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NAVY RESPONSES TO AGENCY COMMENTS ON THE DRAFT STATION-WIDE REMEDIAL INVESTIGATION REPORT

Moffett Federal Airfield
California
(Formerly Naval Air Station Moffett Field)

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ACRONYMS AND ABBREVIATIONS

1E-6	One in one million
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichlorethene
1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethene
1,1,1-TCA	1,1,1-Trichloroethane
95 UCL	95 percent upper confidence limit
ATSDR	Agency for Toxic Substances and Disease Registry
AVGAS	Aviation gasoline
BEHP	Bis(2-ethylhexyl)phthalate
BRAC	Base Realignment and closure
BTEX	Benzene, toluene, ethylbenzene, and xylene
CAP	Corrective Action Plan
CDI	Chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLC	Common laboratory contaminant
COC	Chemical of concern
COPEC	Chemicals of Potential Ecological Concern
CSF	Cancer slope factor
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
HHRA	Human health risk assessment
HI	Hazard index
IAS	Initial assessment study
IRP	Installation Restoration Program
JP-5	Jet fuel
MEW	Middlefield-Ellis-Whisman
m^3/hour	Cubic meters per hour
MFA	Moffett Federal Airfield
mg	Milligram
mg/cm^2	Milligram per square centimeter
mg/kg	Milligram per kilogram
(mg/kg-day)	Milligram per kilogram-day
mg/L	Milligram per liter
μg	Microgram
μg/day	Microgram per day
μg/L	Microgram per liter

ACRONYMS AND ABBREVIATIONS (Continued)

μg/dL	Microgram per deciliter
μg/kg	Microgram per kilogram
MT3D	Modular Three-Dimensional Transport Model
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable unit
PAH	Polynuclear aromatic hydrocarbon
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PEA	Preliminary endangerment assessment
PID	Photoionization detector
ppm	parts per million
PRC	PRC Environmental Management, Inc.
PRG	Preliminary Remedial Goal
RfD	Reference dose
RI	Remedial investigation
ROD	Record of decision
RWQCB	Regional Water Quality Control Board
SVOC	Semivolatile organic compound
SCVWD	Santa Clara Valley Water District
SWAT	Solid waste assessment test
SWEA	Site-wide Ecological Assessment
SWRI	Station-wide remedial investigation
TBD	To be determined
TCA	Trichloroethane
TCE	Trichloroethene
TPH	Total petroleum hydrocarbon
TPHe	Total petroleum hydrocarbons extractable
TPHp	Total petroleum hydrocarbons purgeable
UST	Underground storage tank
VOC	Volatile organic compound
WESCO	Western Ecological Services Co., Inc.

NAVY RESPONSES TO AGENCY COMMENTS ON THE DRAFT STATION-WIDE REMEDIAL INVESTIGATION REPORT

NOVEMBER 17, 1995

This report presents point-by-point responses to the United States Environmental Protection Agency (EPA) and California Environmental Protection Agency, Department of Toxic Substance Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (RWQCB) comments on the May 1, 1995 Draft Station-Wide Remedial Investigation (RI) report prepared by PRC Environmental Management, Inc. (PRC) for Moffett Federal Airfield (MFA), California. The comments were received in letters from EPA, DTSC and RWQCB dated July 12 1995, July 21 1995 and July 20 1995, respectively.

EPA COMMENTS

GENERAL COMMENTS

Comment 1: EPA has reviewed the subject document for consistency of risk procedures and applicability to the overall Remedial Investigation (RI) process. After several meetings to discuss the scope and application of the station-wide review, we believe that it will still require some amount of revision to make the estimated point risk plot useful for the project team to communicate the extent of actions taken and the completeness of the actions to the public. EPA realizes that the Navy's contractor was in disagreement with the suggested approach for presenting the areal achievements in risk reductions and the residual cumulative risk the project team will be determining. This version of the document uses different methods of tallying the risk from a release based on a point or area determination. This difference skews the area of concern interpretation of risks to make it appear that the point risks are outlandish. In any given area, the average of the point risks should match the areal average presented in the tables from the individual site risk assessments. In comparing any area of investigation using the two methods, the report shows discrepancies of up to two to three orders of magnitude. There is no reason this should be the case. Also, it is difficult to observe any cumulative risk effects without contour lines (risk isopleths) connecting these point risks on the plots. Because regulatory agency guidance has

been consistently disregarded, it has been suggested by some that the Navy replace the contract team working on the sample by sample point estimates and replot the data before additional hours are charged to rewrite the text. The document must be rewritten to answer the questions of reduction of risks and the acceptability of remediation in a manner that is acceptable to the regulatory agencies. The additional mapping to present before and after remediation needs further development to demonstrate the accomplishments of the remedial actions in terms of cumulative risk reduction for the base.

Response: *The sample-by-sample approach will not be presented in the main text of the RI report for MFA. The exposure area approach will be used exclusively. As the Navy policy, the sample-by-sample approach will not be used because it does not conform to EPA guidance (1989) and raises serious toxic tort liability issues for the Navy. The sample-by-sample methodology requested by DTSC and EPA Region 9 was not agreed to by the Navy as the correct methodology for assessing risks at any site. It has been included in the draft RI only because it was requested by the two agencies as a means of presenting proxy risk estimates to the public. However, the results of the sample-by-sample approach do not accurately reflect exposure conditions or exposure concentrations for any current or future receptor and the results obtained using this method are inaccurate. The Navy believes that the exposure area risk assessment, which is the methodology delineated by EPA guidance (1989), is the appropriate method for assessing risks and presenting them to the public. This will be the methodology exclusively used in the MFA Station-wide RI. However, the sample-by-sample approach has been included as an appendix to present a broad-brush picture of areas that might be of concern.*

The goal of a Human Health Risk Assessment (HHRA) is "to provide a framework for developing the risk information necessary to assist decision making at remedial sites" (EPA 1989). According to EPA guidance (1989), the four specific objectives of the HHRA process are to:

- *provide an analysis of baseline risks and help determine the need for action at sites;*

- *provide a basis for determining levels of chemicals that can remain onsite and still be adequately protective of public health;*
- *provide a basis for comparing potential health impacts of various remedial alternatives; and*
- *provide a consistent process for evaluating and documenting public health threats at sites.*

Incorporating any information about remediation prior to finalizing remedial decisions may be misleading. The only "risk reduction" that will be demonstrated in the document is the proposed remediation of groundwater to maximum contaminant levels for specific organic chemicals and remediation (capping) of the landfills.

The agencies should note that the sample-by-sample approach was the methodology they proposed. The Navy strongly disagreed with this approach. It was presented in the draft RI only in response to agency requests. The resulting risk estimates were remarkably different from previous HHRA results because the sample-by-sample methodology did not follow EPA guidance (1989) in several ways: specifically chemical of concern (COC) selection, data aggregation, and exposure assumptions. It is now included as an appendix, but the sample by sample approach remains scientifically untenable and does not conform to EPA guidance.

Comment 2: The report presentation of the extent of contamination is limited to the RI sites. The relationship between significant detections of constituents in soil, groundwater, and soil gas should be included and discussed in order to allow the reader to verify the site conceptual models presented.

Response: *Please see the responses to EPA specific comments 37 and 47.*

Comment 3: It is very difficult to discern the differences between the various risks plotted on the sample by sample plots. Because the eye cannot easily differentiate between the symbol sizes used, EPA suggests using either different colors or different symbols to represent different orders of risk magnitude.

Response: *The sample-by-sample approach is presented in Appendix H of the RI and uses different colors to represent risks and hazards associated with particular sample locations. Symbols are no longer being used to represent magnitudes or risk. A color scheme has been developed to represent risks at each exposure area.*

Comment 4: It appears that most areas' risks at the site are driven by risk from inorganics. We suggest that these areas that exhibit background (naturally occurring) levels of inorganics be replotted to show risk from contaminants of concern that are anthropogenic in nature. The Navy needs to first provide proof of their natural occurrence, as was done for beryllium.

Response: *Spatial analyses for arsenic, antimony and chromium have been presented in Section 4 of the draft final RI. This discussion will aid in the evaluation of the origin of inorganic contaminants of concern.*

Comment 5: It appears that by virtue of the delineation of the Site 9 documents in the petroleum sites section and the language in the site descriptions that the Navy maintains its argument that there is no volatile organic compound (VOC) contamination attributed to Navy sources in Site 9 area. Because there are still some outstanding issues on this subject, EPA feels that this document should reflect the areas of uncertainty with regard to source, in particular, the Buildings 29/31 area.

Response: *There is no indication that VOC contamination has resulted from the gasoline storage tanks at Building 29. These tanks have historically held only gasoline or JP-4. There are no waste oil tanks associated with the tanks at Building 29 and therefore no suspected source of VOC contamination other than the Middlefield-Ellis-Whisman (MEW) Site and former Building 88. This information has been added to Section 1.2.4.5.*

Based on the existing data, the Navy contends that there is no source of VOC contamination resulting from the waste oil tank at Building 31. However in order to accurately portray the uncertainty which the EPA feels exists in the characterization of Building 31, the following has been added to Section 1.2.4.5:

Although the Navy has not identified a source of VOC contamination to the groundwater at Building 31, the area will be observed during the long-term remediation of the west-side aquifers. The Navy will conduct additional investigations as is appropriate if sources of VOC contamination are identified in the area.

Comment 6: Please provide a table of outstanding work that needs to be completed before finalizing this station-wide RI/FS process (e.g. SWEA [site-wide ecological assessment], Phase II Additional Sites, Site 12, treatability studies, source of runway wetland, etc.).

Response: *This table has been created and inserted in the cover letter.*

SPECIFIC COMMENTS

Comment 7: Section 1.2.2, page 1-4, para 3. It is possible that this section will need to be updated with regard to NASA (National Aeronautics and Space Administration) after the BRAC (Base Realignment and Closure) 4 Base Closure list is finalized this year.

Response: *Future versions of the station-wide RI report will be updated to reflect applicable new BRAC information as it becomes available.*

Comment 8: Section 1.2.2.2, page 1-5, first full para. Mountain View Well 18 (MV-18) south of Highway 101 has been producing water for domestic purposes since July 1994. The statement that "the C aquifer in the area of MFA is confined to agricultural purposes" should be corrected to reflect this fact.

Response: *This paragraph has been revised to remove the following text:*

The use of groundwater from the C aquifer in the area of MFA is confined to agricultural purposes. Limited use of groundwater from the C aquifer for agricultural purposes may continue into the future; however, due to withdrawal restrictions, extensive use of C aquifer groundwater for agricultural supply is unlikely.

The following text has been inserted in its place:

Currently, no groundwater is pumped from the aquifers underlying MFA, except for purposes of contaminant plume source control. Groundwater is extracted for domestic supply from the C aquifer from wells operated by the City of Mountain View located south of MFA.

Comment 9: Section 1.2.4, page 1-7, last para. The last sentence in this paragraph should be modified to explain that if petroleum products are commingled with CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) substances, they will be addressed through RODs (records of decision). Also, this section should reference the documents that pertain to any UST (underground storage tank) cleanup.

Response: *The last sentence has been modified to state that Sites 5, 9, 12, 14, 15 and 19 will not be addressed through RODs unless petroleum products are determined to be commingled with CERCLA substances. Additionally, a reference to the MFA corrective action plan has been provided. Table 1-5 provides a more comprehensive listing of documents related to petroleum sites cleanup.*

Comment 10: Section 1.2.4.5, page 1-13, last para. This introduction on petroleum sites should briefly mention that various treatability studies are being conducted at these sites. Other sections with more detail should be referenced.

Response: *A reference to the Petroleum Sites CAP (Corrective Action Plan) (PRC 1994c) has been provided in the first paragraph, but the remainder of the paragraph remains unchanged. The various treatability studies and remedial actions are mentioned in the appropriate subsections describing each of the petroleum sites.*

Comment 11: Section 1.2.4.5, page 1-14, para 2. Include a definition of the "capillary fringe zone."

Response: *Capillary fringe zone refers to the zone directly above the water table in which the soil pores are saturated, but the pressure head is less than atmospheric (Freeze and Cherry 1979). This explanation has been added to the text for clarification.*

Comment 12: Section 1.2.4.5, page 1-14, para 3. Although this is a Petroleum Sites section, the discussion of Buildings 29 and 31 should include language regarding the potential contamination from VOCs.

Response: *The text has been revised to indicate that aquifers underlying Buildings 29 and 31 are also contaminated by chlorinated VOCs emanating from the MEW site and Building 88.*

Comment 13: Section 1.2.4.5, page 1-14, para 3. Reference the determination of lead found in aviation gasoline (AVGAS).

Response: *The purpose of this paragraph was to generally describe Site 9, not to provide a description of the constituents that comprise the various fuel types. Therefore, adding lead as a constituent of AVGAS would be out of context with the remaining paragraph.*

Comment 14: Section 1.2.4.5, page 1-15, para 1. Reference any documentation related to the additional investigation of Site 12.

Response: *The letter of September 1, 1995 from PRC to the Navy regarding recommendations for corrective actions at the petroleum sites (PRC 1995g) has been cited in Section 1.2.4.5.*

Comment 15: Section 1.2.4.5, page 1-16, para 3. Although this is a Petroleum Sites section, the discussion of Tanks 2 and 43 should include language regarding the potential contamination from VOCs (commingling).

Response: *The following sentence has been inserted after the first sentence of the paragraph to more accurately describe the area of former Tanks 2 and 43.*

> *Commingling of petroleum-related compounds and VOC contamination (see Operable Unit (OU) 5 discussion in Section 1.2.4.4) occurs in the groundwater in the vicinity of former Tanks 2 and 43.*

Comment 16: Section 1.2.4.6, page 1-16, para 1. This description of OU6 should describe how the Site-Wide Ecological Assessment covers ecological risk assessment and the OU6 Remedial Investigation covers human health risk assessment.

Response: *Text has been added between the third and fourth sentences of the referenced paragraph stating that ecological risks at OU6 are addressed in the site-wide ecological assessment report (PRC and MW 1995c) and human health risks are addressed in the OU6 RI report (PRC 1994b).*

Comment 17: Section 1.2.4.7, page 1-18, para 1, last sentence. A magnetometer survey cannot definitively prove that metallic materials have not been buried at the site. It is suggested that the sentence be reworded.

