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Prepared For

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

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

March 13, 1996

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March 13, 1996

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CLEAN Contract Number N62474-88-D-5086 (CLEAN I)
Contract Task Order 0236

Subject: **Responses to Agency Comments on the Draft Final Station-wide Remedial Investigation Report, Moffett Federal Airfield**

Dear Messrs. Chao and Chan:

Enclosed are three copies of the above-referenced document. Additional copies are being forwarded to the regulatory agencies. These responses will provide a framework for discussion of changes needed to finalize the station-wide remedial investigation report.

If you have any questions, please call us at (303) 312-8816 (Ball) or (303) 312-8857 (Young).

Sincerely,

Theodore T. Ball, PhD.
Project Scientist

Theresa K. Lopez for
Michael N. Young
Project Manager

TEM/nas

Enclosure

cc: Mr. Michael Gill, EPA
Mr. Joseph Chou, DTSC
Mr. Michael Wade, DTSC
Mr. Michael Bessette, RWQCB

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ACRONYMS AND ABBREVIATIONS

AS	Air sparging
AVGAS	Aviation gasoline
CAP	Corrective action plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemical of concern
COPC	Constituent of potential concern
CRQL	Contract required quantitation limit
cm^2	Square centimeters
days/yr	Days per year
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
FS	Feasibility study
GIS	Geographical Information System
HHRA	Human health risk assessment
HQ	Hazard quotient
IT	International Technology Corporation
LUFT	Leaking Underground Fuel Tank
MCL	Maximum contaminant level
$\mu g/g$	Micrograms per gram
MEW	Middlefield-Ellis-Whisman
mg/kg	Milligrams per kilogram
mg/cm^2	Milligrams per square centimeter
MFA	Moffett Federal Airfield
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	Operable unit
PCB	Polychlorinated biphenyl
PDF	Probability density function
PPM	Parts per million
PRC	PRC Environmental Management, Inc.
PRG	Preliminary remediation goal
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
RME	Reasonable maximum exposure
ROD	Record of decision
RWQCB	Regional Water Quality Control Board
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
SWEA	Station-wide ecological assessment

ACRONYMS AND ABBREVIATIONS (Continued)

TDS	Total dissolved solids
TPH	Total petroleum hydrocarbons
UCL	Upper confidence limit
USGS	U.S. Geological Survey
VOC	Volatile organic compound

NAVY RESPONSES TO AGENCY COMMENTS ON THE DRAFT FINAL STATION-WIDE REMEDIAL INVESTIGATION REPORT MOFFETT FEDERAL AIRFIELD, CALIFORNIA

This document presents the Navy's responses to the U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (RWQCB) comments on the November 17, 1995 draft final station-wide remedial investigation (RI) report for Moffett Federal Airfield (MFA), California. The comments were received in letters from EPA and from DTSC and RWQCB dated December 21, 1995 and January 24, 1996, respectively.

RESPONSES TO COMMENTS FROM EPA

General Comments

Comment 1: The work done to produce the area risk maps and point risk (sample by sample) maps appears practically complete. It is obvious that a lot of effort went into this task. It now provides the regulators with the tools necessary to see what cumulative effects to human health risks may be occurring from site contamination.

Unfortunately, these results came at higher than necessary cost. At various scoping meetings, the agencies had communicated a preference for a single map with overlays as was done at Sacramento Army Depot, to represent the cumulative site wide risk. The Navy argued for cumulative risk to be presented using area risk calculations, partially based on the fact that the method was less costly and more expedient. Based on the amount of work presented in this Draft Final version of the RI, these arguments appear questionable. It is obvious that there was a tremendous amount of effort (time and funding) that went into the area risk calculations (Appendix F) and maps (Section 6). We believe more money than necessary was expended to produce the cumulative risk assessment in this document. It presents results that could have been achieved with point risk maps. If contours had been provided on the point risk maps, as had been requested by the agencies (as early as a September 23, 1994 meeting), we believe the area risk maps would not have been necessary. With a few exceptions, they have provided results very similar to the point risk maps.

