blast waste directly into Mare Island Strait. HERD proposed additional core samples in IA-F1 Subarea 6, at the October 21, 2005 meeting, as part of the Offshore ERA. The IA-F1 Subarea 6 data gaps appear to be significant enough to require delay of any IA-F1 final risk characterization conclusion on Subarea 6.

Response: Please see the Navy's response to DTSC General Comment 2 (from James Polisini). The Navy will wait to make a determination on Subarea 6 until the Offshore Data Gap investigation has been completed.

10. **Comment:** **Please amend the text discussion of the inhalation pathway to indicate that inhalation of VOCs could be a significant pathway for burrowing vertebrates (Section 2.4.2, page J-11). This pathway may be excluded from the IA-F1 ERA if burrowing vertebrate species are not one of the vertebrate representative species considered in the IA-F1 ERA.**

Response: Text will be added to Section J2.4.2, page J-11 to indicate that inhalation of VOCs could be a significant exposure pathway for burrowing vertebrates. However, this pathway was not evaluated because burrowing vertebrate species were not one of the vertebrate receptor species chosen during the ERA. The receptors chosen were selected in consultation with the regulatory agencies during the development of the Mare Island onshore and offshore ERA sampling and analysis plans (PRC 1997a, 1997b)

11. **Comment:** **The Ecological Soil Screening Levels (EcoSSLs) available are used to screen Contaminants of Potential Ecological Concern (COPECs) for plants, soil invertebrates and vertebrate receptors (Section 2.4.3, page J-14). The 2003 posting of EcoSSLs is referenced as the source for plants, soil invertebrates and vertebrate receptors. Amendments and more recent postings are available (http://www.epa.gov/ecotox/ecossl/) as of March 15, 2005. For, example EcoSSLs for terrestrial plants were used for aluminum, cadmium, cobalt, iron and lead (Section 3.1.2, page J-17), while additional plant EcoSSLs are available (e.g., arsenic 18 mg/kg). The most recent EcoSSLs should be used in the IA-F1 ERA where EcoSSLs are utilized.**

Response: At the time the SLERA was conducted, the most current version of the Ecological Soil Screening Levels (EcoSSL) was used. Chemical

screening levels published by regulatory agencies are by design dynamic and usually change every two years. The Navy believes that as long as the most current version of the screening levels are used, it is not practicable to expect that each version of the report be updated to reflect new screening levels.

12. **Comment:** **The no-effect for trivalent chromium concentrations up to 500 mg/kg in sewage sludge may not be applicable due to high carbon content and the extremely high number of sorption sites in sewage sludge (Section 3.2.1, page J-21) compared to in-place sediments. Toxicity results other than those associated with sewage sludge should be used for the IA-F1 ERA.**

Response: The text cited refers to plant toxicity studies where plants were grown on sewage sludge-amended soils. In those studies, it was noted that trivalent chromium concentrations of up to 500 mg/kg in sewage sludge resulted in no observable toxic effects in plants. The Navy agrees with reviewers that the lack of observable toxicity could be due to reduced chromium bioavailability. This study is provided as additional information in the chromium toxicity profile.

However, the decision to retain chromium as a COPEC after the SLERA was conducted was based on exceedances of the screening criteria (1 mg/kg). Also, the decision to eliminate chromium as a COPEC in Step 3a of the baseline ecological risk assessment ([BERA] Section J8.1.1 and Section J8.1.2.1) was based on a comparison of site chromium levels against ambient chromium levels.

13. **Comment:** **The statement regarding mammalian exposure to IA-F1 soils (Section 3.2.1, page J-24) is incorrectly stated. The exposure pathway from lead in soil to mammals is potentially present for IA-F1 soils. Please amend (add the underlined text) the statement to include the potential exposure relative to the adverse effect dose to read; "...but a direct pathway from soil to mammals through plants which could potentially produce adverse effects can occur only when lead is present at very high levels in soil."**

Response: The text will be amended as requested.

14. **Comment:** **Relatively high molybdenum bioaccumulation factors (BAFs) for plants do not necessarily equate to high plant tissue concentrations of molybdenum (Section 3.2.1, page J-25). The highest plant molybdenum BAF is 3,300 for algae after a 1 hour exposure (i.e., 0.000005 mg/L or 0.005 μg/L). This would yield a tissue concentration of only 16.5 μg/kg. Please provide the natural range of molybdenum concentrations in plant tissue, relative to 16.5 μg/kg, in support of the conclusion that "Apparently, these high**

concentrations of molybdenum do not harm the alga."

Response: According to R.L. Mahler, molybdenum concentrations in plant tissue can be expected to range from 0.1 mg/kg to 1.2 mg/kg. Since this range is orders of magnitude higher than the estimated 16.5 µg/kg, R.L. Mahler's data supports the conclusion that molybdenum concentrations in algae at such low concentrations are not likely to produce adverse effects (Mahler N.D.).

15. **Comment:** **The table outlining the site-specific statistical testing against Mare Island soil background concentrations (Table J-2) appears to have some errors in the footnotes. A footnote of "c" is applied to the Probability listing under the Statistical Test column. The meaning of a footnote "c" is not presented with Table J-2. A footnote "2" states "Calculate significance level for individual statistical tests. Reject H0 if Prob < 0.05." No footnote "2" is included in Table J-2. Footnote "c" also occurs in the sediment table (Table J-3) without an explanation in the footnote section. Please amend the tables to provide the correct footnotes and correct placement in the tables.**

Response: The tables have been amended accordingly.