Response: *The sentence has been reworded to state that the results of the magnetometer survey do not suggest that significant quantities of metallic materials have been buried at the site.*

Comment 18: Section 1.2.4.7, page 1-19, last sentence. This sentence seems to indicate that since Building 487 was found to be clean, that all buildings in the weapons storage bunkers area are clean. Is this true? Were the other building inspected as well?

Response: *The sentence in question refers to a site visit when PRC was allowed to see the inside of only Building 487. This was to allow PRC to see only what the inside of the bunkers looked like. The bunkers were used to store ordnance only. No fuels, solvents or vehicles were stored. The sentence in question has been deleted.*

In addition, Buildings 459, 484, 486, 487, 490 and 4XC1 (weapons bunkers and laboratory were all surveyed for declassification by Chemical Waste Management, Inc. (CWMI) on December 7, 1993. None of the samples collected from any of the buildings contained radiation levels above background. The buildings were released for unrestricted use (CWMI, 1994). The text has been revised accordingly.

Comment 19: Section 1.2.4.7, page 1-20, para 4. Please clarify whether nuclear weapons or nuclear weapons components were never stored in the bunkers. Can the recent letters

received from the bunkers' caretakers be used to reference this statement along with PRC 1995b?

Response: *This paragraph has been revised to state:*

> *"Based on the Navy's stated historical use of the bunkers, radiological testing was not conducted on these facilities prior to their transfer to the California Air National Guard. There is no reason to suspect that these facilities were used for storage of radioactive materials (PRC 1995a, CANG 1995)."*

Comment 20: Section 1.2.4.7, page 1-20, last sentence. The Navy is encouraged to locate and identify the source of the potential runway wetland (ag well?) prior to the final version of this document.

Response: *As indicated in the text of Section 1.2.4.7, the Navy will attempt to locate this well in 1995 and properly abandon it. A magnetometer survey has indicated a possible location of the suspected well. Excavation of the area will coincide with other field activities in fall 1995 in an attempt to locate the well precisely. If a well is discovered, actions will be taken to abandon it in accordance with Santa Clara Valley Water District (SCVWD) requirements. Results of the investigation and subsequent actions will be reflected in subsequent versions of the report as appropriate.*

Comment 21: Table 1-3, page 1-62, first row. It is our recollection that EPA, not the Navy, requested this report to close out the OU4 deliverables once the MEW ROD was deemed applicable for the west side aquifer. Isn't this report merely a repackaging of the OU4 Remedial Investigation report without the risk assessment? Please clarify.

Response: *A typographical error incorrectly indicated that the Navy requested characterization of the west-side aquifer. This has been changed to indicate that the EPA made the request. The West-Side Groundwater Site Characterization Report (IT 1993c) is a reiterization of the OU4 remedial investigation report (IT 1994) without the risk assessment. The text in the table has been revised to reflect this. Specifically, the statement "But the Navy did request characterization of the west-side aquifer and this report is the result" has been deleted.*

Comment 22: Table 1-4, page 1-68. Please add the Final OU5 feasibility study (FS) and any versions of the ROD that are released prior to completing this document. Generally speaking, Tables 1-1 through 1-7 may need updating prior to the completion of this document due to other document submittals.

Response: *The final OU5 Feasibility Study (FS) report (PRC 1995f) was completed on August 31, 1995. All relevant publications released between the draft station-wide RI and the draft final station-wide RI report are reflected in the new document.*

Comment 23: Table 1-6, page 1-79. Please add SWEA Phase II documents (work plans).

Response: *The draft final phase II SWEA work plan (PRC and MW 1995b) was submitted on May 19, 1995, but has not been approved as final at this time. Reference has been made to this document.*

Comment 24: Table 1-9, page 1-84, Site 12. This site work is not completed yet. EPA submitted comments on the Site 12 Completion Report (June 5, 1995 letter) that called for additional excavation and groundwater monitoring. Please clarify this in the table.

Response: *The draft final station-wide RI report has been revised to indicate that additional excavation and groundwater monitoring are planned for Site 12 based on regulatory inputs. The Site 12 completion report details these planned corrective actions and is scheduled for distribution in October 1995. The table has been clarified in the draft final report.*

Comment 25: Section 2.3.3.3, page 2-10, para 4. EPA encourages that the collection of replacement soil samples in the Inferred Sources 8 and 9 area be completed prior to the submittal of the Final version of this document.

Response: *Eureka laboratory data replacement samples from Inferred Sources 8 and 9 samples are scheduled to be collected concurrent with drilling activities at the wash rack south of Hangar 1 during November 1995 (PRC 1995d). If laboratory results are not available prior to the completion of the final station-wide RI report, an addendum will be issued to present the results.*

Comment 26: Section 2.3.3.4, page 2-12, first para. It should be clarified that in addition to operations at Building 88, VOC contamination at Site 9 could potentially have come from activities in the vicinity of Buildings 29 and 31. At present, this is unclear.

Response: *Please see the response to EPA general comment 5.*

Comment 27: Section 2.3.5, page 2-17, para 3. The OU6 Remedial Investigation Report still has some outstanding issues and is therefore not approved as final at this time.

Response: *Final Operable Unit 6 Remedial Investigation Report (PRC 1994b) is the title of the report. This does not make reference to its approval.*

Comment 28: Section 2.3.6.2, page 2-19, para 4. The Site 12 Completion Report is not yet finalized. As commented earlier, EPA submitted comments on the Site 12 Completion Report (June 5, 1995 letter) that called for additional excavation and groundwater monitoring. Please clarify this in the text.

Response: *Planned excavation and groundwater monitoring at Site 12 has been added to the discussion along with reference to recommendations for corrective action (PRC 1995g).*

Comment 29: Section 2.3.6.9, page 2-26, para 5. The Site 12 Completion Report is not yet finalized. As commented earlier, EPA submitted comments on the Site 12 Completion Report (June 5, 1995 letter) that called for additional excavation and groundwater monitoring. Please clarify this in the text.

Response: *Please see the response to EPA specific comment 28.*

Comment 30: Section 2.3.7.5, page 2-30, last para. The Phase I Site Wide Ecological Assessment has not been approved as final yet. Please clarify this in the text.

Response: *The Final Phase I Site-Wide Ecological Assessment report was completed in September (PRC and MW 1995c). This is the title of the document and does not imply approval. Any resulting changes in the SWEA which affect the Station-Wide Remedial*

Investigation report have been reflected in the draft final report, and the reference has been updated.

Comment 31: Section 3.3, page 3-2, para 4. It is our understanding that in the OU1 model used to calculate infiltration potential, 18" of rainfall per year was used. Is this an updated local average rainfall that should replace the 13.2" mentioned in the text?

Response: *Data collected from the MFA weather station and from the National Oceanic and Atmospheric Administration (NOAA) show that the local average annual rainfall is approximately 13 inches. The modelling conducted for the OU1 FS is presented in Appendix I of the OU1 feasibility report was based on 13.2 inches as stated in Appendix I of the OU1 feasibility study report (PRC 1994e).*

Comment 32: Section 3.5, page 3-3. It is unclear in this section whether or not the potential for groundwater flow at Moffett Federal Airfield is affected by tidal fluctuations. Any studies conducted regarding the tidal effects on the groundwater should be referenced and the potential impact of tidal fluctuations on the groundwater flow should be addressed.

Response: *The influence of tides on the northern portion of the base is discussed in the North Base Area Hydrogeologic Investigation Draft Final Report (PRC and JMM 1992b). This study determined that tidal variations do not affect groundwater flow direction or velocity. This explanation has been added to Section 3.5.1.*

Comment 33: Section 3.5.3, page 3-7, para 3. It is stated that the "B/C aquitard is considered an effective barrier to any potential downward migration of contaminants." This statement needs to be supported by analytical or hydrogeologic data. Please reference data to support this statement.

Response: *The B/C aquitard can be distinguished by the lower electrical resistivities of a layer that is found between depths of approximately 120 and 160 feet below ground surface (bgs) and depicted on geological cross-section C-C' in the OU5 RI report (IT 1993d) (A zone of interlayered sands exists between depths of 125 and 140 feet within the aquitard). The aquitard layer can also be distinguished on cross-section D-D' of the*

OU5 RI report, which crosses MFA from west to east, terminating on the eastern side of OU5. The depth of this layer correlates with the regional confining layer described by Iwamura (1980). This information indicates that the B/C aquitard is continuous below MFA. This information has been added to the text.

Comment 34: Plates 3-2 through 3-5. Please provide a legend that describes the lithology types as indicated in these geologic cross sections. (e.g. CH=__, CL=__, ML=__)

Response: *Definitions for these symbols have been added to the legends of Plates 3-2 through 3-5.*

Comment 35: Section 3, Geologic Cross-Sections A-A' through E-E'. It would be helpful if the aquifer zone designations were indicated at the appropriate depths on the cross-sections.

Response: *Aquifer zone designations have been added to Plates 3-2 through 3-5.*

Comment 36: Section 4.0, page 4-2, first para. Please remove the phrases following the listing of references. These phrases may be viewed as editorializing and do not add to the content of the report. The sentence, starting on page 4-1, should read: "Detected inorganic chemicals have been shown to be present at naturally occurring levels (IT 1992, PRC 1994d, and PRC 1995b)."

Response: *This change has been made as specified.*

Comment 37: Section 4.1.5, page 4-10, para 2. The soil gas data collected should be correlated with the corresponding soil and groundwater data.

Response: *Direct correlation of soil gas chemical concentrations to soil and leachate chemical concentrations is very difficult due to the variability of the landfill refuse. The information in this paragraph was summarized from OU1 RI report (IT 1993a) which did not make such a correlation. A general correlation can be surmised in that Section 4.1.1 of the station-wide RI report notes that elevated concentrations of volatile organic compounds VOCs were detected in both soil and leachate samples*

collected from the landfill refuse. The elevated soil gas concentrations may correspond to these concentrations. A sentence has been added to the paragraph noting this general correlation.

Comment 38: Section 4.2.3.1, page 4-15. The significance of detecting a constituent at a frequency greater than 5 percent is no longer an important criterion. EPA Region 9 (Preliminary Remediation goals) PRGs eliminate the need to use the frequency of detection criterion.

Response: *The paragraph has been revised to state that heavy total petroleum hydrocarbon (TPH) compounds not specifically identified as fuels were detected in groundwater samples at a frequency of 7.7 percent with a maximum concentration of 41 micrograms per liter (µg/L) (Table 4-4). For comparison, the groundwater cleanup levels are 50 µg/L for TPH purgeable as gasoline, and 700 µg/L for TPH extractable as diesel fuel or JP-5 (PRC, 1994c).*

Comment 39: Section 4.2.5, page 4-17, para 1. See comment on Section 4.1.5.

Response: *Please see the response to EPA specific comment 37. A sentence has been added to the paragraph noting a general correlation between soil gas concentrations and soil and leachate concentrations.*

Comment 40: Section 4.7, page 4-30. This section discusses the Chase Park area. Please label this on Figure 4-14.

Response: *Chase Park has been labeled on Figure 4-14.*

Comment 41: Section 4.10.1.1, page 4-38, para 3, fourth sentence. It is stated that the contaminant distribution in groundwater may be explained by the presence of a channel deposit. A brief discussion should be provided in the report that explains how the chemical distribution map was compared with the sand channel map and how this hypothesis was concluded.

Response: *Preferential flow pathways are areas of aquifer materials that have relatively lower resistance (greater conductivity) to groundwater movement than the adjacent aquifer materials. Groundwater and associated contamination migrate at a higher velocity along preferential flow pathways. At Moffett, sand and gravel channel deposits have the greatest hydraulic conductivities. Therefore, contaminant distribution in groundwater from Site 7 is a result of migration along channel deposits that are preferential flow pathways. In addition, review of Figure 3-6 of the draft station-wide RI shows sand channels across Site 7. These sand channels are oriented from southwest to northeast and can be associated with contaminant detections by visual comparison with the figures.*

This information has been added to the text.

Comment 42: Section 4.10.1.1, page 4-39, first para. This paragraph states that the "deepest detections and highest concentrations of these solvents are from samples collected from the following monitoring wells." The first bullet below the paragraph lists well W7-8 as having a PCE detection of 170 μg/L in October 1991. In fact, at well 43-2, PCE was detected at 260 μg/L in 1991. This appears to be the highest concentration of PCE detected in this area. This discrepancy should be corrected.

Response: *The following bullet has been added.*

- *Well W43-2, screened 8 to 18 feet bgs, adjacent to the potential source (former Tank 43) northeast of Hangar 3.*
  - *PCE was detected at 260 μg/L in July 1991.*

Comment 43: Section 4.10.1.2, page 4-40. The first and second sentences are in disagreement with one another. The B2 aquifer is affected by some of the A1/A2 aquifer contaminants. TCE (trichloroethene) was detected in both A1/A2 aquifer zones and the B2 aquifer. Please describe the levels at which TCE was detected in the B2 aquifer.

Response: *The first sentence has been deleted to reflect the detection of organics in the B-aquifer. Also, the following information about TCE detections has been added. TCE was detected in groundwater samples from wells W3-4 in September 1993 at 1 μg/L and*

W3-7 in October 1993 at 2 µg/L (OU5 final FS, Appendix. B) (PRC. 1995f). Both of these wells have been sampled since 1988 (W3-4 16 times and W3-7 13 times) with only one detection of TCE in each well.

Comment 44: Section 4.11, page 4-43, para 2. The OU6 RI Report and Phase I Site Wide Ecological Assessment have not been approved as final yet. Please clarify this in the text.

Response: *It is agreed that these documents have not been approved as final. The referenced paragraph is only citing these documents for the location of data summarized in Section 4.11. It is anticipated that these documents will be finalized prior to finalization of the station-wide RI report. Therefore, further discussion of their approved status may not be necessary.*

Comment 45: Section 4.13, page 4-59, para 1 and page 4-62, paras 1, 2, 3, 4. The Site 12 Completion Report is not yet finalized. As commented earlier, EPA submitted comments on the Site 12 Completion Report (June 5, 1995 letter) that called for additional excavation and groundwater monitoring. Please clarify this in the text.