The various schemes by which base-wide maps were constructed tends to obfuscate the location and extent of contamination as well as how best to address any cleanup. The purpose of producing these maps was to present clearly and concisely an overall picture of the environmental information collected at the base in order to communicate to the public and regulatory agencies the progress of the base cleanup. This goal was unfortunately not achieved. However, once one understands the selection of data for each map, there appears to be sufficient information to reach constructive remedial decisions. Therefore, in the interest of conserving valuable resources, no further major reworking of the mapping scheme is proposed. The Navy should include a caveat in the document to anyone who may use the maps in the future that one must study all the maps carefully in order for one to piece together the whole picture. Although the Navy did not produce a single map or contoured point risk maps, we believe the same results can be achieved by interpreting the submitted maps and accompanying text.

Response: *The comment is noted. The Navy did not state that the exposure area approach was less costly or more expedient. The Navy believes that it is the correct approach and is the methodology that follows risk assessment guidance which states that the "area over which the activity is expected to occur" should be considered when averaging concentrations used in the calculation of chemical intakes (EPA 1989c). Further, EPA guidance (1994c) states: "After the conceptual site model has been developed, the next step is to collect a representative sample set for each exposure area. An exposure area is defined as that geographic area in which an individual may be exposed to contamination over time." The agencies stated that the sample-by-sample approach was less costly and more expedient. During the interagency meeting of February 23, 1995, it was agreed that the sample-by-sample maps would not be contoured. However, in the exposure area approach, acetate overlays of risks associated with groundwater and soil exposures would be provided.*

Comment 2: The differences in methodologies used to calculate area risks (e.g. dermal absorption factors) tend to bias the point risk calculations on the high side. Some differences in the two methods were larger than would be expected. While some of these differences need to be reconciled, we believe we have enough information to proceed with the RI/FS process.

Response: *The comment is noted. The sample-by-sample risk estimates differ from the exposure area risk estimates because the sample-by-sample methodology varied from EPA guidance (1989c) regarding; background comparison data aggregation (in approximately 20 out of 200 exposure areas), and dermal exposure assumptions. The differences in the methodologies requested by the agencies caused the differences between results of the exposure area approach. The exposure area approach closely followed EPA guidance (1989c) resulting in more conservative estimates for the dermal exposure pathway. Dermal exposure to chemicals of concern (COCs) was assessed in the following manner:*

Exposure area risk estimates: Dermal adherence factor of 0.2 milligrams per square centimeter (mg/cm^2) (EPA 1995b) and dermal absorption factors from DTSC were used to assess exposure to soil. Oral toxicity values were adjusted for gastrointestinal absorption as required by EPA guidance (1989a). The following values were used for exposed surface area: residential, 5,000 square centimeters (cm^2) (EPA 1995a); occupational 3,200 cm^2 (EPA 1989a); and recreational, 5,000 cm^2 (EPA 1992).

Sample-by-sample risk estimates: Dermal adherence factor of 1.0 mg/cm^2 and dermal absorption factors from DTSC were used to assess exposure to soil. 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 not in accordance with EPA guidance (1989a). Exposed surface area was assumed to be 5,800 cm^2 for all receptors; this is the value recommended by DTSC for adult receptors (DTSC 1994).

Other differences noted between the two approaches were due to some chemicals (notably, arsenic and chromium) being incorrectly included on the sample-by-sample maps. This has been corrected and revised maps have been submitted to the agencies.

Comment 3: A one-half acre exposure area was used for both occupational and residential scenarios in this cumulative risk assessment. This was acceptable to EPA because the Navy agreed to submit point risk maps along with area risk maps. EPA still maintains that either the Navy could have satisfied the requirements by submitting the point risk maps alone or by using a more realistic area size for a residential lot in the area risk maps. Most residents of Santa Clara County do not have one-half acre lots. The

majority of the residential lots are on the order of 8,000 square feet. With that said, we would caution the Navy in assuming that a one-half acre lot can be used for any other Navy site. As stated in our correspondence of October 31, 1995, cumulative risk assessments should use an area size that is representative of a typical lot size for the county in which the base resides.

Response: *A review of minimum Santa Clara County lot sizes indicates that lot sizes may range from 5,000 square feet to 160 acres (County of Santa Clara, Environmental Resources Agency Planning Office 1995). One-half acre may not be representative of average residential lot sizes in the cities of Mountain View and Sunnyvale; however, it must be emphasized that an exposure area may not necessarily be equivalent to lot size. EPA guidance (1994c) defines an exposure area as "that geographic area in which an individual may be exposed to contamination over time." Therefore, the text will be modified to state that the 1/2-acre area is a reasonable approximation of a residential exposure area (EPA 1994c) and may not be equivalent to an average residential lot size in Mountain View or Sunnyvale. Further, as agreed in the February 23, 1996 meeting, a statement will be added to clarify that a smaller exposure area does not appreciably alter the results or provide any additional information regarding site-related risks.*

Regarding Responses to Draft Comments

Comment 4: Comment 1. No differences were shown for before/after soil remediation on the soil maps because the authors say this would be misleading to indicate any remediation, when it's not yet chosen. While this argument does makes some sense, we believe this should be made clear on the maps, too.