16. **Comment:** **Soil is not in-place sediment and sediment is not soil. Comparison of sediment concentrations in IA-F1 Subarea 6 to Mare Island terrestrial soil background concentrations (Table J-3) is inappropriate for selection of COPECs. Some other data set, perhaps the sediment samples collected for the Offshore ERA which did not demonstrate toxicity, should be used to determine whether a release has occurred in IA-F1 Subarea 6.**

Response: The Navy agrees to revise the Subarea 6 ambient data set to be the same ambient data set used in the offshore investigation for IA K at Mare Island. This data set comes from the Water Board (Water Board 1998) and has been agreed to by the Navy and the regulatory agencies as being appropriate for use with sediments at Mare Island.

17. **Comment:** **A subset of the plant toxicity benchmarks (Section 3.2.2, pages J-34 through J-36 and Table J-7) were checked and found to agree with the listed source (Efroymson, et al., 1997). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

18. **Comment:** **Earthworm toxicity benchmarks (Section 4.2.2, page J-55 through J-57 and Table J-9) were checked and found to be correct, or more protective. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

19. **Comment:** **A subset of the ecological exposure parameters (Section 5.1, pages J-61 through J-65) were checked and found to be either the single value cited or a reasonable average of multiple potential values. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

20. **Comment:** **The food intake rate is estimated based on energy requirements (Section 5.1, pages J-61 through J-65) of free-living organisms (Nagy, 2001) using body weight as the predictor variable. The intake rate in kg_{foot}/day which results from the Nagy (2001) equation is estimated total energy requirement. In fact, the reference cited states: "These equations should underestimate somewhat the feeding rates of free-living animals that are growing, reproducing or storing up fat." The intake of soil or sediment, as percent of the total ingestion rate, cannot be subtracted from this estimate and still allow for correct caloric food intake. Please amend the calculations of intake for all vertebrate species to add the contaminant soil or sediment intake to the contaminant intake in food based on 100 percent of the food intake estimates (Nagy, 2001).**

Response: It appears that the reviewer misinterpreted the text of the SLERA; the soil intake was not subtracted from the total food intake. To the contrary, the soil and food intakes were estimated separately, and the soil and sediment intakes were added to total food intake, not subtracted. So the total animal caloric intake was not affected or reduced by the soil intake. Therefore, the approach followed in the SLERA is in agreement with the calculations recommended in the comment.

21. **Comment:** **A subset of the Toxicity Reference Values (TRVs) for vertebrate representative species (Tables J-15 through J-21) was checked and found to be arithmetically correct for the reference cited (EFAWEST, 1998 and Sample et al., 1996). Chromium, copper, lead, nickel, zinc, polychlorinated biphenyls (PCBs) and total DDT appear to be the risk drivers based on visual inspection of soil and sediment concentrations (Appendix G and Figures J-5 though J-11). TRVs were used for all these COPECs, and Hazard Quotients (HQs) were calculated, indicating that the ecological risk drivers for relatively shallow soil and sediment are adequately evaluated. Deeper sediments in Subarea 6 will be evaluated as part of the Offshore Data Gaps investigation. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

22. **Comment:** **The conclusion that there is "systematic overestimation of risk due to the bioavailability of analytes" due to bioavailability values less than unity (Section 6.4.3, page J-87) cannot be made without measurement of the bioavailability in the original toxicity experiment used as the basis for the chemical-specific TRV. Please amend the statement to indicate that overestimation is possible, but of an unknown magnitude.**

Response: The text will be amended to indicate that overestimation is possible.

23. **Comment:** **COPECs with a frequency of detection less than 5 percent cannot be eliminated from the Baseline Ecological Risk Assessment (BERA) for plants (Section 8.1, page J-92) unless it is demonstrated that the detected samples are not located in a small geographic area (i.e., a "hot spot").**

Response: No endangered plant species were identified at the site. In addition, plants identified at the site are widely distributed within the area. Therefore, the Navy believes that plant populations will not be threatened by the presence of contaminant "hot spots" at the site. The Navy will review the data associated with any chemical that was eliminated as a COPEC based on low frequency of detection to ensure those chemicals meet the requirements set forth in EPA guidance for this refinement method (EPA 2001).

24. **Comment:** **Upland and wetland plant COPECs cannot be removed from further consideration based on arbitrary HQ based on the maximum concentration (HQ_{max}) value (i.e., HQ_{max} <5) (Section 8.1, page J-92). Six of 12 upland plant COPECs are removed from the BERA using this criterion (Section 8.1.1, page J-93). Ecological HQs do not represent a probability of ecological hazard. The average HQ based on the upper 95 percent confidence limit on the mean (HQ_{max}) (Section 8.1, page J-92) must be presented for each plant COPEC with a HQ_{max} greater than 1.**

Response: The BERA will be revised and all chemicals with an HQ_{max} >1 (from the SLERA) will be included in the evaluation. Results of this evaluation are found in Appendix J, Section 8.4.

25. **Comment:** **Conclusions on the statistical variance of the antimony ambient concentrations cannot be made based on an assumption that the statistical variance of the ambient soil concentrations is the same as the statistical variance of the IA-F1 antimony soil concentrations (Section 8.1.1.1, page J-93). The MINSY ambient data are available. This assumption regarding the equivalent range in antimony concentrations can be tested. Unless the range of MINSY**

ambient soil antimony concentrations is shown to be similar to IA-F1 upland soil antimony concentrations, the statement regarding exceedances of Oak Ridge National Laboratory antimony screening concentrations should be removed.

Response: The Navy concurs and the text "Based on the HQs for average and ambient concentrations, it is assumed that a similar percentage of ambient concentrations exceeded the Oak Ridge National Laboratory (ORNL) plant toxicity benchmark (5 mg/kg)" will be deleted from the section.