Response: *Please see the response to EPA specific comment 24. The text has been revised to clarify the additional corrective actions.*

Comment 46: Section 4.13.2.1, page 4-61, para 4 (bulleted items). A list of semivolatile organic compounds (SVOCs) detected outside the excavated area is provided. Please provide a statement as to whether or not these detections exceed applicable standards or EPA Preliminary Remediation Goals (PRGs) and whether the SVOCs are commingled with total petroleum hydrocarbon (TPH) contamination.

Response: *Detected benzoic acid, bis(2-ethylhexyl)phthalate (BEPH) and pyrene concentrations were all below industrial PRGs by three to six orders of magnitude. TPH concentrations at all sample points were below detection. Therefore, SVOCs do not appear to be an issue in soils at Site 12. These data have been reflected in the revised document.*

Comment 47: Section 4.13.4, page 4-62, para 5. See comment on Section 4.1.5.

Response: *The objective of soil gas surveys conducted during the RI was to identify potential contaminant source areas for further investigation. Soil borings and groundwater monitoring wells were then installed and sampled in these areas to evaluate the nature and extent of soil and groundwater contamination. Soil gas data provide screening-level information useful to focus additional investigation activities. Correlation of soil gas data to soil and groundwater data would not be useful because each of the areas screened using soil gas surveys was subsequently and more thoroughly investigated using soil borings and groundwater monitoring wells.*

As noted in the last sentence in Section 4.13.4, page 4-63, the location of the elevated soil gas concentrations corresponded with the area excavated during the Site 12 source control measure. This area was found to be contaminated with petroleum products from previous fire fighting training activities (PRC and MW 1994).

Comment 48: Section 4.19, page 4-82, paras 2 and 3. Reference is made to Figure 4-47, but the reference should be to Figure 4-42.

Response: *The references to Figure 4-47 has been changed to Figure 4-42 as requested.*

Comment 49: Section 4.21.3, page 4-93, para 1. Figure 4-46 does not presently show sample locations at the flux ponds, as mentioned here. Please correct Figure 4-46.

Response: *Locations of monitoring wells WSW-4, WSW-5 and WSW-6 have been added to Figure 4-46.*

Comment 50: Figure 4-7. Based on the data presented, it appears that Site 3 is not the source of the PCB (polychlorinated biphenyl) contamination observed. This should be discussed in the text.

Response: *The observation regarding Figure 4-7 is correct. The text of Section 4.3.4 has been changed to state that the presence of trace-level PCB concentrations in only one*

section of the Marriage Road Ditch (Site 3) suggests that Marriage Road Ditch is not a source of PCB contamination.

Comment 51: Figure 4-20. TPH concentrations of greater than 700 μg/L have been highlighted on this figure. The text should explain why this is a significant concentration. Please reference the Petroleum Sites Corrective Action Plan (CAP).

Response: *The legend in Figure 4-20 states that the highlighted areas correspond to areas of groundwater contamination that contain extractable TPH concentrations exceeding the 700 μg/L cleanup level. A reference to the petroleum sites CAP (PRC 1994c) has been added to the legend.*

Comment 52: Figure 4-27. A cleanup level for TPH-extractable of 400 mg/kg (milligrams per kilograms) is referenced on this figure. The source of this cleanup level should be explained in the text. Please reference the Petroleum Sites CAP.

Response: *A reference to the petroleum sites CAP (PRC 1994c) has been provided on the figure, and a discussion of how the cleanup levels were decided upon has been added to Section 1.2.4.5.*

Comment 53: Figure 4-29. A cleanup level for TPH-purgeable of 150 mg//kg is referenced on this figure. The source of this cleanup level should be explained in the text. Please reference the Petroleum Sites CAP.

Response: *A reference to the petroleum sites CAP (PRC 1994c) has been added to the Figure. See EPA specific comment 52.*

Comment 54: Figure 4-35. If sidewall confirmation samples were collected from the excavation, then these results should be shown. Also, the former underground storage tank (UST) location should be depicted on the figure.

Response: *Sidewall samples TN2-NY, TN2-EY, and TN2-SY and their respective analytical results are depicted in Figure 4-35. The location of former Tank 2 is approximately in the center of the excavation area depicted in the figure.*

Comment 55: Figure 4-36. This figure identifies groundwater concentrations of TPH. However, the estimated limit of TPH in the soil is shown. Also, the former underground storage tank (UST) location should be depicted on the figure.

Response: *Figure 4-36 accurately depicts the estimated extent of TPH in groundwater; however, the legend inaccurately described the area as the extent of soil contamination and has been corrected. Please see the response to EPA specific comment 54 regarding the location of former Tank 2.*

Comment 56: Figure 4-37. The former underground storage tank (UST) location should be depicted on the figure.

Response: *The location of former Tank 14 is approximately in the center of the excavation area depicted in the figure.*

Comment 57: Figure 4-38. Based on the data for Site 19, it appears that SVOCs are a bigger contributor to environmental risk than TPHe (total petroleum hydrocarbon extractable). It would be more useful if the distribution of one of the more toxic SVOCs was also depicted on the figure. In addition, the symbol that consists of a partially filled in circle is not explained in the legend.

Response: *Figure 4-38 depicts the location of former Tank 43 (Site 19). Although some SVOCs were detected at former Tank 43, none of the SVOCs are considered to contribute significant risks to this site. Additional chemicals were not depicted in this figure for clarity because of the large number of data points. Additionally, the SVOCs were detected in only a few of the samples and are adequately described in Section 4.16.3.2. Figure 4-38 has been modified to define all symbols.*

Comment 58: Figure 4-40. See comment on Figure 4-29.

Response: *A reference to the petroleum sites CAP (PRC 1994c) has been added.*

Comment 59: Figure 4-41. An explanation should be provided in the text why no soil samples were collected in the area of the documented fuel release.

Response: *The purpose of the shaded area in Figure 4-41 was only to generally depict the location of the Zook Road fuel spill. The precise location of the spill is unknown. As depicted in Plate 1 of the additional petroleum sites investigation report (PRC 1995b), the soil borings drilled during the Phase I and II investigations intersected the area of contamination. Therefore, soil samples were collected in the area of the fuel release. The shaded area in Figure 4-41 has been removed to avoid confusion.*

Comment 60: Section 5.1.1, page 5-2, para 2. The detection of concentrations of polychlorinated biphenyls (PCBs) at Landfill 2 soil should be added to the discussion.

Response: *The discussion has been revised to include the detections of PCBs in soil within the perimeters of landfills 1 and 2.*

Comment 61: Section 5.1.2, page 5-2, para 3. The second to last sentence states that shallow groundwater beneath Marriage Road ditch was not evaluated during this (IT's RI) study. Please clarify that this groundwater was sampled during OU5 studies.

Response: *The sentence indicating that groundwater has not been sampled has been deleted and information regarding groundwater investigated under OU5 has been added. The text has been modified to state that shallow groundwater in the vicinity of the Marriage Road Ditch was investigated as part of the OU5 remedial investigation and feasibility study.*

Comment 62: Section 5.1.3, page 5-3, para 2. Although Site 4 has been closed, EPA does not recall that it has been capped. We understand that soil excavations will be occurring later on this summer. Please clarify.

Response: *Site 4 is the former wastewater holding ponds located west of Site 6 (the runway apron). Site 4 was closed as described in the text. The closure referred to in the comment is for the former industrial wastewater ponds, located northeast of Hangar 3. Closure activities at the industrial wastewater ponds began in August 1995.*

Comment 63: Section 5.1.4, page 5-4, para 1. The detection of concentrations of polychlorinated biphenyls (PCBs) at Site 5 soil should be added.

Response: *A discussion of PCB detections has been added to the text, although PCBs were detected in samples from only one soil boring.*

Comment 64: Section 5.1.9, page 5-6, para 3. The Site 12 Completion Report is not yet finalized. As commented earlier, EPA submitted comments on the Site 12 Completion Report (June 5, 1995 letter) that called for additional excavation and groundwater monitoring. Please clarify this in the text.

Response: *Please see the response to EPA specific comment 24. The text has been revised to clarify the additional corrective actions.*

Comment 65: Section 5.1.11, page 5-7, para 3, second sentence. The document states that low levels of VOCs were detected in soil. EPA does not consider 7,100 μg/kg (micrograms per kilogram) of benzene and 2,400 μg/kg of toluene to be low levels (see Section 4.14.1.1). Please define what is considered "low level."

Response: *As summarized in the petroleum sites CAP (PRC 1994c), cleanup levels for benzene and toluene at MFA are 4.4 mg/kg; (4,400 μg/kg), and 2,700 mg/kg (2,700,000 μg/kg), respectively. Based on these cleanup levels, the benzene concentration is above the cleanup level and the toluene concentration is significantly below. The elevated benzene concentration was from one soil sample; benzene concentrations in the remaining soil samples were significantly below the cleanup level. Therefore, with the exception of one benzene detection, the benzene-toluene-ethylbenzene-xylene (BTEX) concentrations were generally at low levels (below the cleanup levels).*

The text of Section 5.1.11 has been changed to reflect that benzene was detected above the cleanup concentration of 4,400 μg/kg in one soil sample, and that the remainder of the BTEX concentrations detected in soil samples were below cleanup levels. A reference to the petroleum sites CAP has also been added.

Comment 66: Section 5.1.11, page 5-7, para 4. The document states that low levels of contamination at Tanks 19 and 20 have not migrated significantly from the shallow soil adjacent to the tank locations. EPA does not consider 5,900 μg/L of benzene (see Section 4.14.1.2) and 42,000 μg/L of TPH (see Section 4.14.3.2) to be low levels.

Please define what is considered "low level" regarding the contaminant concentrations and what is considered "significantly" regarding migration distance.

Response: *The referenced paragraph has been reworded to state that contamination from Tanks 19 and 20 have contributed to VOC and TPH detections in the groundwater.*

Comment 67: Section 5.1.18, page 5-10, para 1. The description of Hangar 1 should be expanded to include its potential contribution to contamination to the regional groundwater plume through horizontal conduits, etc.

Response: *The second sentence in Section 5.1.18 has been deleted and the following paragraph has been placed between the first two paragraphs of the section.*

One potentially major man-made conduit exists beneath Hangar 1. A subsurface tunnel extends northeast from Building 10 to the east side of Hangar 1. The eastern half of the tunnel bottom is beneath the potentiometric surface of the first saturated zone, and groundwater appears to enter and flow along the tunnel floor to a sump at the tunnel's east end. Analytical data indicate that the tunnel provides a mechanism for groundwater transport from the western half of the tunnel to the sump at the eastern end. The data indicate that the tunnel acts as a groundwater sink along the portion beneath the potentiometric surface of the shallow saturated zone. However, Hangar 1 overlies the regional groundwater contamination plume on the western side of MFA. The regional groundwater plume and not Hangar 1 is the source of groundwater contamination (PRC 1995c).

Comment 68: Section 5.1.19, page 5-12, para 1, third sentence. This sentence references the detection of VOCs in groundwater at the flux ponds. The data presented in Section 4.21.3 do not include this information . This inconsistency should be addressed.

Response: *The flux ponds are located on the east-side of MFA. Groundwater on the east-side of MFA is addressed as OU5. Groundwater in the vicinity of the flux ponds is addressed under OU5 in Section 4.10.1. Clarification of this point has been added to Section 4.21.3.*

Comment 69: Section 5.4, page 5-20, para 3, first sentence. The acronym "MT3D" should be defined in the text and included in the list of acronyms.

Response: *MT3D is the proper name of a modular three-dimensional transport model (a computer program). The text has been modified to clarify this.*

Comment 70: Section 6.2.2.4, page 6-9, para 3. It should be clarified that in addition to operations at Building 88, VOC contamination at Site 9 could potentially have come from activities in the vicinity of Buildings 29 and 31. At present, this in unclear.

Response: *Please see response to EPA general comment 5. This paragraph is presented only as a brief description of Site 9, which was not evaluated in the HHRA because it is located on the western side of MFA. The description in Section 6.2.2.4 will not be revised.*

Comment 71: Section 6.2.2.4, page 6-11, para 3. Although this is a petroleum sites section, it should be mentioned that TPH contamination, as well as VOC contamination exists in the areas around Tanks 2 and 43. These two types of contamination are commingled.

Response: *Please see response to EPA specific comment 15.*

Comment 72: Section 6.2.2.6, page 6-14, para 2. Please present the magnetometer survey results in this document (possibly in an appendix).

Response: *The magnetometer survey of Golf Course Landfill 3 was conducted as part of the Site 2 (Golf Course Landfill 2) field activities during the confirmation study (ESA 1986). The boundaries of Golf Course Landfill 2 were unknown at the time, and Golf Course Landfill 3 was apparently included in the survey area unintentionally. The magnetometer survey results can be found in Appendix D of the confirmation study (ESA 1986).*

Comment 73: Section 6.2.2.6, page 6-16, para 1. This sentence seems to indicate that since Building 487 was found to be clean, that all buildings in the weapons storage bunkers area are clean. Is this true? Were the other building inspected as well?

Response: *Please see response to EPA specific comment 18.*

Comment 74: Section 6.2.2.6, page 6-16, para 5. Please clarify whether nuclear weapons or nuclear weapons components were never stored in the bunkers. Can the recent letters received from the bunkers' caretakers be used to reference this statement along with PRC 1995b?

Response: *Please see response to EPA specific comment 19.*

Comment 75: Section 6.2.2.6, page 6-17, para 1. The second sentence should be modified to read: "These ponds were taken out of service in January 1994 and will be remediated."

Response: *The text will be revised as requested.*

Comment 76: Section 6.3.2, page 6-18, para 2, second bullet. EPA Region 9 does not consider frequency of detection as a selection criteria for determining COCs in a human health risk assessment. Preliminary Remediation Goals provide a more realistic screen of COCs when considering sites with large amounts of acreage and unevenly spaced sample points, as on military bases.

Response: *This section summarizes criteria that were used in previous RIs to select COCs, as well as the criteria used for the exposure area HHRA presented in this document. Per discussions at the July 28, 1995 meeting of DTSC, EPA Region 9, and the Navy, and subsequent discussions of the agencies, all chemicals detected in soils and sediments will be retained as COCs for the sample-by-sample risk estimates except for arsenic, antimony, beryllium, and chromium. COC selection summarized in Section 6.3.2 has been used in previous RIs and is relevant to the risk characterization discussion, which includes information from the previous HHRAs and the exposure area HHRA, as the revised text indicates. Furthermore, COCs are selected to focus the HHRA on site-related chemicals that pose the most significant risks. This prevents the reader from being distracted from the true site-related risks (EPA 1989).*

Comment 77: Section 6.3.2.2, page 6-20. Remove this section, as it is no longer considered part of the selection criteria for determining COCs. PRGs are now the recommended screening tool.

