



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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November 28, 2005

Mr. Jerry Dunaway
Dept of the Navy
Base Realignment and Closure
Program Management Office
1455 Frazee Road, Suite 900
San Diego, CA 92108-4301

2005 DEC -5 A 7:36

BRAC OFFICE

RE: Draft Remedial Investigation Report Installation Restoration Program Sites Within Investigation Area F1, Mare Island, Vallejo, California, February, 2005

Dear Mr. Dunaway:

EPA has reviewed the Draft Remedial Investigation Report for sites within Investigation Area F1 dated February 2005. We offer the following comments on the overall report and the Human Health Risk Assessment. Comments already submitted by Dr. Beckye Stanton of California Dept of Fish and Game dated October 26, 2005 also address EPA's concerns with the Ecological Risk Assessment.:

GENERAL COMMENTS

1. 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.
2. The Human Health 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.
3. 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 have 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.

SPECIFIC COMMENTS

1. **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.
2. **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.
3. **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 exceedences. What does Navy consider to be the source of TPH contamination in this area?
4. **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.
5. **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.

6. **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.

7. **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.

8. **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 ug/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.

9. **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 were specifically investigated during the field work.

10. **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 indicated the location on a figure in the next version of the Report .

11. **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 milligrams per kilogram (mg/kg) in soil and the comparison criteria 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 effect human health and the environment.

12. **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 ug/l and vinyl chloride as high as 8,400 ug/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.

13. **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.

14. **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 groundwater 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.

15. **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.
16. **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 to be 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.

17. **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 criteria has been incorrectly listed as 640 mg/L and should correctly be listed as 640 micrograms per liter (ug/L). Also, the acronym for ug/L should be defined in the "Notes" section of the legend. Secondly, the units of the data provided in the figures is 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.
18. **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.
19. **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.

COMMENTS ON THE HUMAN HEALTH RISK ASSESSMENT

GENERAL COMMENTS

1. 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.

SPECIFIC COMMENTS

1. **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 polynuclear aromatic hydrocarbons (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 these 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.
2. **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.
3. **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.
4. **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.

5. **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.
6. **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.
7. **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 foot notes are cut off by the margin.
8. **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 ($6300 \text{ ug/m}^3 / 0.43 \text{ ug/m}^3 = 14,651$) 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

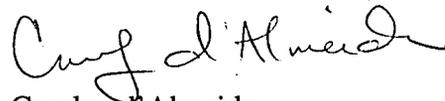
applicability of the Johnson and Ettinger model to shallow groundwater contamination.

Reference

Little, J.C., J.M. Daisey, and W.W. Nazaroff (1992) Transport of Subsurface Contaminants into Buildings: An Exposure Pathway for Volatile Organics. *Env. Sci. Technol.*, Vol. 26 pp 2058-2066.

Thank you for the opportunity to review this report. If you have any questions, please call me at (415) 972-3150.

Sincerely,



Carolyn d'Almeida
Remedial Project Manager

cc: George Leyva, RWQCB
Chip Gribble, DTSC
Henry Chui, DTSC
Rizgar Ghazi, DTSC