26. **Comment:** **HERD agrees with the upland sample locations identified in the BERA as candidates for remedial action based on elevated concentrations of chromium, lead, nickel, and zinc in the discussion of hazard to plants (Section 8.1, pages J-94 and J-95; Section 8.1.3, page J-97). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

27. **Comment:** **Terrestrial soil ambient concentrations for MINSY are not applicable to IA-F1 wetland sediments (Section 8.1.2, page J-96). In wetland discussions, ambient HQs, based on MINSY terrestrial ambient soil concentrations, are useful only to demonstrate the difference in ecological hazard between wetland sediments and terrestrial soils. This comparison by itself is not sufficient justification for No Further Action (NFA) based on equivalent HQs.**

Response: The Subarea 6 ambient data set will be revised to match the same ambient data set being used in the offshore investigation for IA K at Mare Island. This data set comes from the Water Board (Water Board 1998) and has been agreed upon by the Navy and regulatory agencies as being appropriate for use with sediments at Mare Island.

28. **Comment:** **The maximum wetland chromium concentration sample location (SM44o) should be identified as a candidate for further remedial action (Section 8.1.2.1, page J-96) just as upland sample locations with elevated concentrations are similarly identified (Section 8.1.3, page J-97).**

Response: The draft RI report describes the comparison between the HQ_{avg} for chromium in the wetland habitat (214) and the HQ_{amb} value (140). If the sediment ambient data set (Water Board 1998) is used, the HQ_{amb} value becomes 112. There are several important differences in the scenario for the wetland chromium level and the upland chromium level.

First, the area retained for further evaluation in the upland evaluation had a maximum concentration of 2,060 mg/kg, one order of magnitude

greater than the 214 mg/kg maximum detected concentration in the wetland.

Second, only one sample out of 12 collected in the wetland habitat (which is less than 10 percent) exceeded the Mare Island ambient concentration of 140 mg/kg. In addition, sampling location SM44o (in the wetland area) was bounded by three sampling locations with concentrations lower than background concentrations. The upland sample which exceeded the Mare Island ambient concentration was bounded by four other samples, all of which also exceeded the ambient concentration. Given the observations described previously, it is logical to evaluate the upland sample further but to eliminate sample location SM44o from further consideration.

29. **Comment:** **The maximum wetland zinc concentration sample location (SM44o) should be identified as a candidate for further remedial action (Section 8.1.2.2, page J-96) just as upland sample locations with elevated concentrations are similarly identified (Section 8.1.3, page J-97).**

Response: The HQ_{avg} for zinc in the wetland habitat was 28 and the HQ_{amb} was 4.6. The HQ_{avg} indicates that the exposure point concentration (EPC) for zinc (1,391 mg/kg) is greater than the ORNL plant toxicity benchmark and the Mare Island ambient concentration (230 mg/kg for soil and 158 for sediment). However, the EPC used to determine the HQ_{avg} was skewed by the maximum detected concentration of 1,790 mg/kg at sample location SM44o. Because it is unlikely that any receptor would be exposed to the maximum detected concentration over time, the median concentration was used as an alternative. Also, as in the case of chromium, sampling location SM44o is bounded by three sampling locations with concentrations less than background concentrations. Given the above listed observations, zinc contamination at sample location SM44o is believed to be isolated and thus does not require remediation.

30. **Comment:** **Upland and wetland invertebrate COPECs cannot be removed from further consideration based on an arbitrary HQ based on the maximum concentration (HQ_{max}) value (i.e., HQ_{max} <5) (Section 8.1, page J-92; Section 8.2, page J-97). Three of 7 upland invertebrate COPECs are removed from the BERA using this criterion (Section 8.2.1, page J-98). Ecological HQs do not represent a probability of ecological hazard. The average HQ based on the upper 95 percent confidence limit on the mean (HQ_{avg}) (Section 8.2, page J-97) must be presented for each invertebrate COPEC with a HQ_{max} greater than 1.**

Response: The BERA will be revised and all chemicals with an HQ_{max} >1 (from the

SLERA) have been included in the evaluation.

31. **Comment:** **HERD agrees with the upland sample locations identified in the BERA as candidates for remedial action based on elevated concentrations of chromium, copper, lead, and zinc in the discussion of hazard to invertebrates (Section 8.2, pages J-99 and J-100; Section 8.2.3, J-101). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.**

Response: Comment noted.

32. **Comment:** **Copper, zinc, 4,4'-DDD and total DDD are excluded as wetland invertebrate COPECs with HQ Exposure Point Concentrations (HQ_{EPC}) of 1, but less than 5 (Table J-10) with only total DDT retained (Section 8.2.2, page J-101). The location of the copper, zinc, 4,4'-DDD and total DDD maximum concentrations should be evaluated to determine if sample location SM444o is the location. Upland sample locations with elevated DDT concentrations are identified (Section 8.2.3, page J-101) for possible remedial action. The sample location (SM44o) with the maximum wetland total DDT concentration should also be identified as a candidate for possible remedial action.**

Response: As in the case of chromium and zinc detailed previously, sampling location SM44o contained DDT at concentrations that exceeded its screening value. However, sampling location SM44o is bounded by three sampling locations with significantly lower concentrations. Therefore, it is believed that contamination at sample location SM44o is isolated and thus does not require remediation.