Response: *Please see response to EPA specific comment 76.*

Comment 78: Section 6.3.3, page 6-21, 22. This list of COCs needs to be compared to final list to be included in the Phase I SWEA. The SWEA COCs should be a subset of this list. Since the Phase I SWEA is not accepted as final, it may be necessary to update this document's COC list once the Phase I SWEA is finalized.

Response: *The chemicals of potential ecological concern presented in the MFA Phase II SWEA are indeed a subset of all chemicals detected at MFA. COCs selected in this RI, or any HHRA, are not necessarily the same as those for an ecological risk assessment because risk assessment methodologies are not the same for humans and ecological reports. The HHRA COC list is separate from and not affected by COCs selected for the ecological risk assessment.*

Comment 79: Section 6.4.2.3, page 6-31. Reword the last sentence to reasonably explain the lack of surface water exposures.

Response: *The sentence explains why residential exposures to surface water are incomplete. The exposure area risk estimates assume that residential receptors are exposed to a single exposure area for the entire exposure duration. Homes cannot be constructed in wetlands or ditches, so residential receptors would be exposed to soil for the entire exposure duration (24 hours per day, 250 days per year, 30 years), precluding exposure to surface water locations. Additionally, the surface water at MFA is limited to wetlands and ditches, which are not potential residential areas. Risks to residential receptors from surface water exposures are also not included in the sample-by-sample risk estimates.*

Comment 80: Section 6.4.3, page 6-31, 32. Remove the editorializing throughout this section. It will be sufficient to explain and contrast the area average and point estimate approaches.

Response: *This section describes exposure point concentration estimation. The discussion is relevant to the exposure area HHRA and previous HHRAs conducted at MFA. The*

discussion is referenced to the applicable EPA guidance documents and is not an editorial comment. The section has not been significantly revised.

Comment 81: Section 6.4.5, page 6-38, last para. Explain or reference the determination of possibly naturally occurring metals through the areal extent and their average risk estimates, as done for beryllium at OUI-East.

Response: *Please see response to EPA specific comment 4.*

Comment 82: Section 6.6, page 6-86, para 2. Please provide more justification why acute exposures are not of concern. Typically, acute effects are more noticeable at higher concentrations.

Response: *By convention, acute health risks are not addressed in a HHRA because they represent short exposures to high levels of chemicals. These exposures will not be found at typical hazardous waste sites. The predominant concern for human receptors at these sites is chronic exposure to low levels of chemicals for extended periods of time, usually in terms of years. It should be noted that the pathological effects produced by acute exposures are in most instances distinctly different from those evoked by low dose, chronic exposure. Whereas acute exposures can cause noncarcinogenic systemic effects, chronic exposures can lead to cancer.*

Comment 83: Section 6.6, page 6-86, para 4. Procedures for evaluating dermal exposures are presented in the Region 9 PRGs and should be followed. Delete the correction of oral toxicity for absorbed doses.

Response: *DTSC, EPA Region 9, and U.S. EPA have different procedures for evaluating dermal exposures. Dermal exposure to soil COCs has been assessed in the following manner:*

> *Exposure area risk assessment: Dermal adherence factor of 0.2 milligrams per square centimeter (mg/cm^2) (EPA Region 9) and dermal absorption factors from DTSC were used to assess COC intake from dermal exposure to soil. Oral toxicity values were adjusted for gastrointestinal absorption as required by EPA guidance (1989).*

Sample-by-sample risk estimates: Dermal adherence and absorption factors form DTSC have been used (these are not necessarily the same as EPA Region 9 or U.S. EPA). Oral slope factors were not adjusted for gastrointestinal absorption at the request of Dr. Dan Stralka of EPA Region 9 and Dr. Michael J. Wade of DTSC. This is contrary to EPA guidance (1989).

Comment 84: Section 6.6.1, page 6-89, para 2. Please explain why risk isopleths were not possible to be constructed. Other sites have graphically constructed them with minimal problems.

Response: *Risk isopleths have not been included in the draft final station-wide HHRA. These isopleths were also not included in the draft HHRA because they are difficult to interpret, and a great deal of professional judgment was required to complete the isopleths. Recent conversations with EPA (November 1, 1995) confirm that isopleths will not be required in the revised RI.*

Comment 85: Section 6.6.1, page 6-91, para 3. The California State screening value for lead in soil is 130 ppm (parts per million) and should be considered here because it is more conservative than the EPA level.

Response: *This paragraph has been changed to state that all soil and sediment sampling locations (at depths of up t o 2 feet below ground surface) with lead concentrations exceeding 130 mg/kg have been assessed using DTSC's lead exposure spreadsheet. These spreadsheets are included as Appendix G. EPA's screening level concentration has been retained in the discussion.*

Comment 86: Section 6.6.2, page 6-92, para 1. Why was only a small area chosen to demonstrate the exposure area approach? Results from one area of the total site may not be representative of the complete site. If the Navy is going to argue in favor of using this technique, cumulative risk throughout the whole base must be shown. EPA requested a sample by sample approach be used and be shown with risk isopleths. These were never drawn. Without these isopleths, it is impossible to see a time-lapsed effect of removals or remedial actions. Both methods are incomplete.

Response: *The exposure area approach is presented in Section 6 of the revised document and has been used for the entire base for residential, recreational, and occupational receptors. The exposure area approach is required by EPA guidance (1989) and is fundamental to structuring site-related risks. The sample-by-sample approach is presented in Appendix H. The effects of remediation have also been shown for both methodologies.*

Comment 87: Section 6.6.4, page 6-94, para 4. The methods for a quantitative uncertainty analysis were not presented nor were they determined necessary for this base. Please delete this paragraph.

Response: *The Monte Carlo analysis has been used for the exposure area approach. For every area with a risk greater than one in one million (1E-6), Monte Carlo simulations provide a quantitative analysis of uncertainty for that value. In those areas where Monte Carlo simulation was conducted, the results have been included in Appendix H of the draft-final RI. The paragraph will not be removed.*

Comment 88: Figures 6-9 and 6-10. The symbol configuration used to illustrate intensity should be proportional to the value, not inversely so. Please change the symbol intensities to be intuitive.

Response: *Please see response to EPA general comment 3.*

Comment 89: Table 6-26. Why is there a TBD (to be determined) in a station-wide review?

Response: *The "TBD" designation applied only the Patrol Road Ditch surface water. Sampling data were not available for this area at the time the draft RI was submitted. They are now available and the "TBD" designation has been replaced with the risk and hazard estimates.*

EDITORIAL COMMENTS

Comment 90: Please submit only one copy of the draft final version of this document. We unnecessarily received five copies of the draft version.

Response: *Comment noted.*

Comment 91: From EPA's perspective, it is not necessary to resubmit the appendices for the Draft Final version of this document. It may not be necessary to submit them for the final version either.

Response: *Comment noted.*

Comment 92: This document should include an overall, summarized table of contents in every volume. The outside cover pages should provide more description than they presently do (e.g. Station-Wide Remedial Investigation Report, Chapters 1-4).

Response: *The draft final includes a summarized table of contents in each volume. In addition, the outside cover pages indicate which sections or appendices are enclosed. New outside cover pages are also included to be inserted in the appendices from the draft report because new appendices do not accompany the draft final, with the exception of Appendix I (Spatial Analysis Data).*

Comment 93: Section 1.2, page 1-2, para 1. The first sentence of this section does not make sense and should be reworded.

Response: *The sentence has been revised accordingly.*

Comment 94: Section 2.4.1, page 2-32, para 1. Tables 2-2 through 2-4 summarize sample collection and analysis, not Table 2-1 through 2-3 as listed.

Response: *The text has been changed accordingly.*

Comment 95: Section 4.14, page 4-63, para 3. "Site 5" should read "Site 14 South."

Response: *The text has been changed accordingly.*

Comment 96: Section 6.6, page 6-88, first bullet. This should read Region 9, not Region 4.

Response: *This typographical error has been corrected.*

DTSC COMMENTS

GENERAL COMMENTS

Comment 1: Much of Section 6 of the document is devoted to criticism of the point estimate approach for a site wide risk assessment. We find this troubling in that the Navy, DTSC and U.S. EPA agreed with this approach and we are puzzled why so much of the document is devoted to discrediting the approach agreed to by all parties. Discussion of the differences between point estimate of risk used in the Station-Wide Risk Assessment and the spatially averaged approach used in the risk assessments for the individual Operating Units (OUs) should be consolidated in the uncertainty section.

Response: *The point estimate (sample-by-sample) approach is presented in Appendix H of the revised RI. The exposure area approach is exclusively presented in Section 6 of the RI. As a Navy policy, the sample-by-sample approach will not be used because it does not conform to EPA guidance (1989) and raises serious toxic tort liability issues for the Navy because it inaccurately presents risk information. The sample-by-sample methodology requested by DTSC and EPA Region 9 was not agreed to by the Navy. In fact, the Navy strongly stressed the inappropriateness of the sample-by-sample approach. It had been included in the draft and revised only because it was requested by the two agencies. The Navy believes that the exposure area risk assessment, which is based on EPA guidance, is the appropriate method for assessing and presenting risks.*

Comment 2: The method of different sizes circles and crosses which was chosen to portray risk and hazard in Figures 6-1 through 6-10 is confusing. These figures are arguably the most important feature of the entire Station-Wide Risk Assessment. The Navy, DTSC and U.S. EPA should discuss the problem and arrive at a more satisfactory method of presenting the data.

Response: *The figures presented in Appendix H are no longer used to symbolize risk. Risks are presented using different colors. The exposure area results, presented in Section 6 of the RI, also use color instead of symbols to indicate incremental risks and hazards.*

Comment 3: As part of this Station-Wide RI, in addition to Sites 21, 22, and 23, data for three other sites is presented for the first time. They are the "Station-Wide" sites,

consisting of the weapons storage bunkers, the industrial wastewater flux ponds and the potential runway wetland at the end of the runways. No risks assessments at all were calculated for these sites. At least residential and industrial scenario risk assessments should be presented for these sites.

Response: *Risk assessments will not be conducted for these three sites. Screening investigations have found no contamination and there is no reason for a risk assessment.*

Comment 4: It appears that carcinogenic chemicals were not included when calculating noncarcinogenic hazard for Sites 21, 22 and 23. DTSC guidance specifies that both carcinogenic and noncarcinogenic chemicals must be included when calculating hazard.

Response: *Carcinogenic chemicals have been assessed for both carcinogenic risk and noncarcinogenic hazard at Sites 21, 22, and 23. The revised text and tables present the results.*

SPECIFIC COMMENTS

Comment 1: Page 1-4, bottom paragraph. The high concentrations of several inorganics in the MFA upper aquifers are attributed to the site-specific background. More information should be provided to support its conclusion. For example, the sources of those high "background concentrations" of antimony, manganese, and thallium were not satisfactorily explained in the OU5 Final Feasibility Study (FS) report. If metal concentrations in groundwater at MFA are from natural dissolution of sediments derived from the Santa Cruz Mountains or affected by salt water intrusion, then similar compositions should be found in neighboring groundwater or in seawater. Unfortunately, no neighboring groundwater data were provided in the OU5 FS report for comparison. Further, the "OU5 background concentrations" are quite different from seawater.

Response: *The inorganic constituent background evaluation and spatial analysis presented in the final OU5 FS report (PRC 1995f) was revised to address California Environmental Protection Agency (CAL/EPA) concerns and expanded to include a comparison of MFA groundwater to other areas of Santa Clara County. This evaluation further supported the analysis presented in the OU5 FS report indicating the distribution of*

inorganic constituents in MFA groundwater is naturally controlled and not the result of facility activities. This additional information was added to the OU5 FS report after the preparation of the draft station-wide RI report and after the preparation date of CAL/EPA's comments. A reference to the final OU5 FS report has been added to this paragraph to direct the reader to this additional information concerning background inorganic constituents in MFA groundwater.

Comment 2: Page 1-5, paragraph 2. To our understanding, there is no restriction of using C aquifer. However, the Santa Clara Valley Water District (SCVWD) does not allow withdrawing water from both deep and shallow aquifers from the same well to prevent cross contamination.

Response: *With the exception of well construction requirements, SCVWD has no mandatory restrictions concerning water usage. See the response to EPA specific comment 8 for changes to this paragraph.*

Comment 3: Page 1-7, bottom paragraph. The commingled plumes of petroleum products and other CERCLA substances at Site 5 or other areas are not excluded from CERCLA process. Therefore, they should be included in future SWRI (station-wide remedial investigation) reports.

Response: *Please see the response to EPA specific comment 9.*

Comment 4: Page 1-9, paragraph 4. Were analyses for dioxin conducted on samples from the Site 2 landfill? Since a former burn pit was reported to be located at this site, dioxins could be present.

Response: *A small number of soil samples were analyzed for dioxins at Site 2 and dioxins were not detected (IT 1993a). However, the Navy is employing the presumptive remedy strategy (containment via landfill capping) at Site 2. Consequently, extensive characterization of dioxin concentrations at Site 2 is unnecessary.*

Comment 5: Page 1-9, bottom paragraph. It is our recollection that the chain-link fence has been only installed in the west side of the landfill which is next to the runway and will not be able to provide any access control.

Response: *The recollection provided in the comment is correct. The text has been revised to indicate the current lack of access control at Site 2.*

Comment 6: Page 1-11, paragraph 1. It is unnecessary to address the estimated volume of waste again here. Please delete the second sentence as it has been mentioned in a previous paragraph (Site 6).

Response: *It is possible that 120,000 to 600,000 gallons of waste could have been disposed of at each site (NEESA 1984). Therefore, to prevent the possibility of underestimating the volume of waste disposal, the sentence in question remains unchanged. However, a reference to the Moffett initial assessment study (IAS) (NEESA, 1984) has been added.*

Comment 7: Page 1-14, paragraph 2. Further description or a citation should be supplied for the soil cleanup levels referred to in this paragraph.