Response: *The maps show remedial actions which have occurred, have been agreed upon, or are anticipated. A footnote has been added to the maps.*

Comment 5: Comment 5. The paragraph in the response does not appear to have been added to Section 1.2.4.5. Please add it.

Response: *The referenced paragraph was left out of the draft final RI report in error. The following paragraph has been added to page 1-16 of the final RI report as requested:*

> *Although the Navy has not identified a source of VOC [volatile organic compound] contamination to the groundwater at Building 31, the area will be observed during the long-term remediation of the west-wide aquifers. The Navy will conduct additional investigations as appropriate if sources of VOC contamination are identified in the area.*

Comment 6: Comment 9. Table 1-5 does not appear to be any more comprehensive in the draft final version than the draft version, as stated in the response.

Response: *Table 1-5 (Petroleum Sites Document Listing and Synopsis) was mistakenly not updated in the draft final RI report. It has been updated in the final version.*

Comment 7: Comment 12. This comment should also have addressed the potential VOC contamination in the same way that Comment 5 should have addressed it.

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

Comment 8: Comment 13. If providing a reference on the determination of lead found in AVGAS is out of context with this paragraph, at least provide a reference with this information in your response to comments.

Response: *A reference for the concentration of lead specific to aviation gasoline (AVGAS) is not readily available. However, it is reasonable to believe that concentrations of lead in AVGAS are similar to those in gasoline for automobiles. According to the State of California Leaking Underground Fuel Tank (LUFT) Field Manual (State of California LUFT Task Force 1989), the lead content of gasoline ranges from 530 to 1,120 micrograms per gram (μg/g).*

Comment 9: Comment 26. Same as draft comments 5 and 12 above.

Response: *The following text has been added to the end of the first paragraph of Section 2.3.3.4:*

> *No sources of VOC contamination have been identified in the Building 31 area. However, the area will be monitored during the long-term remediation of the west-side aquifers.*

Comment 10: Comment 58. Reference to the Petroleum CAP does not seem to have been added.

Response: *The petroleum sites corrective action plan (CAP) was mistakenly omitted from Figure 4-40 in the draft final station-wide RI report. This reference has been added to the referenced figure in the final version.*

Comment 11: Comment 75. The text revision does not seem to have been made.

Response: *This was an oversight. The text has been revised to state, "These ponds were taken out of service in January 1994 and will be remediated."*

Comment 12: Comments 76, 77 (also applies to Appendix E). Based on procedure, frequency of detection as a screen is not required at Moffett Field and was not necessary to focus this investigation. Its use can filter out the detection of a high concentration, i.e., possible hot spots, within a given site. When applied here, it does not affect the final outcome because you have provided a sample by sample evaluation. Although no changes to the document regarding the use of frequency of detection as a screening criteria and/or PRGs are necessary, we believe that by using PRGs (a concentration-toxicity screen), the Navy and the agencies could have reached a conclusion faster and cheaper than was done using the area risk method.

Response: *The comment is noted. However, the frequency of detection criterion was used in previous RIs, the human health risk assessment (HHRA) for Sites 21, 22, and 23, and the station-wide HHRA 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. In the exposure area HHRA, this criterion could be used at only one area because the sampling density within the exposure areas did not approach 20 samples (the minimum number of samples needed*

for this criterion to be used). The text identifies the chemicals eliminated as COCs using this criterion during the HHRA for sites 21, 22, and 23. The data summary tables list the maximum concentration of each chemical. A review of these concentrations indicated that no hot spot was missed using the 5 percent frequency of detection criterion.

Comment 13: Comment 83. The sample-by-sample calculations appear to be consistent in that the stated methodology was mathematically applied. However, this methodology is different from that which was used in the area estimates and different from the Region 9 PRGs and biases high the outcome (especially for those chemicals where dermal exposures contribute significantly to the risk), thus confusing the conclusions of both analyses to such an extent that one cannot be used to check the results of the other. Although there are differences, both methods can be used qualitatively to reach conclusions on areas that warrant remediation. In the interest of conserving resources, no further work is recommended.