33. **Comment:** **The TRV_{low} and TRV_{high} values were developed to provide specific information to risk managers for the purposes of evaluating risk management options. The Biological Technical Assistance Group (BTAG) TRV_{low} dose (i.e., HQ_{low}=1) was meant to be an intake which would not be of ecological concern. The BTAG TRV_{high} dose (i.e., HQ_{high} =1) was meant to be an intake indicative of potential adverse ecological hazard at which point remedial alternatives should be evaluated. Given the differing magnitude of difference between the TRV_{low} and the TRV_{high} for COPECS, averaging the HQ_{low} and the HQ_{high} (Section 8.3, page J-101) removes information and should not be done. Please present the HQ_{low} and the HQ_{high} for each vertebrate receptor.**

Response: The Navy agrees that HQs based on the low toxicity reference values (TRV) and high TRV should not be averaged. The $HQ_{(avg\ dose/high\ TRV)}$ and $HQ_{(avg\ dose/low\ TRV)}$ are never averaged as described in the comment. Instead, the $HQ_{(avg\ dose/high\ TRV)}$ and $HQ_{(avg\ dose/low\ TRV)}$ values are obtained

by dividing the average dose (the 95 UCL concentration of each COPEC) by the corresponding high and low TRVs. This is adequately explained in the report in Section J8.3, page J-101 (Appendix J).

34. **Comment:** **Multiple lines of evidence are provided for the proposed bioavailability adjustments of dose for vertebrate receptors (Section 8.3, page J-102 to J-109), mainly associated with the bioavailable fraction in abiotic media and tissue. Adjustments of the TRV require that the original toxicity experiment which served as the basis for the TRV provides measurements of absorption. With the exception of noting that lead acetate and zinc carbonate are "very soluble" (Section 8.3.2, page J-106), specific absorption rates are not provided for the original toxicity experiments. Many assumptions and best-judgment decisions regarding equivalency of media and absorption are incorporated into the bioavailability adjusted HQs. HERD recommends that the IA-F1 HQs based on the proposed bioavailability adjustment <u>not</u> be the basis for any remedial decisions, but be considered only to provide a bound on the unadjusted HQs with considerations for the Site Use Factor (SUF).**

Response: The Navy agrees with HERD that risk management decisions should not be exclusively based on the bioavailability-adjusted HQs. Section 8.0 will be reviewed to ensure that bioavailability-adjusted HQs are used properly in the COPEC refinement process.

35. **Comment:** **The Salt Marsh Harvest Mouse (SMHM) is a protected rare, threatened or endangered (RTE) species. SMHM is meant to receive protection at the individual level, no the population level. There is no reason to present average does exposure scenarios and/or TRV_{high} effects characterization (Section 8.3.4, page J-108) for RTE species such as the SMHM. The average exposure and/or TRV_{high} characterization should be removed from this section.**

Response: Text regarding average exposure scenarios and characterization will be removed from Section J8.3.4.

36. **Comment:** **IA-F1 Subarea 6 sample location SM44o should be added to the "hot spot" list of location which pose potential unacceptable risk to ecological receptors (Section 8.4, page J-109). This "hot spot" list currently contains upland locations.**

Response: Wetland habitat sampling location SM44o had chromium, zinc, and DDT at concentrations that exceeded either corresponding screening values and/or background concentrations. However, sampling location SM44o is bounded by three sampling locations with significantly lower concentrations. Therefore, contamination at sample location SM44o is apparently isolated. However, the Navy will await the results of the BERA and outfall investigation for IA K at Mare Island before a final

determination is made about this sampling location.

37. **Comment:** **Please state whether the visual evaluation of maps, which was used in the BERA to assess the physical distribution of COPECs (Section 8.1, page J-93), was used in support of the SLERA conclusions in the main text (Section 7.4, page 7-7). Evaluation of potential "hot spots" is required to support statements such as no COPECs exceed sediment benchmarks in more than 3 sediment samples.**

Response: A statement will be added to Section 7.4 to indicate that conclusions are based on results of the risk assessment, including visual evaluation of maps.

38. **Comment:** **HERD does not agree with the recommendation for No Further Action (NFA) for Subarea 6 based on the Screening Level Ecological Risk Assessment (SLERA) (Section 7.4.3, page 7-9). HERD has required additional sampling at depth in Subarea 6 be performed in the Offshore Data Gaps Investigation. Any risk management decision regarding IA-F1 Subarea 6 should be delayed until the Offshore Data Gaps samples at depth are obtained and evaluated.**

Response: The Navy agrees that further sampling should be conducted in Subarea 6 before a final recommendation is made in the RI report. Please see the Navy's response to DTSC General Comment 2 (from James Polisini).

RESPONSES TO DTSC COMMENTS PROVIDED BY JOHN P. CHRISTOPHER

General Comments

G1. **Comment:** **Overall: This risk assessment is very clearly presented. In particular, the methods used are very well presented and explained. The Navy's method of eliminating some COPC by comparison to screening criteria is not acceptable to DTSC. We require that the Navy include all chemicals of potential concern (COPC) and present complete estimates of concern risk and non-cancer hazard. After all COPC are included and the Navy present new estimates of risk and hazard, we expect that Sub-Areas 1, 2, 3, 4, and 6 will present no significant non-cancer hazard for future workers and cancer risks will still fall within or below the risk management range of 1 E-6 to 1 E-4. Estimated cancer risks for future workers at Sub-Area 5 are at least as high as 4 E-5. Once all COPC are included, new estimates of cancer risk for future workers at Sub-Area 5**

might exceed 1 E-4.

Response: The Navy acknowledges DTSC's requirement to evaluate potential cancer risks and noncancer hazards that may result from exposure to all COPCs. To satisfy this requirement, the total and ambient risks were estimated and presented in the HHRA (Appendix I), in addition to the incremental risk estimate prepared to satisfy Navy requirements (that included the risk-based screening step for COPC selection). The total risk estimate presents the risks and hazards from potential exposure to all detected compounds, not including the inorganic compounds within ambient levels (statistically shown to be attributed to fill upon which the area was constructed) and VOCs that were only detected once in groundwater. The ambient risk estimate presents the risks and hazards from exposure to the inorganic compounds within ambient levels. With all site-related COPCs included in the total risk estimate, and including the indoor inhalation pathway (please see the Navy's response to EPA Specific Comment 25), cancer risks are either within or below the risk management range, and all hazard indices (HI) are below 1 for all six subareas at IA F1. This information will be presented in Section I10 of Appendix I.