Response: *A reference to the petroleum sites CAP (PRC 1994c), which summarizes cleanup levels, has been added.*

Comment 8: Page 4-1, paragraph 2. Please clarify whether the fuel related contaminants are still in the unsaturated zone soil near Buildings 29 and 31 or has been remediated.

Response: *Though some fuel contamination has been removed from soils near Building 29 during Phase I corrective actions, remediation for the majority of Site 9 soils is currently being planned (PRC 1995d). This is reflected in Section 1.2.4.5.*

Comment 9: Page 4-1, bottom paragraph. The inorganic chemicals detected at MFA are derived from naturally occurring materials, anthropogenic levels and may as well relate to site activities. With current available information, it is still very difficult to differentiate those sources.

Response: *Spatial analyses have been conducted on metals to be specified to evaluate metals concentrations in soils. The evaluation of metals in groundwater presented in the final OU5 FS report (PRC 1995f) contains the rationale supporting the statement that the distribution of inorganic constituents in groundwater is naturally occurring.*

Comment 10: Page 4-2, top of page. The report states that data for metals will not be presented because no source at the airfield can be identified. This is most unusual, especially since high levels of metals in excess of regional background were found at several locations. Metals should be included in the report in order for a complete understanding of the site to be communicated to the reader.

Response: *Please see the response to DTSC specific comment 9.*

Comment 11: Page 4-6, bottom paragraph. The department agrees that bis(2-ethylhexyl)phthalate (BEHP) is a common laboratory contaminant (CLC). However, it is inappropriate to report all the findings of BEHP at Moffett Federal Airfield are from laboratory contamination without evaluating other factors.

Response: *As discussed in the paragraph, other factors were considered when evaluating the existence of BEHP.*

Comment 12: Page 4-15, paragraph 1. Please note that various inorganic contaminants were identified in the OU1 RI report.

Response: *This paragraph is intended to discuss SVOCs detected in sediment. Metals are addressed through spatial analyses in Section 4.22 of the draft final SWRI report.*

Comment 13: Page 4-17, bottom paragraph. According to the OU2 Final RI report, metal analyses were performed as well.

Response: *The paragraph has been revised to indicate that metals analyses were also conducted.*

Comment 14: Page 4-22, paragraph 3. Please clarify if any PCBs have been detected at Site 3 through the Site Wide Ecological Assessment (SWEA).

Response: *PCBs were detected at Site 3 on MFA. However, further sampling of this area during Phase II of the SWEA did not result in additional detections of PCBs. This is stated in the revised text.*

Comment 15: Page 4-23, paragraph 2. The first sentence in this paragraph should be revised to reflect that various inorganic contaminants were identified in the OU2 RI report.

Response: *Metals are addressed through spatial analyses in Section 4.22 of the revised report.*

Comment 16: Page 4-89, paragraph 2. Please explain how to reach the conclusion that the chlorinated solvents at Hangar 1 Fuel Pits area are derived from regional VOC plume.

Response: *The chlorinated solvents detected in groundwater beneath Hangar 1 include PCE; TCE; 1,1,1-trichloroethane (1,1,1-TCA); 1,2-dichloroethene (1,2-DCE); 1,1-dichloroethene (1,1-DCE); and 1,1-dichloroethane (1,1-DCA). Several rounds of chemical data from groundwater samples collected upgradient of and slightly west of Hangar 1 (monitoring well W9-30) indicate concentrations of TCE, 1,1-DCE, and 1,2-DCE similar to those concentrations found in groundwater samples from beneath the hangar. The detection of 1,1,1-TCA can also be associated with the regional plume and 1,1-DCA is a degradation product of TCA. Therefore, PRC concludes that these solvents are part of the regional plume.*

Comment 17: Page 4-92, paragraph 1. Please clarify whether pesticides/PCBs were only detected in the surface debris or has it been found in the soil boring as well.

Response: *As noted in this paragraph, only the surface debris samples were analyzed for pesticides/PCBs. Sample analyses were conducted as specified in the Station-Wide RI work plan.*

Comment 18: Page 5-2, paragraph 2. The second sentence is contradictory to the findings of OU5 Final Feasibility Study Report. According to the Final OU5 FS report, contaminants were found in the surrounding groundwater of Site 1 and 2.

Response: *Sites 1 and 2 groundwater is discussed in the OU1 FS report (PRC 1994e) not the OU5 FS report (PRC 1995f).*

The data in the Final OU1 FS report show that low-level sporadic detections of contaminants have been reported in groundwater surrounding OU1 landfills. In addition, the OU1 FS report concludes that these detections do not warrant groundwater remediation (PRC 1994e). The text has been revised to clarify these findings.

Comment 19: Page 5-2, paragraph 3. Exfiltration of groundwater from A1 aquifer to the ditch should be considered as a potential pathway and be included in the conceptual model.

Response: *Exfiltration from groundwater to the ditch has been added to the conceptual model as a minor pathway. Because of groundwater and ditch elevations, this pathway is more likely at the northern end of the ditch. The groundwater contaminant plume delineated in this area is located at the southern end of the ditch.*

Comment 20: Page 5-2, paragraph 5. To our knowledge, at least 11 A1, and 3 A2 aquifer monitoring wells were installed through previous RI activities and the shallow groundwater aquifer has been evaluated in the OU5 RI report. All the previous investigation data should be included in the SWRI report.

Response: *Please see the response to EPA specific comment 61.*

Comment 21: Page 5-3, paragraph 5. Please provide more information about the dry wells mentioned in this paragraph.

Response: *Few details regarding the operation and precise locations of the dry wells are available. Use of dry wells for disposal of tank stripping wastes stopped prior to current personnel working at MFA.*

Comment 22: Page 5-5, paragraph 4. Several organics such as 1,1,1-TCA, Bis(2-ethylhexyl)phthalate and toluene were identified as chemicals of concern in the A1 aquifer and cannot be attributed to the regional plume. If VOCs in vadose zone soil are due to volatilization from contaminants in groundwater, then the same contaminants should be found in groundwater as well.

Response: *It is agreed that if VOCs in vadose zone soil are due to volatilization from contaminants in groundwater, then the same contaminants should be found in groundwater as well. Paragraph 4 on page 5-5 identifies BEHP and TPH as limited to the shallow soil where groundwater volatilization is not a transport mechanism. This paragraph has been modified to reflect Section 4.7.1; VOC contamination is not attributable to Site 10. The last sentence of this paragraph identifies the potential for VOCs that are present in the regional groundwater plume to also be present in Site 10 soils where these soils overlie the regional plume.*

Comment 23: Page 5-5, paragraph 5. Previous shallow soil analytical results of the stained area should be included in the SWRI report.

Response: *These results are discussed in Section 4.8 (nature and extent of contamination for Site 11) and are presented in Appendix C.*

Comment 24: Page 5-10, paragraph 3. The infiltration from vadose zone to groundwater might be considered as a potential migration pathway.

Response: *Figure 5-16 has been revised to show that infiltration from vadose zone soils may be a potential migration pathway for contaminants.*

Comment 25: Page 5-11, paragraph 2. It is stated that volatilization could be an important pathway at the pier. If so, air emission should be evaluated.

Response: *JP-5 is the fuel used by the U.S. Navy for air craft operations. This fuel is formulated with an elevated flashpoint to minimize the risk of explosion aboard aircraft carriers. Therefore, JP-5 does not contain most of the highly volatile single-ring aromatic hydrocarbons found in other jet fuels and in aviation gasoline.*

JP-5 was the only fuel transferred through the pipeline terminal at the fuel pier until June 1995. According to Mr. Jim Anderson, the Department of Defense fuels manager at MFA, small releases of fuel can occur during transfer of fuel from the transport barge to the fuel line. These releases can occur when the line is disconnected from the barge or if a gasket to the fuel filter (located in the line at the pier) fails. These releases would likely result in spills of less than 5 gallons. Mr. Anderson indicated that the spills occur infrequently. Since spill events occur infrequent, are of a small quantity, and volatility is low, the volatilization pathway will not be considered for JP-5 volatilization at the fuel pier. The text has been changed accordingly.

Comment 26: Page 5-11, paragraph 5. An individual site number should be assigned to each of the "Station-wide sites".

Response: *Individual site numbers will not be assigned to the Station-wide sites. This decision has been made to standardize the Navy internal and external reports. This will allow all of the reports to refer to the same site numbers.*

Comment 27: Page 5-11, paragraph 1. A conceptual contaminant transport model should be included for, at least, the "first group" of bunkers.

Response: *Though the weapons bunkers were investigated for potential contaminants, no contaminants attributable to the bunkers were detected. Therefore, no COCs exist for a conceptual contaminant transport model to be created.*

Comment 28: Page 5-12, paragraph 2. Please provide the abandonment schedule of the agricultural well in the "runway wetland" area.

Response: *As indicated in the SWRI text, the Navy will attempt to locate this well in 1995 and properly abandon it." A magnetometer survey has indicated a possible location of the suspected well. Excavation of the area will coincide with other field activities in fall 1995 in an attempt to locate the well precisely, and abandon it. Text stating these developments has been added to the draft final SWRI report.*

Comment 29: Page 5-12, paragraph 3. The last sentence should be removed from the report. Instead, inorganics should be considered in conceptual modeling and risk assessment.

Response: *The last sentence of this paragraph has been removed. Inorganic compounds and metals have been considered in the conceptual modeling and risk assessment.*

Comment 30: Page 5-24, Figure 5-2. Please see Comment 18.

Response: *Please see the response to DTSC specific comment 18. VOCs have been added as a shallow groundwater contaminant on Figure 5-2 even though VOCs are present at concentrations below action levels.*

Comment 31: Page 6-3, bottom paragraph. Please note that soil or groundwater plumes containing mixed petroleum and non-petroleum wastes are not covered under the petroleum exclusion and should be evaluated on a chemical by chemical basis using DTSC and U.S. EPA guidance.

Response: *The last sentence of this paragraph has been modified to indicate that areas of co-mingled chemicals will be addressed through RODs.*

Comment 32: Page 6-18, paragraph 3. According to DTSC guidance, all site related chemicals should be included in the risk assessment unless a very large number of chemicals are present (DTSC, 1992). There are not a very large number of chemicals present at Moffett Field and all site related chemicals should be carried through the risk assessment. The advent of modern computer spread sheets does not make this an onerous task.

Response: *COC selection summarized in Section 6.3.2 has been used in previous RIs and in this RI for the exposure area HHRAs. It is relevant to the risk characterization discussion, which includes information from previous human health risk assessments (HHRAs) and the exposure area HHRA. The COC selection criteria discussed in this section were used in the exposure area HHRA, as the revised text indicates. The selection criteria are in strict accordance with EPA guidance (1989). Furthermore, COCs are selected to focus the HHRA on site-related chemicals that pose the most significant risks. This prevents the reader from being distracted from the true site related risks (EPA 1989).*

The sample-by-sample approach presented in Appendix H includes all chemicals detected at MFA except arsenic, antimony, beryllium, and chromium. These four inorganic chemicals are at ambient levels in soil across the base, as shown by spatial analysis.

Comment 33: page 6-19, paragraphs 1 and 2. These two paragraphs are somewhat confusing and could use further explanation about how the point by point estimate was conducted. Also, it is not clear to DTSC how the inclusion of chemicals of concern (COCs) across the site is a confounding factor. If a chemical was not used at a particular area and was not detected in the analyses then it will not contribute to the point estimate of risk for the area. We feel any discussion of confounding factors should be moved to the uncertainty section. We do not agree that much of the discussion in Section 6.3.2 should be devoted to criticism of the point estimate of risk approach. This approach was successfully used at Sacramento Army Depot where it was approved by U.S. EPA, the Army and DTSC.

Response: *The text has been greatly modified because the sample-by-sample risk estimates are no longer included in Section 6 of the HHRA. Only the exposure area estimates are now presented in this section. COCs have been selected in accordance with EPA guidance (1989), as described in the text. Chemicals which were above background levels,*

were not essential nutrients, and were detected at a frequency of greater than 5 percent were selected as COCs for the particular exposure area in which they were detected. It should be noted that for most exposure areas, the number of samples did not allow the frequency of detection criterion to be applied; accordingly, this criterion was not used at those exposure areas.

COCs were selected to focus the HHRA on site-related chemicals. The inclusion of non-site-related chemicals can significantly confound risk assessment results. As an example, the inclusion of inorganic chemicals at background levels falsely increases the risk estimates. As another example, retaining all chemicals as COCs without regard to whether they were site-related can cause laboratory contaminants to be included in the risk and hazard estimates. In both cases, the risks and hazards at an exposure area would be falsely elevated and could cause a misinterpretation of HHRA results.

Comment 34: Page 6-20, paragraph 1. We do not feel 5% frequency of detection is a conservative benchmark to eliminate a chemical as a COC. Indeed, this is more of an upper limit, especially if the chemical was used on site and/or it was detected at a high level. Injudicious use of a 5% cutoff could result in elimination of a hot spot of a particular chemical.

Response: *This criterion was used in previous RIs reviewed and approved by DTSC and EPA Region 9. It has been applied in the HHRA for Sites 21, 22, and 23, and the station-wide RI where appropriate. It is included because it is relevant to the discussion of COC selection and risk characterization, which presents previous HHRA results as well as results of the exposure area HHRA. It should be noted that in the exposure area HHRA, this criterion could be used at only one area because the sampling density within the exposure areas was less than 20 samples (the minimum number of samples needed for this criterion to be used). In the HHRA for Sites 21, 22, and 23, the chemicals eliminated as COCs using this criterion are identified in the text. The maximum concentration of each chemical is also summarized in the data summary tables. A review of the data indicated that hot spots do not exist. Therefore, the text and use of this criterion have not changed. It should also be stressed that sampling was collected purposively with the expressed intent of locating hot spots.*

Comment 35: Page 6-21, last paragraph. This paragraph does not provide any actual details how the list of COCs were selected. Such detail must be provided.

Response: *Please see responses to specific comments 32, 33, and 34. The text has been clarified to describe how COCs were selected.*

Comment 36: Pages 6-26 and 27, discussion of Sites 3, 7 and 10. The text indicates that soil and groundwater contact was assessed. Does that include the complete exposure scenarios including groundwater and soil ingestion as outlined in Table 6-1 and described in Section 6.4.2 on page 6-30?