Response: *Please use the response to EPA comment 2.*

Comment 14. Comment 87. Based on the cited guidance, EPA would not have paid for Monte Carlo uncertainty estimates to be calculated at this site. It is not EPA's request that the Monte Carlo analysis be removed from the document, because it would be a costly task with little benefit; it has no bearing on any decisions. The funding has already been spent. But we still believe it was unnecessary work. In addition, there are some inconsistent variations in the distribution functions which would have the effect of lowering the 95 percentile in relation to the RME calculations. As stated previously, since this is an unnecessary analysis for this site, no further attempt should be made to reconcile the differences.

Response: *This comment is noted. However, when following EPA (1989a) risk assessment guidance, human health risks are estimated as single-point estimates based on either the reasonable maximum exposure (RME) or the average exposure. Stakeholders who are not familiar with risk assessment methodology commonly focus on the upper-bound single-point risk estimates and disregard the underlying assumptions used to estimate risk and the uncertainty associated with the risk estimate.*

EPA has developed its risk assessment guidance to be "protective, rather than best, estimates of risk" (EPA 1992, 1994a, and 1994b). In most HHRAs, including all of the HHRAs conducted for Moffett Federal Airfield (MFA), risk assessment assumptions were selected to be protective and may not accurately predict site risk under actual exposure conditions. Recent EPA guidance (1995a) addresses the problems associated with point estimate risk assessments. It states:

> *Often when risk assessment information is presented to the ultimate decision-maker and the public, the results have been boiled down to a point estimate of risk. Such "short-hand" approaches to risk assessment do not fully convey the range of information considered and used in developing the assessment.*

The guidance also discusses the problems associated with characterizing risk and making risk management decisions based on point estimates. It concludes that multiple risk descriptors should be used in all HHRAs as one method to circumvent the problems associated with the point estimate methodology. EPA recommends (EPA 1995a) the Monte Carlo simulation as one approach to quantitatively evaluate the uncertainty underlying the RME and average estimates.

For the aforementioned reasons, the estimated RME risk is typically much higher than the 95 percent upper confidence limit (95 UCL), which is EPA's target risk level for the RME. Compounding conservatism in the risk evaluation typically results in risks as high as the 99 percentile. The Monte Carlo simulation is a powerful tool to quantify uncertainty. In addition, recent guidance from EPA (1995a) on risk characterization states:

> *First, the characterization should address qualitative and quantitative features of the assessment. Second, it should identify important strengths and uncertainties in the assessment as part of a discussion on the confidence in the assessment. This emphasis on a full description of all elements of the assessment draws attention to the importance of the qualitative, as well as the quantitative, dimensions of the assessment.*

As emphasized in the guidance, it is important to present a "full picture of risk, particularly including a statement of confidence in the assessment and the associated uncertainties." Monte Carlo simulations provide these descriptions in a quantitative manner, as the guidance describes (EPA 1995a).

Furthermore, DTSC (1993) states that "Uncertainty and variability in the movement of the chemical in the environment as well as the nature of the potential human exposures mean that the risk is more accurately characterized by a range or distribution." DTSC also emphasizes that remedy selection should not be based on risks with unknown certainty, stating "One often used method for addressing uncertainty in risk assessments is the compounding of upper bound estimates in order to make decisions based on a highly conservative estimate of exposure and risk. Such an approach is contrary to the principles of decision making under uncertainty."

For these reasons, Monte Carlo simulations were conducted in the MFA station-wide HHRA according to guidance from EPA Regions 3 and 8, using exposure parameter probability density functions (PDFs) from sources suggested by this guidance. However, when sufficient statistical information was unavailable for a exposure parameter and a PDF could not be determined, the standard default value suggested by EPA guidance (1993b) was used as the exposure parameter value.

Specific Comments

Comment 15. Executive Summary. Please include a brief mention of sample by sample (point) risk analysis here.