G2. Comment: Format of Report: We thank the Navy for adding the very helpful hot links to the Adobe portable data file (pdf); these greatly aided our review. Unfortunately, in Appendix I, the Human Health Risk Assessment, links to references were only partially operational, and links to tables, figures, and sections of the text did not work at all.

Response: Appendix I will be revised to ensure that links to references, tables, figures, and sections are operational in the Adobe Acrobat (*.pdf) version of the draft final RI report.

G3. Comment: Surrogate Chemicals: The text and tables in the human health risk assessment used acceptable surrogate chemicals for detected chemicals with no published toxicity criteria, except for picric acid, as discussed below. However, text in Section 2, 3, 4, and 5 of the main text states that chemicals with no toxicity were not evaluated (e.g., Sub-Area 1, "PAH Compounds in Soil", p. 2-6.) Please correct the main text to reflect what was done in the risk assessment.

Picric acid or 2,4,6-trinitrophenol was detected in soil in all sub-areas. This chemical has no published toxicity criteria, and the Navy chose not to select a surrogate chemical for it. The Navy should use an oral RfD of 5 E-4 mg/kg-day, which is the value in IRIS for 2,4,6-trinitrotoluene (TNT). Other possible surrogates for picric acid were 1,3,5-trinitrobenzene and 2,4-dintro-phenol. We chose TNT because it is at least similar in structure as the other two candidates and has the lowest RfD.

Response: New text will be added to Sections 2.0, 3.0, 4.0, and 5.0 of the main text to indicate that acceptable surrogate chemicals were used in the HHRA in place of detected chemicals with no published toxicity criteria.

The Navy agrees that 2,4,6-trinitrotoluene (CAS No. 118-96-7) has a chemical formula very similar to that of picric acid (CAS No. 88-89-1). The IRIS oral reference does (RfD) for TNT will be used as a surrogate for the RfD for picric acid.

G4. Comment: Screening of Chemicals: DTSC guidance permits sites to be screened, but not individual chemicals (DTSC, 1994a, b). USEPA has similar guidance (EPA 2004b) for use of its Preliminary Remediation Goals, many of which are cited as screening values (EPA 2004a) in the current document. Navy guidance on this subject, cited in this report as "Navy, 2001a", is not acceptable. We have notified the Navy of this fact on many prior occasions. The Navy has presented its assessment as through each chemical were present *in vacuo*. Receptors are exposed to the entire mixture of contaminants at each site, not just to one chemical at a time. In Table I-2.1 through I-2.15, the Navy presents comparisons of maximum detected concentrations (C_{max}) to screening values, but does not calculate ratios of the two, nor do they present a sum or such ratios. A site may be screened out as presenting no significant risk if the sum of those ratios is less than the carcinogenic effects. Similarly, cancer risks and non-cancer hazards due to volatile chemicals were not summed for the indoor air pathway, and the indoor air pathway was not summed with other pathways. This flaw in method must be corrected in the next draft of the risk assessment.

Response: As indicated in the Navy's response to DTSC General Comment 1 (from John Christopher), screening values were used to reduce the COPC list only under the incremental risk scenario; not under the total risk scenario. The total risk scenario included all organic compounds detected in soil at the site, all inorganic compounds present above ambient concentrations, and all VOCs detected more than once in groundwater. The cancer risks and noncancer hazards estimated under the total risk scenario for Subareas 1 through 5, not including the indoor inhalation pathway, are presented in Attachment I5 (Appendix I). The cancer risks and noncancer hazards for the total risk scenario, including the indoor inhalation pathway, are provided in Section I10 of Appendix I. The cancer risks and noncancer hazards estimated under the total risk scenario for Subarea 6 are presented in Attachment I3.

Specific Comments

RESPONSES TO DTSC COMMENTS PROVIDED BY JOHN CHRISTOPHER (CONTINUED)

1. **Comment:** **Acceptable Risk, Sec. 1.3.5, p. 1-22: This section seems to indicate that remedial options will be considered only if estimated cancer risks exceed 1 E-4 or non-cancer hazard exceeds 1.0. In fact, DTSC considers estimated cancer risks less than 1 E-6 to be acceptable. Risks in the range of 1 E-6 to 1 E-4 must be considered on a case-by-case basis (the "risk management range"). Risks greater than 1 E-4 typically require remedial action. Text in this section should agree with the correct presentation in Table 1-2.**

   Response: It is the Navy's position that only sites with cancer risks exceeding 10^{-4} or hazard indexes exceeding 1 always require that remedial action be considered in an FS. Sites with cancer risks within the risk management range (10^{-6} to 10^{-4}) do not automatically move to evaluation of remedial action in an FS; instead, a risk management decision is made as to whether remedial action is warranted or not. The Navy agrees that sites with cancer risks below 10^{-6} or hazard indexes of < 1 are considered to present no unacceptable risk.

2. **Comment:** **Ambient levels of PAH, Sec. 1.4.4.1, p. 1-27: All detected PAH must remain as COPC. DTSC does not accept elimination of PAH by comparison to "background" levels. Ambient levels of PAH might be valuable in risk management decisions, but they have no place in the risk assessment itself.**

   Response: As indicated in the Navy's response to EPA Specific Comment 20, the RI report will be revised to clarify that the ambient levels for PAHs were not used to eliminate them from the HHRA. In Appendix I all PAHs detected at the site were evaluated in the human health risk assessment.