Response: *Yes.*

Comment 37: Section 6.4.3, Pages 6-31, and 6-32. Section 6.4.3 should concentrate on explaining how the point concentrations were obtained. A critique of the point estimate of risk approach as compared to a spatially averaged concentration should be moved to the section on uncertainty. Personal opinions and editorial comments are not appropriate in the body of the risk assessment.

Response: *As described in response to DTSC General Comment 1, the sample-by-sample approach will not be presented in Section 6 of the revised RI. Section 6.4.3 describes the calculation of the 95 percent upper confidence limit (95 UCL) of the mean concentration for each exposure area. If a 95 UCL concentration could not be calculated (due to insufficient sample size) or if the 95 UCL concentration exceeded the maximum detected value, the maximum detected value was used as the exposure point concentration. In the sample-by-sample risk estimates (presented in Appendix H), the maximum concentration was used exclusively.*

Comment 38: Page 6-35, paragraph 2. The most recent iteration of the DTSC dermal absorption guidance (DTSC, 1994) lists a value of 0.15 for the dermal absorption of PCBs, the value listed of 0.20 was from an earlier version of our guidance before results obtained from a soil matrix were available.

Response: *The value of 0.15 has been used in the revised HHRA.*

Comment 39: Uncertainty section, pages 6-37 to 6-39. The comparisons of the point estimate to spatially averaged concentration approach should be consolidated in this section and eliminated from the earlier sections. Since both EPA and DTSC recommended the point estimate approach, we feel it would be appropriate for there to be an even handed discussion of the two approaches rather than persistent criticizing upon the point estimate approach.

Although much is made of the fact that receptors will be "standing for thirty years" in contaminated areas, receptors will also be located over relatively uncontaminated areas Instead of being averaged in with contaminated areas, these receptors will show a very low risk or hazard. Additionally, the spatially averaged approach employs the upper 95th percentile value on the mean as a conservative measure of chemical concentration. The point estimate approach uses the measured value itself, and in that regard is less conservative.

Response: The text has been significantly revised because the sample-by-sample approach is presented in Appendix H and not Section 6, as described in response to DTSC General Comment 1.

Conservative upper-bound exposure factors have been used to estimate risks and hazards for occupational, residential, and recreational receptors. The methodology presented in Section 6 accounts for receptor movement within a predefined exposure area. The lower of the 95 UCL concentration and the maximum detected concentration within each exposure area is now used as the exposure point concentration, in accordance with EPA guidance (1989). Use of the 95 UCL concentration, in contrast to consistent use of the maximum detected concentration, is the method required by EPA guidance (1989, 1992). Use of the maximum concentration when data are available and can be aggregated to provide a 95 UCL concentration is an overly conservative approach. Receptors are not continuously exposed to the maximum detected concentration of a chemical under reasonable exposure conditions. Furthermore, EPA guidance (1989) states (emphasis not added):

> *The concentration term in the intake equation is the arithmetic average of the concentration that is contacted over the exposure period. Although this concentration does not reflect the maximum concentration that could be contacted at any one time, it is regarded as a reasonable estimate of the concentration likely to be contacted over time. This is because in most situations, assuming long-term contact with the maximum concentration is not*

reasonable. . . Because of the uncertainty associated with any estimate of exposure concentration, the upper confidence limit (i.e., the 95 percent upper confidence limit) on the arithmetic average will be used for this variable . . . If there is great variability in measured or modeled concentration values (such as when too few samples are taken or when model inputs are uncertain), the upper confidence limit on the average concentration will be high, and conceivably could be above the maximum detected or modeled value. In these cases the maximum detected or modeled value should be used to estimate exposure concentrations. This could be regarded by some as too conservative an estimate, but given the uncertainty in the data in these situations, this approach is regarded as reasonable.

Furthermore, this guidance states:

> *As discussed in Section 6.4.1, the concentration term in the exposure equation is the average concentration contacted at the exposure point or points over the exposure period. When estimating exposure concentrations, the objective is to provide a conservative estimate of this average concentration (e.g., the 95 percent upper confidence limit on the arithmetic mean chemical concentration). Use of the maximum detected concentration is much more conservative than using the 95 upper confidence limit of the mean concentration (95 UCL) in an exposure area. Receptors are not continuously exposed to the maximum concentration of a chemical under reasonable maximum exposure assumptions.*

Recent EPA guidance provides a description of how to calculate the 95 UCL and reiterates that the 95 UCL over the entire exposure area is the best estimate of the exposure concentration (EPA 1992).

Comment 40: Page 6-39, paragraph 3. We are not aware of any specific studies which have been conducted showing that "dermal absorption of compounds in soil is highly variable." If studies which specifically indicate that dermal absorption of chemicals in soil is highly variable are unavailable at present, we suggest this paragraph be deleted. Recent studies have shown that several inorganic chemicals can be absorbed by the dermal route from a soil matrix. Please note the Wester and Maiback (1995), recently reviewed this subject. (A copy of the manuscript, currently in press, can be obtained if requested).

Response: *The paragraph has been revised. The above quotation has been removed.*

Comment 41: Page 6-42, paragraph 1. Our understanding, after reviewing a recent pharmacology textbook, is that therapeutic use of antimony in humans has been discontinued because of its toxicity except for a specific use in treating Leishmaniasis (Gilman et. al, 1990).

Response: *The text has been revised to state that antimony has been used in the past as an emetic and an expectorant.*

Comment 42: Page 6-45, paragraph 5, last sentence. There appears to be a typographical error or partial deletion in this sentence.

Response: *The sentence has been revised.*

Comment 43: Page 6-62, last paragraph. A value of 300 mg (milligrams) of lead per day appears to be greatly in excess of normal adult daily exposure. Our information is that about 10 μg lead per day normally ingested from the diet, along with about 5 or 10 μg (micrograms) of lead per day which may originate from drinking water, represent the major sources of lead exposure in uncontaminated areas. This paragraph should be changed accordingly.

Response: *According to the Agency for Toxic Substances and Disease Registry (ATSDR) toxicity profile for lead (ATSDR 1989), the average amount of lead intake for an adult male in a non-urban setting is 50 micrograms per day (μg/day). In an urban setting, or with other non-occupational exposures, the amount can be over 200 μg/day. The revised ATSDR toxicity profile (1993) indicates that approximately 10 μg/day is a more appropriate value. The text has been revised accordingly.*

Comment 44: Page 6-77, paragraph 3. We suggest reference be made to the primary known metabolic role of selenium in humans, substitution for sulfur in the amino acids selenomethionine and selenocysteine required for activity of the enzyme glutathione peroxidase.

Response: *This was added to the toxicity profile.*

Comment 45: Page 6-77, paragraph 4, sentence 1. This sentence should be revised. In its current form, it is not grammatically correct.

Response: *The sentence has been revised.*

Comment 46: Page 6-79, paragraph 1. We are aware of previous medical use of silver in treating syphilis, currently we believe there are only extremely limited medicinal uses of silver compounds.

Response: *Comment noted.*

Comment 47: Page 6-80, paragraphs 5 and 6. The first sentence of each of these paragraphs need revision to correct typographical errors.

Response: *The sentence has been revised.*

Comment 48: Page 6-86, paragraph 1. The paragraph indicates that risks were not summed across all pathways as requested by DTSC and U.S. EPA. Instead, it is indicated that groundwater risks were presented separately. We understood that all parties had agreed to summing risks across all pathways as required in both U.S. EPA and DTSC guidance. We fell a deviation from our agreement of this magnitude must be agreed to by all parties and is unacceptable to DTSC.

Response: *Risks from soil exposure and groundwater exposure have been presented separately (Plates 6-3 and 4; Figures 6-6 and 6-7) and are summarized in Plates 6-7 through 6-10. The text has been revised to indicate this.*

In Appendix H, soil and groundwater risks are also summed for the residential scenario.

Comment 49: Page 6-86, last paragraph. The contractor may include a correction for incomplete GI (gastrointestinal) absorption when estimating the toxicity of chemical exposure by the dermal route. However, please note this is not required under DTSC guidance in the EPA manual (DTSC, 1994).

Response: *At the July 28, 1995 meeting of DTSC, EPA Region 9, and the Navy, DTSC and Region 9 requested that unadjusted oral toxicity values be used to assess risks associated with dermal exposures. However, this methodology is contrary to EPA guidance (1989) and is not scientifically defensible. Therefore, adjusted oral toxicity values have been used to assess risks from dermal exposure in the exposure area HHRA and the HHRAs for Sites 21, 22, and 23. Unadjusted toxicity values were used for the sample-by-sample risk estimates presented in Appendix H.*

Comment 50: Page 6-87, paragraph 3, last sentence. This sentence by using the word "toxic" in the phrase "toxic or carcinogenic" may confuse the reader into thinking that Cal EPA has RfDs (reference doses) for chemicals when only Cancer Slope Factors (CSFs) are available. In all fairness, if the last sentence in the paragraph is to be retained, it should be pointed out that Cal EPA cancer slope factors for some chemicals are smaller than the corresponding U.S. EPA value. If teamwork between all parties is a goal, we feel the last sentence of the paragraph should be deleted.

Response: *The sentence has been deleted.*

Comment 51: Page 6-87, paragraph 2. We do not recall the point estimate approach being recommended for expediency. All comparisons of the point estimate and spatially averaged approach should be impartial and condensed into one section.

Response: *It is the Navy's recollection that the sample-by-sample risk estimates were recommended for expediency. However, the approach is contrary to EPA HHRA methodology (1989) and will not be presented in Section 6 of the revised RI, as described in the response to DTSC General Comment 1. Discussions of the differences between the exposure area HHRA and the sample-by-sample risk estimates have, therefore, been removed from Section 6.*

Comment 52: Page 6-91, paragraph 3. The approach suggested for analyzing lead hazard, using the DTSC lead spreadsheet combined with a default value of 400 ppm, is unacceptable. Our understanding was that the DTSC lead spreadsheet would be used for all analysis of lead hazard. A value of 130 ppm lead as given in the PEA (preliminary endangerment assessment) manual could be used as a health based screening level for lead hazard.

Response: *The text stated that the California EPA lead exposure model would be used to assess hazards from exposure to lead. Results of the exposure assessment are presented in Appendix G and include an analysis of all samples where lead concentrations exceeded 130 milligrams per kilogram (mg/kg). The EPA screening value for lead in a residential scenario is 400 mg/kg, as noted in the revised text.*

Comment 53: Page 6-92, last paragraph, last sentence. The sentence has a plural subject and singular verb and states that the point estimate of risk is ten-fold higher than the spatially averaged estimate. The numbers provided however, show only about a three to four-fold higher risk estimate by the point estimate method. Additionally, the maximum point estimate value for the area was selected for comparison against the spatially averaged value. All the other point estimates would be lower for that exposure area. The argument could be made that the point estimate approach is not conservative enough by citing the lowest value in the exposure area and pointing out that it is lower than the spatially averaged value. One conservatism built into the spatially averaged approach, and not mentioned in the discussion, is the use of the upper 95 percentile value on the mean concentration when estimating an exposure point concentration. As we have indicated previously, the comparison of the two approaches should be moved to the uncertainty section.

Response: *The text has been substantially revised because the exposure area risk assessments have been completed for all of MFA and the sample-by-sample risk estimates are presented only in Appendix H. The tables now provide a comparison of the previous HHRA results and the exposure area results.*

Comment 54: Page 6-94, paragraph 1. DTSC would like further discussion on the purpose of the second sentence in this paragraph.

Response: *The text have been revised.*

Comment 55: Page 6-94, paragraph 2. References should be provided for the first two sentences.

Response: *The sentences has been removed.*

Comment 56: Page 6-94, paragraph 2. A reference or citation should be provided as to where the Monte Carlo simulation can be located.

Response: *The Monte Carlo analysis has been included in the draft final RI both in Section 6 and Appendix F.*

Comment 57: Page 6-95, paragraph 3. We would appreciate further clarification of this paragraph. In some cases, inorganic chemicals present at background levels for a particular area can be eliminated as chemicals of concern. If background risk might be a concern, it should be calculated separately from site-related risk. If this procedure is followed, background level contaminants will not artificially elevate risk or hazard. Therefore, if detected at a sampling point, a site related chemical would be contributing to risk or hazard estimates in general, DTSC does not approve of elimination of chemicals as COPECs (chemical of potential ecological concern) if they are present as site related contaminants, unless they are inorganics present at below background levels.

Response: *Please see responses to specific comments 32, 33, and 34.*

Comment 58: Page 6-95, paragraph 2. DTSC cannot agree with the second sentence of the paragraph and would like to further discuss the issue with the Navy. The third sentence is vague, it appears that some words were left out.

Response: *The sentences are complete. The discussion has been expanded.*

Comment 59: Figures 6-1 through 6-10. The mechanism of different size circles used to communicate the magnitude of risk and hazard for soil samples makes it confusing and difficult to compare the risk at different locations. The crosses chosen to communicate risk and hazard for groundwater are even more confusing. Also, the title of the figures displaying hazard indicate noncarcinogenic hazard indices are displayed, but the legend refers to a "*Risk Value*". We are certain that if the Navy, DTSC and U.S. EPA can meet on this problem, a more satisfactory method of displaying risk and hazard can be arrived at.

A figure depicting blood leads predicted using the DTSC lead spreadsheet should be prepared at least for the residential scenario. Figures should be prepared for the other two scenarios if the predicted blood leads approach 10 μg/dl or greater (at the 99th percentile) at any of the sampling points.

Response: *The figures have been substantially revised, as the sample-by-sample methodology is no longer being presented in Section 6 of the revised RI. The sample-by-sample is presented in Appendix H. Symbols are no longer being used to indicate relative risk. The terminology "hazard" and "hazard indices" has been used where appropriate to distinguish between noncarcinogenic hazard and carcinogenic risks.*

An appendix containing lead exposure assessment spreadsheets has been included for every sample where lead concentrations exceeded 130 mg/kg.

Comment 60: Table 6-1. DTSC guidance indicates that the ingestion of fruits and vegetable be evaluated when utilizing the DTSC lead spreadsheet for evaluating the hazard from lead in a residential exposure scenario.