Response: *A synopsis of the sample-by-sample (point) risk analysis results has been included in the Executive Summary.*

Comment 16. Section 4.22, Spatial Analyses of Metals. The maps seem to make sense; it appears that there are no horizontal or vertical trends in the distributions of arsenic, antimony or chromium, except for outfall areas. We agree with the statement (page 4-96, Interpretations) "...increased metals concentrations in surface water outfall areas such as the storm water retention ponds and the Northern Channel are expected due to the nature of the materials composing the samples from these locations." This fact will be very important in any future decisions made regarding remedial actions. It is clear that clay sediments concentrated at the outfall areas cause more contaminants (and metals) to be sorbed and therefore accumulated at concentrations greater than health protective levels.

Response: *The comment is noted. Thank you for the acknowledgement.*

Comment 17. Section 4.13.2.1, page 4-62. Please include the latest version of the EPA Region 9 PRGs in an appendix.

Response: *The latest version of the EPA Region 9 preliminary remediation goals (PRGs) has been added as Appendix J of the final station-wide RI report. A reference to Appendix J has also been added to the text of Section 4.13.2.1.*

Comment 18. Section 5.1.18, page 5-11, also Section 5.1.20. As of this date, the Horizontal Conduit Study is still not finalized, due to ongoing discussions with the Navy. Please reference the draft final version of this document to avoid any possible misunderstandings.

Response: *The draft final horizontal conduit study will be referenced in the final station-wide RI report.*

Comment 19. Section 6.6.1.1, page 6-92. Plate 6-7 indicates a groundwater risk greater than 10^{-4} in the Site 2 (landfill) area, from vinyl chloride in groundwater. Plate 6-9, an after-remediation snapshot, shows that this risk will be diminished to between 10^{-5} and 10^{-4}. How can this be so when no groundwater treatment has been proposed for the Site 2 area (capping only for the landfill; no groundwater remediation in the OU5 northern groundwater plume due to high total dissolved solids [TDS])? Also, response to comment 1 states that the only "risk reduction" demonstrated in these maps is groundwater treatment; no soil treatment is considered. What action will cause the risk at this site to decrease?

Response: *Groundwater at the landfill area is not potable due to high levels of TDS, therefore this plume was removed from plates 6-9 and 6-10. Only those groundwater areas with potentially complete exposure pathways will be shown. However, for completeness, the plume has been included in Figures 6-8 and 6-9. Groundwater risk at the Site 2 landfill area is therefore not present.*

Comment 20. Section 6.6.1.1, page 6-93, para 1. Does the Navy plan on submitting an "after remediation" plot for an occupational scenario soils carcinogenic risk? The first sentence here would indicate that it is forthcoming. Same comment applies to Section 6.6.1.2, page 6-95, last paragraph (non-carcinogenic risks).

Response: The Navy will present maps showing the effects of planned remediation on risks or hazard indices associated with occupational exposures. As stated in the cited paragraphs, planned remediation of the landfills (capping) will reduce risk. This is because exposure pathways will no longer be complete. Figures depicting the effect of landfill capping on occupational exposures will be included.

Comment 21. Section 6.7, page 100. The paragraph on sample risk appears out of place. Is this an editing oversight?

Response: Yes. This paragraph has been revised.

Comment 22. Section 6. Was the recreational scenario data for OU6 taken directly from the OU6 RI (yet to be finalized)?

Response: Yes. The recreational receptor-specific information was taken directly from the operable unit (OU) 6 RI so that the station-wide RI would be consistent with previously submitted site-specific RIs. One difference, however, is that arsenic, chromium, beryllium, and antimony were not considered COCs for OU6 in the station-wide RI.

Comment 23. Section 6. According to your letter of 11/6/95, you agreed to produce a map illustrating before and after remediation risks. We could not find the maps showing the after remediation area risks for the industrial or recreational scenarios. Were they produced and not included in our copy of the document?

Response: Please see the response to EPA comment 20. Maps illustrating residual risks for occupational and recreational receptors were not included in the draft final station-wide RI report. They were included for residential receptors.

Comment 24. Figures 6-3, 6-4, 6-5. Why were half-acre areas not used for these risk maps?

Response: *In the exposure area risk assessment, an exposure area of one-half acre was used for both residential and occupational exposures to soil and sediment. However, this exposure area size is not representative of recreational exposure to soil and sediment at OU6 and the golf course area (Figure 6-3). Based on potential recreational activities, contact (exposure) could occur over the entire area. Therefore, recreational risk and hazard estimates are presented for each site, rather than one-half acre exposure areas.*

In addition, surface water risk and hazard estimates for occupational and recreational receptors (Figures 6-4 and 6-5, respectively) are presented for each surface water body. Assuming that COC concentrations are in equilibrium throughout the surface water body, exposures would be comparable regardless of the area or point of contact.