3. **Comment:** **Appendix K, Fate and Transport Modeling: The Navy states that conservative assumptions were employed for modeling fate and transport in groundwater. However, we do not understand how health-protectiveness is maintained when the Navy assumes that a release occurred at the monitoring well farthest from the point of exposure within a sub-area. This practice would seem to minimize rather than maximize the opportunity for any receptor to be exposed with that sub-area.**

   Regarding degradation of chlorinated ethenes (p. K-3), DTSC requires a demonstration that biodegradation is occurring *in situ* before we will allow such degradation to influence the exposure point concentration. Although the Navy found conditions that could favor reductive dehydro-cholrination of substances such as trichloroethylene, we require some attempt at constructing a mass balance between the parent contaminant and the by-products of degradation. This requires some knowledge of the mass of

contaminant at the time of release. This could include attempts at measuring the extent of complete dechlorination to ethane or ethane, such as was performed by the navy at NAS Point Mugu, IRP Sites 6 and 24.

The text and a table on page K-8 show that sensitivity analysis included variation in three model parameters: velocity of groundwater flow (*V*), longitudinal dispersivity (a_x), and retardation factor (*r*). The table on page K-8 seems to suggest that values for *V* or a_x were held constant in the sensitivity analysis and only two trial values for *r*, yet five resultant exposure point concentrations are show. What has occurred here?

We are interested in the BIOSCREEN model from the Air Force Center for Environmental Excellence, but the Navy presents virtually no descriptive text on how this model works. Please enlighten us.

Response: The statement that conservative assumptions were used is accurate, however not every assumption used was conservative; such as a realistic assessment of the location of releases.

The Navy anticipates conducting additional groundwater sampling to demonstrate the occurrence of biodegradation. This monitoring will include sampling for monitored natural attenuation parameters. Sampling is expected to be conducted in conjunction with the feasibility study for this area.

The table on page K-8 showing the results of the sensitivity analysis is presented in the following order:

The first three runs shown hold the retardation factor constant while changing the value for groundwater velocity (*V*) in the second run, and the dispersivity (a_x) in the third run. Having established in these three runs the lack of sensitivity of results to *V* and a_x, two values for retardation coefficient were evaluated in the fourth and fifth runs while holding *V* and a_x constant.

As described in Section K1.2 of Appendix K, BIOSCREEN is an analytical model for natural attenuation decision support published by the EPA Office of Research and Development. The model uses Domenico's analytical solution to the standard advection-dispersion equation system (Domenico and Schwartz 1990). BIOCHLOR is the enhancement to the original BIOSCREEN model to include modeling of biodegradation of organic compounds through first order decay processes such as reductive dechlorination. BIOCHLOR is also a product of the EPA Office of Research and Development (as referenced) but the Center for Airforce Excellence published the Microsoft Excel-

based Version 2.2 used for the modeling presented in Appendix K.

4. **Comment:** **Potability of Groundwater, Sec. I.5.3, p. I-13: The Navy states that shallow groundwater beneath Area F1 is non-potable due to high total dissolved solids. Only the San Francisco Bay Regional Water Quality Control Board can define the beneficial uses of California waters. We will assume for the purposes of the risk assessment that shallow groundwater beneath Area F1 is not drinkable, and that the pathway of domestic use of groundwater is not complete. However, the Navy must eventually supply the Water Board's written confirmation of this to DTSC.**

   Response: The Navy understands DTSC's requirements for Water Board confirmation that groundwater is not a potential source of drinking water at IA F1. The Navy requests that DTSC consider Water Board concurrence on the draft RI report as written confirmation.

5. **Comment:** **Fisher's Exact Text, Sec. I6.1.3, p. I-23: Comparison of the proportions of detected values at a site to the same proportion in the ambient data set has no probative value whatsoever for selecting inorganic chemicals or potential concern (COPC). This portion of the otherwise excellent Navy guidance (Navy, 2002) should be ignored.**

   Response: The test of proportions was included as a background screening tool in the Navy's "Handbook for Statistical Analysis of Environmental Background Data" (Navy 1999) and incorporated in subsequent background statistical guidance developed by the Navy for soil, sediment, and groundwater (Navy 2002, 2003, 2004). The Navy's application of this test also follows recommendations for using the test in EPA's DQA guidance (EPA 2000), and the Department of Energy's Visual Sampling Plan (VSP) software (Hassig and others 2005).

   At IA F1, this test was used as an additional line of evidence in cases where the site and/or background data set contained a high proportion of censored measurements, and tests of central tendency could not be performed. When the work of this draft RI report was conducted in early 2004, the test was used to compare the frequencies of detected measurements in the full data sets. Later applications of the test more closely followed Navy guidance, which is to look only at the frequency of detected measurements that exceed some upper threshold in the background data set. For data sets with a high proportion of censored measurements, the threshold typically used is a concentration slightly greater than the maximum censored measurement in the background data set. In either case, application of the test of proportions is acknowledged to be a relatively weaker test, and is less informative than tests based on the actual magnitude of chemical concentrations.

There are also additional assumptions connected with the test of proportions discussed in the Navy's guidance (e.g., the censoring mechanisms in the two data sets are the same), which could further limit the validity of the test in some situations. This is another reason why the test is only viewed as one additional, albeit weaker, line of evidence in the background screen. The quantile test is always performed as a second-tier test in cases where tests of central tendency cannot be performed, and provides an additional check that concentrations in the right-hand tail of the site distribution are not elevated relative to those in the background data set. In cases where a conclusion that sample concentrations at the site exceed background concentrations is only based on the test of proportions, a footnote is added to the screening table to indicate that caution should be exercised in interpreting the results. For IA F1, significant test results were shown only for antimony (at four subareas) and thallium (at two subareas) and, in all cases, these chemicals were carried forward as COPCs in the human health risk assessment.