Response: *Fruit and vegetable ingestion was not investigated in the HHRA; therefore, it was not included on the lead exposure spreadsheets.*

Comment 61: Table 6-5. As we have indicated in previous memos, DTSC guidance indicates a value for soil adherence of 1.0 mg/cm^2 which should be utilized.

Response: *A soil adherence value of 0.2 mg/cm^2 was used to assess dermal exposure in the exposure area HHRA because this value is used by EPA Region 9 in calculating preliminary remediation goals. A value of 1.0 mg/cm^2 was used in the sample-by-sample approach presented in Appendix H.*

Comment 62: Table 6-6. The value for inhalation rate should be 0.83 m^3/hour for adults.

Response: *The value of 0.83 m^3/hour was used in the exposure equation. The table contained a typographical error.*

Comment 63: Table 6-5 through 6-10. DTSC guidance specifies that both childhood and adult exposures be considered when calculating carcinogenic risks from exposure to soil, air and water in a residential exposure scenario. Children, the most sensitive receptor, should be used when calculating noncarcinogenic hazard from soil, air or water. Please see our PEA manual for default exposure parameters (DTSC, 1994).

Response: *Intake of COCs by children was assessed separately for soil ingestion only. EPA guidance does not require separate evaluation for any other exposure pathway because inhalation rates and dermal surface area are proportional to body weight. Assessing exposures separately for children and adults does not provide any additional information. Furthermore, toxicity values are based on the most sensitive receptors, and in this way are protective of both adult and children (EPA 1989).*

Comment 64: Table 6-12. See our comment regarding Table 6-5 above; a soil adherence value of 1.0 mg/cm^2 should be used.

Response: *See response to specific comment 61.*

Comment 65: Table 6-18. See our comments on Table 6-12 above; a soil adherence value of 1.0 mg/cm^2 should be used.

Response: *See response to specific comment 61.*

Comment 66: Table 6-24. Hazard indices should be calculated (and RfDs provided) for carcinogenic as well as noncarcinogenic COCs.

Response: *The table has been revised to include RfDs for all COCs when available from EPA sources. Hazard indices (HIs) were calculated for all COCs in both the draft and draft final documents.*

Comment 67: Table 6-25. The Cal EPA inhalation slope factor for hexavalent chromium is 510 $(mg/kg\text{-}day)^{-1}$ not 5.0. The listing for chromium should indicate that it is for the hexavalent form.

The Cal EPA slope factors for arsenic are incorrect. The slope factor of 12 $(mg/kg\text{-}day)^{-1}$ is the value for the inhalation slope factor. The oral value is pending.

Response: *The table has been revised. The correct toxicity values were used to assess risks and are presented in Appendix F.*

Comment 68: Tables 6-27 and 28. It would be useful if an additional table or tables were available providing at least a sample of chemical exposure point concentrations and associated risks and hazards for the site wide risk assessment.

Response: *The sample-by-sample risk estimates are presented in Appendix H. Intake factors and results are included in the appendix. Appendix F presents the exposure area calculations and contains tables with the COCs, exposure point concentrations, and associated risks and hazards for each exposure scenario for each receptor. The intake factors used to calculate risks and hazards for each receptor are also included in this appendix.*

Comment 69: Page E-5, first paragraph. We do not feel a 5% frequency of detection is a conservative benchmark to eliminate a chemical as a chemical of concern (COC). Indeed this is more of an upper limit, especially if the chemical was used on site and/or it was detected at a high level. Injudicious use of a 5% cutoff could result in elimination of a hot spot of a particular chemical. Chemicals eliminated as COCs because of less than 5% frequency of detection should be re-evaluated based on site specific conditions.

Response: *Comment noted. This does not produce a change in the COC lists for Site 21, 22, and 23, and the text will not be revised.*

Comment 70: page E-8, second paragraph. As a policy, DTSC requires a residential scenario for all sites. This does not mean the site will need to be cleaned up to residential standards. Cleanup would depend on the most likely future use. The residential scenario is required to document the need for a deed restriction on the property if it is not cleaned up to residential standards. There should be further discussion between DTSC, EPA and the Navy concerning the landfill and ditch as well as the groundwater underlying these sites.

Response: *Landfills are exempt from residential exposure scenario assessments. As stated in EPA guidance (1993):*

> *Streamlining the risk assessment of the source area eliminates the need for sampling and analysis to support the calculation of current of potential future risk associated with direct contact. It is important to*

note that because the continued effectiveness of the containment remedy depends on the integrity of the containment system, it is likely that institutional controls will be necessary to restrict future activities at a CERCLA municipal landfill after construction of the cap and associated systems. EPA has thus determined that it is not appropriate or necessary to estimate risk associated with future residential use of the landfill source, as such use would be incompatible with the need to maintain the integrity of the containment system.

Therefore, residential exposure scenarios will not be assessed for any landfill at MFA, including Sites 22 and 23.

Although a residential scenario could theoretically be assessed for a ditch, only occupational and recreational exposures were assessed for Site 21 for the following reasons:

1. *For a residence to be built, the ditch would have to be filled. This would preclude contact with soil or sediment within the ditch.*

2. *The ditch collects stormwater and is an integral part of stormwater removal at MFA. If a building was constructed over the ditch, the area would flood with each rain event, making it an undesirable area for any building. Another ditch would have to be built adjacent to this one, which is not a desirable landscape feature for a building. Exposure to Patrol Road Ditch soil and sediment would still be precluded if a building were constructed on it.*

3. *This ditch has been identified by DTSC as a potentially ecologically sensitive wetland. A residence could not be built on a wetland.*

For these reasons, only recreational and occupational exposures will be assessed for Site 21.

Comment 71: Page E-14, second paragraph. We are not aware of any specific studies which have been conducted to show that "dermal absorption of compounds in soil is highly variable". If studies which specifically indicate that dermal absorption of chemicals in soil is highly variable are unavailable at present, we suggest this paragraph be deleted. Recent studies have shown that several inorganic chemicals can be absorbed by the dermal route from a soil matrix. Please note the Wester and Maibach, 1995 review (currently in press) of this subject (a copy of the manuscript can be obtained if requested).

Response: *This paragraph has been revised. The phrase quoted above has been removed and the explanation has been expanded.*

Comment 72: Page E-15, first paragraph, last sentence. Please remove the last sentence. Toxicity information is not directly appended to the Table of Cancer Potency Values made available by the Office of Environmental Health Hazard Assessment (OEHHA). However, each of the cancer potency values in the Table was obtained from a risk assessment document prepared by OEHHA or the Department of Pesticide Regulation. Dr. David Siegel of OEHHA could be contacted at (916) 324-2829 for further information or acquisition of the carcinogenic risk assessment supporting any of the values in the CAL EPA Cancer Potency Table. Alternatively, under the column heading "Source" each of the compounds listed on the table of potency values has a telephone number which is provided so that interested individuals can call and obtain information on the supporting risk assessment. Some of these risk assessments, such as those for toxic air contaminants or drinking water contaminants are quite extensive.

Response: *This sentence has been removed.*

Comment 73: Page E-15, second paragraph. Please note that recent studies by Waalkes et al (1992) indicate that cadmium may have activity as an oral carcinogen in rats.

Response: *The second paragraph on page E-15 is an introduction to toxicity profiles and does not discuss cadmium. However, cadmium is identified as a class B1 carcinogen in the toxicity profile.*

Comment 74: Page E-19, last paragraph. It is our understanding that cobalt is only essential when administered as part of the vitamin B_{12} molecule and cobalt itself has no current therapeutic uses although it may have been administered in the 1950s (Gilman et. al., 1990; NRC, 1989).

Response: *The sentence has been revised to state that cobalt is essential as a part of cobalamin (vitamin B12).*

Comment 75: Page E-23, second paragraph. We are unfamiliar with the word sulfite being used as a synonym for Endosulfan. It is not listed as a synonym in *The Farm Chemicals Handbook or Merck Index.*

Response: *The word "sulfite" will be removed from the toxicity profile.*

Comment 76: Page E-25, second paragraph. A value of 300 mg of lead per day appears to be greatly in excess of normal adult daily exposure. Our information is that about 10 μg/day is normally ingested from the diet, which along with about 5 or 10 μg of lead/day which may originate from drinking water, represent the major sources of lead exposure in uncontaminated areas.

Response: *According to the ATSDR toxicity profile for lead (ATSDR 1989), the average amount of lead intake for an adult male in a non-urban setting is 50 μg/day. In an urban setting, or with other non-occupational exposures, the amount can be over 200 μg/day. The revised ATSDR toxicity profile (1993) indicates that approximately 10 μg/day is a more appropriate value. The text has been revised accordingly.*

Comment 77: Page E-29, fourth complete paragraph. This paragraph would be more informative if further information were provided as to why inhalation is the

most significant route of exposure to PAHs (polynuclear aromatic hydrocarbons).

Response: *This paragraph summarizes information regarding toxicity and is not site-specific. The paragraph describes studies that have been conducted, not the inhalation exposures at Sites 21, 22, and 23. Further information is available from the cited references.*

Comment 78: Page E-31, fourth complete paragraph. We suggest reference be made to the primary known metabolic role of selenium in humans, substitution for sulfur in the amino acids seleomethionine and selenocysteine required for activity of the enzyme glutathione peroxidase.

Response: *This was added to the toxicity profile.*

Comment 79: Page E-32, last paragraph. Our understanding is that phytotoxicity refers to toxicity to plants. How can phytotoxicity be studied in experimental animals?

Response: *This was a typographical error. "Phytotoxicity" has been changed to "fetotoxicity."*

Comment 80: Page E-34, third paragraph. The soil screening value of 130 ppm cited in the PEA manual (DTSC, 1994) can be used as a screening value for lead. The value of 400 ppm is not in accordance with DTSC guidance and is not acceptable.

Response: *Lead was selected as a COC at Site 22 and evaluated using the lead exposure spreadsheet as required by DTSC. This is indicated in the text and Table E-64. The exposure point concentration was 142.9 mg/kg. The EPA screening value for lead is 400 mg/kg, which is not exceeded at Site 22 as stated in the text. The text will not be revised.*

Comment 81: Page E-45, California EPA references. The finalized version of the Preliminary Endangerment Assessment manual is dated January, 1994. The

most recent iteration of the Cal EPA Cancer Potency Factors List is dated December 28, 1995. The earlier versions cited in the two references on page E-45 are not finalized documents.

Response: *The finalized PEA document is now cited. A copy of the December 28, 1994 Cancer Potency Factors List has not been provided to the Navy. Therefore, the November version was used. If any of the California toxicity values changed from the November list to the December list, please note the chemicals and risk estimates will be adjusted accordingly. Alternately, please provide the Navy with the updated list and the values will be reviewed and changed as necessary.*

Comment 82: Page E-52, Table E-3. More information needs to be provided about chromium. Was chromium speciated and was hexavalent chromium found? In contrast to the trivalent species, hexavalent chromium is carcinogenic and more toxic. Further information on speciation data on chromium is required to ensure that the potential risk from hexavalent chromium has been suitably addressed.

Response: *All chromium was assumed to be hexavalent. However, chromium was not detected at concentrations above background levels at any of the three sites and was not selected as a COC.*

Comment 83: Page E-54, Table E-5. A complete literature citation should be provided for the Hetch Hetchy, USGS and Waller references cited as sources of the reported background concentrations of inorganic chemicals. There are a number of sites in the South Bay which may have relevant background data.

Response: *More complete references are now provided. These data were used by IT for the OU2 RI and approved by DTSC.*

Comment 84: Page E-58, Table E-9, and Page E-62, Table E-13. More detail should be supplied on the algorithm or model used to estimate vapor concentration of chemicals in air based on measured soil concentration.

Response: *A volatilization factor was used to estimate vapor concentration in the air. The exposure parameter tables have been revised to include this parameter. Section E.4.4.4 lists the volatilization factors for the chemicals assessed via this pathway. Volatilization factors were calculated using the volatilization factor equation from EPA (1991) and physical and chemical constants from DTSC (1994).*

Comment 85: Page E-59, Table E-10. Units of mg/L (milligrams per liter) are given for chemical concentration to be used in calculating soil ingestion.

Response: *The typographical error in this table has been corrected.*

Comment 86: Page E-60, Table E-11. As per our guidance (DTSC, 1994), a value of 1.0 mg/cm^2 should be used for soil adherence.

Response: *A value of 0.2 mg/cm^2 was used for these sites because EPA Region 9 uses this value (1995).*

Comment 87: Pages E-67 and E-94, Tables E-18 and E-44. Based on the upper 95th percentile confidence limit on the mean soil concentration (95 UCL) shown in Table E-18 and the exposure parameters shown in Table E-10, we attempted to reproduce the calculations for the Cal/EPA CDI (chronic daily intake) and Cal/EPA cancer risk for Aroclor-1260. The values for CDI and cancer risk that we calculated were about 15 fold larger. Although we did not run calculations for the other chemicals, this discrepancy appears to extend to other chemicals in addition to Aroclor-1260. Spotchecks should be conducted on other tables to screen for arithmetic errors.

Response: *This is not an arithmetic error. The soil ingestion rate for the recreational receptor was 6.25 mg/hour for the one hour of daily exposure. This value was derived by dividing 100 mg/day (the default adult soil ingestion rate) by 16 hours, the average amount of time an adult is awake. DTSC has since requested that a higher soil ingestion rate be used because:*

DTSC has sometimes designated a fractional exposure apportioning exposure from a site. For example, assuming that a worker ingests 50 mg of their daily 100 mg of soil ingested at their workplace. We would imagine that the majority of an adult's soil exposure would occur during active outdoor activity (where dust levels are higher) as opposed to more passive indoor activities such as office work, reading or watching TV. Therefore we would suggest that about one-eighth of an individual's daily soil exposure would come during their one hour outdoor recreational time and that the daily exposure parameters be calculated accordingly (DTSC 1995).

According to the Navy's calculation, the apportioning of 50 milligrams over an eight hour day is equivalent to apportioning 100 mg of soil ingestion over a 16 hour day. Additionally, it is likely that soil/dust ingestion rates are highest during hand-to-mouth activities such as eating, which would more frequently occur indoors than outdoors. Moreover, increased activity should not be equated with increased ingestion. In fact they may be mutually exclusive. For example, a runner comes into contact with soils less frequently than hikers or other recreational receptors. The recreational exposures assessed for MFA include hiking, biking, bird watching, running, and golfing. These are not particularly soil-contact intensive activities, in comparison to sports such as football and soccer. The increase in dust inhalation has been accounted for by using a higher inhalation rate, but a change in the soil ingestion rate is not warranted. Therefore, the soil ingestion rate for a recreational receptor has not been changed for the HHRA for Sites 21, 22, and 23.