6. **Comment:** **Receptors, Sec. I7.2.1, p. I-25: We agree with the Navy that risk management decisions for Area F1 should be based on the construction and commercial/industrial exposure setting. Risks for potential future residents are presented in the report, but these are not highlighted.**

Response: Comment noted. The evaluation of risk to residential receptors is presented in Attachment I7.

7. **Comment:** **Comparing Site Concentrations to Screening Values in Sub-Area I, Sec. I.10.1, p. I-42 & Table I-2.1: {[See General Comment 4 above.] The following comment applies to all sub-areas. The Navy states on page I-42 that no COPC were identified in Sub-Area 1. However, the method did not included consideration of possible additive effects of contaminants. The Navy's procedure does not follow DTSC guidance for screening risk assessments (DTSC, 1994a,b), and it is therefore not acceptable. The screening of COPC shown in Tables I-2.1 through I-2.15 is incomplete and must be re-done. This incorrect screening leads to underestimation of carcinogenic risk and non-cancer hazard in all sub-areas.**

Response: The screening approach presented in Tables I-2.1 through I-2.15 applies exclusively to the incremental risk scenario. Under the total risk scenario, all organic chemicals detected in soil, all inorganic analytes present above ambient concentrations, and all VOCs detected more than once in groundwater were included in the evaluation, as presented in Tables I5-1.1 through I5-1.15 for Subareas 1 through 5 (Attachment I5) and Table I3-2.1 for Subarea 6 (Attachment I3).

8. **Comment:** **Risk Characterization for Sub-Areas 1, 2, 3, 4, Sec I.10.1 through I.10.4, pp. I-42 ff.: The Navy estimates cancer risks in the range of 1 E-7 to 5 E-6 for future workers at Sub-Areas 1 through 4. Non-cancer hazard estimated at ~1 E-3 for each sub-area, which is far below the benchmark of 1.0. Because some chemicals were screened out inappropriately and not included in the summation of cancer risk and non-cancer hazard, these values are underestimates, probably by <10-fold. Thus, cancer risks for the future workers at the various sub-areas fall into the risk management range of 1 E-6 to 1 E-4, and non-cancer hazards are <1.0.**

Response: The results listed in this comment were derived for the incremental risk scenario. Cancer risks and noncancer hazards were estimated without risk-based screening for the total risk scenario. The cancer risk estimates for future workers at Subareas 1 through 4 for the total risk scenario were less than half an order of magnitude higher than the estimates for the incremental risk scenario, ranging from 9×10^{-9} to 2×10^{-5} as presented in Attachment I5 of Appendix I. Noncancer hazards for the total risk scenario are < 1.0.

9. **Comment:** **Risk Characterization for Sub-Area 5, Sec. 10.5, pp. I-47 – I-48: The Navy estimates cancer risks for soil pathways in the range of 2 E-7 to 2 E-6 for future workers at Sub-Area 5. Non-cancer hazard is estimated at ~2 E-2 for this sub-area, which is well below the benchmark of 1.0. Cancer risk to future workers due to intrusion of volatile chemicals from subsurface into indoor air is estimated at 4 E-5, driven mainly by perchloroethylene (PCE). Because some chemicals were screened out inappropriately and not included in the summation of cancer risk and non-cancer hazard, these are underestimates of risk and hazard, probably by <10-fold. The Navy concludes that cancer risks for Sub-Area 5 are within the risk management range of 1 E-6 to 1 E-4. However, we caution against accepting this conclusion until all COPC are included and all pathways are summed.**

Response: The results listed in this comment were derived for the incremental risk scenario. Cancer risks and noncancer hazards were estimated without risk-based screening for the total risk scenario.

The cancer risk estimates for future workers at Subarea 5 for the total risk scenario (not including the inhalation of indoor air pathway) were less than half an order of magnitude higher than the estimates for the incremental risk scenario, ranging from 5×10^{-7} to 5×10^{-6} as presented in Attachment I5 of Appendix I.

The contribution from the indoor inhalation pathway shall be added to the cancer risk and noncancer totals presented in Appendix I.

10. **Comment:** **Risk Characterization for Sub-Area 6, Attachment I3, pp. I3-1 ff.: Estimates of cancer risk at Sub-Area 6 are driven by polychlorinated biphenyls (PCB) and PAH, especially benzo(a)pyrene. The non-cancer hazard index was estimated at 0.31, which is less than the benchmark of 1.0. This value is underestimated by an uncertain amount, due to inappropriate screening out of some COPC. Cancer risks for Sub-Area 6 were estimated to be 7 E-6. Even after inclusion of any missing carcinogenic COPC, this value is not likely to exceed the risk management range of 1 E-6 to 1 E-4. For comparison, the Navy estimates ambient non-cancer risk and hazard at 2 E-5 and 0.26, respectively, driven almost entirely by arsenic.**

Response: The noncancer hazard index of 0.31 and cancer risk of 7×10^{-6} listed in this comment were derived for the total risk scenario, as presented in Section I3.2.3 and Table I3-2.3 of Attachment I3. COPCs excluded from the total risk estimates were limited to inorganic compounds occurring naturally within the environment. Contributions to cancer risks and noncancer hazards for these inorganic compounds were provided in the separate ambient risk estimates per Navy guidance (Navy 2004). Cancer risks and noncancer hazards from chemicals within ambient levels are outside the scope of the Navy's Environmental Restoration Program.