Comment 88: Page E-115, Table E-64. A reference should be cited for the values used to estimate lead in air and lead in water.

Response: *Concentrations of lead in air of 0.018 micrograms per cubic meter and in water of 15 micrograms per liter have been used in the draft final RI to calculate blood levels (DTSC 1993).*

RWQCB COMMENTS

GENERAL COMMENTS

Comment 1: Sites identified as the Weapons Storage Bunkers, Industrial Wastewater Flux Ponds, and the Potential Runway Wetland should be designated with Site Numbers.

Response: *Individual site numbers will not be assigned to the Station-wide sites. This decision has been made in order to standardize the Navy internal and external reports. This will allow all of the reports to refer to the same site names.*

Comment 2: Past environmental impact by Navy activities is to be considered a potential source of inorganic concentrations detected in groundwater samples above background levels.

Response: *Please refer to the response to DTSC specific comment 9. The evaluation of metals in groundwater presented in the final OU5 FS report (PRC 1995f) contains rationale supporting the levels of metals detection as naturally occurring.*

Comment 3: Please tabulate and reference all background and ambient inorganic constituent concentrations in soil and groundwater.

Response: *Appendix C contains the referenced data. Table C1 contains soil background levels and Table C2 contains groundwater background concentrations. Table C2 was reproduced from the draft final OU5 FS report and has been revised to reflect changes made to the presentation of this information for the final OU5 FS report (PRC 1995f).*

Comment 4: Revise document to state "ambient concentrations" when anthropogenic sources are included.

Response: *The text of the report has been revised to clarify background, naturally occurring, and ambient concentrations.*

Comment 5: The exclusion of metal data from this document because of the stated reason as to not confuse the reader is unacceptable. Please, present inorganic concentration data for soil and groundwater in such a way to clearly demonstrate the correlation to ambient conditions.

Response: *Spatial analyses of arsenic, antimony, and chromium have been conducted to evaluate metals concentrations in soils. The results are presented in Section 4.22 of the draft final SWRI report. The evaluation of metals in groundwater presented in the final OU5 FS report (PRC 1995f) contains the rationale supporting the statement that the distribution of inorganic constituents in groundwater is naturally occurring.*

Comment 6: Many descriptions of site activities stop at specific times and leave in question the activities up to the present. Please fill this data gap with information regarding any change in the type of activities performed at each site and how waste management practices changed. The question of continuing sources of potential contamination to groundwater and soil should be answered by the inclusion of this information.

Response: *Discussion of current activities has been added to Section 1.0 to provide a continuous record of activities. Data concerning changing waste management practices has been added to the extent possible.*

Comment 7: This document would appear to be greatly enhanced by the inclusion of a discussion and table of the following items; the clean up requirements as specified in the MEW ROD, the clean up requirements as specified in the petroleum CAP, and treatment goals for TPH impacted soils.

Response: *Text has been added to Section 1 describing cleanup requirements.*

Comment 8: Aquifer zones, model layers and channel deposit horizons need to be presented and clearly correlated in a cross-section conceptual model cartoon.

Response: *The A1 and A2 permeable zones have been marked on all cross-sections, as will the A/B aquitard and the B aquifer (for cross-sections that extend to these depths). Model layers apply only to the modeled area of OU5 and are clearly marked on 5 cross-sections presented in the OU5 feasibility study (PRC 199f5) and have not been added to the cross-sections. West-side channel zone maps will be revised this fall after PRC obtains field data from additional studies on the west side. These maps will not be ready in time for the draft final RI, but should be completed in time to include in the final.*

Comment 9: A conceptual model cartoon demonstrating the behavior of groundwater influenced by the pumping at building 191 and horizontal conduits, e.g., french drains, would be helpful in understanding the hydraulic controls on the groundwater movement in the northern area of MFA. The model should include a cross-section representation of the saltwater/freshwater interface with the actual depths of the aquifers and flow arrows depicting the interpreted groundwater behavior.

Response: *Figure 5-19 depicting inferred groundwater flow directions and the freshwater/saltwater interface in the vicinity of the Navy Channel has been added to the document.*

Comment 10: The cross sections do not provide adequate presentation of the soil horizons and the associated aquifers. Preferably each classification of soil should be represented by a distinct pattern with a legend to describe each unit. Additionally, every aquifer zone should be delineated with correlation to the channel zones. Potentiometric surfaces of every aquifer should be shown. The use of color would also greatly improve the quality of the cross sections.

Response: *The cross-sections are designed to provide a broad overview of the distribution of permeable sediments throughout MFA. The A1 and A2 permeable zones have been identified on all cross-sections, but inclusion of all of the requested information would render the cross-sections unreadable.*

Comment 11: Understanding the morphology of the sand channels would be significantly improved by the use of fence diagrams. Please consider including fence diagrams also as an overlapping check on the geology presented in the cross-sections.

Response: *Lithologic data points are generally too widely spaced to construct fence diagrams that would clearly delineate channel morphology in three dimensions.*

Comment 12: Please include a C aquifer potentiometric surface map.

Response: *A potentiometric surface map cannot be constructed for the C aquifer because of the low density of C aquifer monitoring wells.*

Comment 13: The Horizontal Conduit Study is not referenced in this report and should be included as a supporting document.

Response: *The conclusions of the horizontal conduit study have been added to Section 5.1.20 and referenced (PRC 1995e).*

Comment 14: Please include a map showing the horizontal conduits as identified in the Horizontal Conduit Study and those within OU5. Please insure incorporation of the french drains beneath the runways and the tunnel associated with Hangar One.

Response: *Two plates from the Horizontal Conduit Study have been added to Section 5. One depicts the sanitary sewer (Plate 5-1) and the other shows the storm sewer, french drains under the runways and the steam tunnel between Building 10 and Hangar 1 (Plate 5-2).*

No maps have been produced showing the locations of horizontal conduits in OU5. However, Appendix E of the OU5 feasibility study (PRC 1995f) states that the storm sewer extends south from the

Building 191 pump station, and the sanitary sewer extends south from the eastern side of Hangar 3 and along Marriage Road Ditch.

This information has been added to Section 5.1.20.

Comment 15: The results of the Solid Waste Assessment Test (SWAT) Volume 1 -- Report, NAS Moffett Field, California, Remedial Investigation/Feasibility Study (International Technology Corporation, March 1989) performed at Sites 1 and 2 should be incorporated into the text and included in document listing.

Response: *Results from the SWAT are included in the OU1 RI (IT 1993a) and FS (PRC 1994e). These two documents have been referenced and incorporated into the text of the station-wide RI as appropriate. Therefore, data from the SWAT will not be discussed specifically other than what is already included in Table 1-1. The SWAT has been added to the reference list.*

SPECIFIC COMMENTS

Comment 1: Page 1-1, Sec. 1.0, para.1. Include text to state "Formerly Naval Station Moffett Field."

Response: *This change has been made as requested.*

Comment 2: Page 1-1, Sec. 1.0, para. 3. State the number of appendices.

Response: *The number of appendices has been stated.*

Comment 3: Page 1-9, Sec. 1.2.4.1, para. 2, sen. 2. This sentence may appear to mean that groundwater is being used at MFA for agricultural purposes.

Response: *This sentence has been modified to indicate regional pumping occurred from the 1920s through the 1960s to minimize the potential appearance of current use.*

Comment 4: Page 1-5, Sec. 1.2.2.2, para. 1, sen. 1. Please verify this with the California Integrated Waste Management Board, as they may have files regarding operations at Site 1.

Response: *The California Integrated Waste Management Board files regarding Site 1 do not mention groundwater use. Therefore, no revision was necessary.*

Comment 5: Page 1-15, Sec. 1.2.4.5. Please revise the title of this section to agree with the subsequent text regarding the number of sumps.

Response: *The title of this section has been revised to eight sumps and one tank.*

Comment 6: Page 1-18, Sec. 1.2.4.4. The discussion regarding Hangar 1 should include the investigation status of the electrical utility vault and the subsurface tunnel connecting Hangar 1 to the steam plant.

Response: *There are no additional investigations planned in the area of Electrical Vault 5 and Tunnel 1. However, corrective action concerning contaminated water from the Hangar 1 and Electrical Vault 5 sumps is under construction. The contaminated groundwater will be pumped to the Building 45 component of the Site 9 Source Control Measure where it will be treated by air stripping and granulated activated carbon adsorption (PRC 1994a). Text to this effect has been added.*

Comment 7: Page 3-3, Sec. 3-4, para. 2. Please clarify the extent of the crevasse splay deposits. Does the geology indicate that the splay deposit area of a given horizon extended from the primary river or the secondary channels; or do the secondary channels and splay sediments indicate concurrent deposition? A conceptual model depicting the site and the nature of deposition would be helpful to delineate the lobate tongues of the splay deposits.

Response: *Figure 3-6 illustrates the sand channel locations on the east side of MFA, and Figures 3-2 through 3-5 show channels, splay deposits and floodplain deposits for the west side. Data on the east side is too sparse to accurately depict the*

splay deposits. However, plates 1-5, 1-6 and 1-7 in the OU5 FS (PRC 1995f) show the channel deposit lithology along with total sand thickness in each borehole. The borings with little or no sand represent floodplain deposits, and the splay deposits are represented by moderate amounts of sand. Section 4.4 of the Station-Wide RI is a general description of the geology at MFA, and such detail is not warranted. However, reference to Figures 3-2 through 3-6 and the OU5 FS has been added.

All of the channels that have been identified at MFA have been interpreted to be secondary channels, therefore, most of the crevasse splay sands were probably deposited by flood flows emanating from the secondary channels. Crevasse splay sands are generally considered to have been deposited concurrently with channel deposits during flood events; they represent concurrent deposition under a lower flow regime, adjacent to a channel.

Channel, crevasse splay, and floodplain depositional environments are discussed in detail in the geology and hydrogeology technical memorandum (PRC and JMM 1992a), which also presents a diagram that depicts a conceptual model of these depositional environments.

Comment 8: Page 3-3, Sec. 3-4, para. 2, sen. 4. Please, clarify if both the secondary channel and the splay deposits dissect the marsh environment or does either overlay the marsh. Improved cross sections allowing the discernment of secondary channel and splay deposits will help in this understanding.

Response: *Many of the sand channels were likely deposited by flood events capable of dissecting fine-grained floodplain deposits (including marsh deposits). It is less likely that crevasse splay deposits are deposited by flows capable of scouring a significant amount of fine-grained material. Thus, it is more likely that crevasse splay deposits overlay floodplain deposits. This has been clarified in the text.*

Crevasse splay and channel deposits are delineated on five east-side cross-sections that were included with the OU5 feasibility study (PRC 1995f).

Comment 9: Page 3-4, Sec. 3.5.1, para. 1, last sentence. Please, clarify if both the secondary channel and the splay deposits dissect the marsh environment or does either overlay the marsh. Improved cross sections allowing the discernment of secondary channel and splay deposits will help in this understanding.

Response: *Please see the response to RWQCB specific comment 8.*

Comment 10: Page 3-7, Sec. 3.5.3, para. 3, last sen.. Document the data used to determine the vertical groundwater gradient of the C aquifer.

Response: *A citation to the August 1994 quarterly report (PRC and MW 1995a) has been added.*

Comment 11: Page 3-7, Sec. 6. Please include a site map delineating the types of habitat occurring at MFA.

Response: *Appendix A of the Draft Final Phase I Station-Wide Ecological Assessment addresses the findings of the habitat and receptor characterization study performed by Western Ecological Service Company (WESCO) (WESCO 1993). The habitats at MFA can be characterized using two general descriptions (1) wetlands and aquatic, and (2) uplands. Figure 4 of the WESCO report displays the general locations of habitats on MFA. This figure has been added as Figure 3-10 in revisions to the Station-Wide RI report.*

Comment 12: Figures 3-2 through 3-5. Include the depths associated with each zone on each figure.

Response: *Depth ranges (below ground surface) have been added to each figure.*

Comment 13: Plates 3-2 and 3-5. Please verify the depicted geology beneath WU5-8. These cross sections do not correlate and require revision.

Response: *Borehole WU5-8 is represented only on Plate 3-5.*

Comment 14: Page 4-2, Sec. 4.1, para. 1. Incorporate the data presented in the March 1989 SWAT.

Response: *Please see the response to RWQCB general comment 15.*

Comment 15: Page 4-37, Sec. 4.10, para. 1, sen. 1. Delete sentence.

Response: *The sentence has been deleted as requested.*

Comment 16: Page 4-39, Sec. 4.10.1.1, para. 3. Include the vinyl chloride concentrations detected.

Response: *Vinyl chloride detections in OU5 groundwater are discussed in the last paragraph of Section 4.10.1.1.*

Comment 17: Page 4-96, Figure 4-1. Please delineate the landfill boundaries to clarify the locations of the wells presented on Figure 4-1.

Response: *The landfill boundary has been clarified on Figure 4-1.*

Comment 18: Page 5-2, Sec. 5.1.1, para. 2. The data presented in the March 1989 SWAT and OU1 FS should be incorporated to make conclusions regarding the presence of contamination in groundwater; please, revise.

Response: *Please see the response to RWQCB general comment 15.*

Comment 19: Page 5-11, Sec. 5.1.18, para. 4. Please address the migration pathway of TPH to surface waters in Guadalupe Slough by pipeline leakage.

Response: *Some fuel may have entered Guadalupe Slough due to pipeline leakage via overland flow. Section 5.1.18 and figure 5-17 have been modified to clarify this point.*

Comment 20: Page 5-23, Figure 5-1. Complete the pathway from leachate to groundwater.

Response: *Figure 5-1 has been modified to show that leachate infiltration to groundwater was a potential contaminant migration pathway investigated during the remedial investigation of the landfills.*

Comment 21: Page 5-39, Figure 5-17. Complete the pathway of TPH to surface water, Guadalupe Slough, by leakage.

Response: *Please see the response to RWQCB general comment 19.*

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