11. **Comment:** **Lead Exposures, Sec. I.10.7, pp. I-50ff.: Lead in soil was not encountered at concentrations higher than USEPA Region 9 Industrial PRG of 750 mg/kg. Therefore, levels of lead in soil are acceptable for future commercial or industrial use of the property.**

Response: Comment noted. The Navy understands DTSC currently recommends the EPA Region 9 PRG for lead in soil (800 mg/kg) be used as a benchmark for remedial-based decision-making for potential industrial sites. The use of DTSC's LeadSpread model (Version 7.0) to calculate blood-lead levels for hypothetical adult workers was based on guidance available at the time the report was written. As presented in Tables I-15.1.1 through I-15.4.2, the estimated 99th percentile blood-lead levels are lower than the 10 μg/dL level recommended by DTSC as protective of this percent of the population.

12. **Comment:** **Residential Setting, Attachment I7, pp. I-1ff.: Residential development for Investigation Area F1 is not anticipated at this time. For Sub-Areas 1 through 5, the Navy estimates cancer risks in the range of 1 E-7 and 3 E-4. Non-cancer hazards are all <0.2. Estimated cancer risks of 2 E-4 at Sub-Area 4 and 3E-4 at Sub-Area 5 were driven to trichloroethylene (TCE) in indoor air and used a cancer potency factor for TCE not retracted by USEPA. When the**

lower Cal/EPA cancer potency factor was used for TCE, these estimates were reduced to 2 E-5 and Sub-Area 4 and 3 E-5 at Sub-Area 5.

Response: Comment noted.

13. **Comment:** **Modeling Vapor Intrusion with Soil Gas, Attachment I8, Sec. I.8.2.3, p. I8-4: The Navy presents two estimates of concentrations of volatile organic chemicals in indoor air, one based on measurements in groundwater and the other based on soil gas. We recommend using the former and excluding the latter. From the many other sites we have seen at Mare Island, we have learned that groundwater is present at quite a shallow depth, 1-8 ft bgs, depending on the season. We have also learned that the artificial fill covering Area F1 and many other areas of Mare Island has a relatively low hydraulic conductivity. From these two factors, one can surmise that the capillary fringe above the shallow groundwater is probably quite thick, perhaps reaching almost to the surface. These subsurface conditions do not match the description of the vadose zone modeled by Johnson and Ettinger (Johnson, 2002; DTSC, 2005).**

Response: The Navy concurs with the comment and will remove the Johnson & Ettinger modeling performed using the collected soil gas data. Attachment I8 will be revised to present only the results of the soil gas sampling. Furthermore, other sections of the HHRA (Appendix I) and relevant sections of the main text of the RI report have been revised to indicate soil gas data was collected but ultimately not modeled into indoor air for the estimation of vapor intrusion risks and hazards based on the recommendations from DTSC provided above.

John Christopher's Conclusions and Recommendations

1. **Comment:** **The Navy may not eliminate COPC by comparison to PRGs. Risks and hazards for all organic chemicals detected and all inorganic constituents present at concentrations exceeding ambient conditions.**

Response: As indicated in the Navy's response to DTSC General Comments 1 and 4 (from John Christopher), the Navy acknowledges DTSC's requirement to evaluate potential cancer risks and noncancer hazards that may result from exposure to <u>all</u> COPCs. To satisfy this requirement, the total risk and ambient risk estimates were prepared and presented in the HHRA (Appendix I), in addition to the incremental risk estimate prepared to satisfy Navy requirements (including the risk-based screening step for COPC selection). The total risk estimate presents the risks and hazards for all organic chemicals detected and all inorganic

constituents present at concentrations exceeding ambient conditions. The ambient risk estimate presents the risks and hazards from exposure to the inorganic compounds within ambient levels.

2. **Comment:** **For COPC with no published toxicity criteria, the Navy must use surrogate chemicals of similar structure which do have published criteria. Please consult DTSC if any of the recommendations in the comments above are not clear.**

   Response: Comment noted.

3. **Comment:** **DTSC requires that biodegradation be demonstrated *in situ,* rather than being inferred from the presence of possible degradation products in a medium.**

   Response: Comment noted. The Navy will address this comment in the feasibility study phase of IA F1.

4. **Comment:** **Exposure point concentrations must be derived from data which maximize rather than minimize the probability of exposure occurring.**

   Response: Comment noted.

5. **Comment:** **After all COPC are included and the Navy presents new estimates of risk and hazard, we expect that Sub-Areas 1, 2, 3, 4, and 6 will present no significant non-cancer hazard for future workers and cancer risks will still fall within or below the risk management range of 1 E-6 to 1 E-4. Estimated cancer risks for future workers at Sub-Area 5 are at least as high as 4 E-5. Once all COPC are included, new estimates of cancer risk for future workers at Sub-Area 5 might exceed 1 E-4.**

   Response: As indicated in the Navy's response to DTSC Specific Comments 8, 9, and 10 (from John Christopher), cancer risks and noncancer hazards were estimated with all site-related COPCs included in the total risk scenario. For this risk scenario, including the inhalation of indoor air pathway, no significant noncancer hazards were presented and all cancer risks were within or below the risk management range of 10^{-6} to 10^{-4} for future workers in all six subareas.

   The hazard indices and cancer risks estimated for all subareas under the total risk scenario, including the inhalation of indoor air pathway, shall be presented in Section I10 of Appendix I.

6. **Comment:** **Vapor intrusion to indoor air should be modeled using groundwater as a source term for all of Area F1, because groundwater is so shallow and the hydraulic conductivity of the surface soil is low.**

   Response: As indicated in the Navy's response to DTSC Specific Comment 13

(from John Christopher), the Navy concurs that vapor intrusion to indoor air should be modeled using groundwater as the source term and will remove the Johnson & Ettinger modeling performed using the collected soil gas data. Attachment I8 will be revised to present only the results of the soil gas sampling. Furthermore, other sections of the HHRA (Appendix I) and relevant sections of the main text of the RI report will be revised to indicate soil gas data was collected but ultimately not modeled into indoor air for the estimation of vapor intrusion risks and hazards.

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