Comment 25. Table 6-29 (Draft), Summary of RME Cancer Risks and Hazard Indices Associated with Exposure to Groundwater. This table was helpful. Why was it removed from the draft final version? Also, there is no table outlining RME cancer risks or hazard indices for groundwater using the area risk method (as in the draft). Please include these tables.

Response: *Table 6-29 (Draft), Summary of RME Cancer Risks and Hazard Indices Associated with Exposure to Groundwater, was removed from Section 6.0 because it summarized the point risk associated with each groundwater monitoring well. In the exposure area approach, chemical concentrations in each plume, rather than in specific monitoring wells, were used to calculate groundwater RME risk and hazard estimates for residential receptors. This was done so that the effects of planned groundwater remediation could be shown. Since the plumes do not exist at every site, the table would not have provided much information. Groundwater maps presenting the plumes and associated risk and hazard estimates have been included in the final RI report. However, at EPA's request, this table will be included in Appendix H of the final RI report, for receptor contact with groundwater.*

Comment 26. Tables 6-34, 6-35. The EPA RME risks listed for beryllium in both tables (containing risks of background inorganics) appear incorrect. These risks were both greater than 10^{-4} in the OU2-East soils (see OU2-East Record of Decision), although all parties agree that they are background levels. These and any other errors need correction. How were these numbers generated?

Response: *Tables 6-34 and 6-35 present background risks and hazards for the residential and occupational scenarios, respectively. The background risks and hazards were calculated using (1) the background data presented by International Technology Corporation (IT) in the OU2 RI report and (2) exposure algorithms presented in Section 6.0. The data used are presented in Table 6-1. Tables 6-34 and 6-35 have been modified to identify the origin of the data used in the risk and hazard calculations.*

Comment 27. Appendix G. A brief interpretation of this analysis needs to be presented to address potential problems from lead on site. A map showing the locations of lead exceeding 400 ppm (from Table 6-31) is one possible way of illustrating potential problems.

Response: *Appendix G contains the lead exposure model spreadsheet results for all soil and sediment sampling locations with lead concentrations in excess of 130 milligrams per kilogram (mg/kg) in the 0- to 2-foot interval. In addition, Table 6-31 Section 6.0 lists all sampling locations included in this appendix, and corresponding lead concentrations. Additional narrative will be provided in Appendix G explaining the lead exposure model results for soil and sediment in the 0- to 2-foot depth interval. Based on the results presented in Table 6-35, lead is not anticipated to be a concern for the site-wide cleanup.*

Comment 28. Appendix H, page H-8, bottom. The proposed soil/sediment remediation obviously does not include outfalls. Why? Is it because the Navy considers it too premature to estimate cleanup levels in these areas? If this is true, EPA would suggest that the maps be marked to reflect this idea. Otherwise, it gives the public the idea that no remediation will be done.

Response: *Please see the response to EPA comment 20. Additional narrative will be provided discussing the effects of planned remediation (that is, capping landfill areas and remediating groundwater to maximum contaminant levels [MCLs]) on site-wide risks. In addition, a statement will be added to clarify that remedial actions that have not been agreed upon were not included in maps presenting risks or hazard indices after remediation.*

Comment 29. Appendix H, Section H.5. This "Uncertainties Section" seems to deal with general risk assessment and not the uncertainties of the point risk method. It seems out of place. We suggest that paragraphs 2 (page H-9) and 3 (page H-10) be removed.

Response: *Paragraphs 2 and 3 of the Uncertainties section in Appendix H focus on the compounding conservatism associated with the point risk approach. Additionally, the use of multiple risk descriptors, such as the Monte Carlo simulation, is a suggested method of quantitatively evaluating the uncertainty surrounding point risk estimates. The Navy believes that the discussion is relevant not only to general risk assessment, but also to the point estimate approach and prefers to leave the text in the final RI report.*

Comment 30. When creating the maps (area risk and point risk), the only difference was supposed to be the exposure point concentrations. Most maps showed risks which were close in value when comparing the same area of the site for the same scenario. However, some discrepancies were found. These differences were generally limited to distinct areas per scenario. These areas are outlined below and the discrepancies should be addressed.

a. Residential/Carcinogenic/Soil-Groundwater. (Figure H-1 and Plate 6-7). The areas of difference on these maps were Site 4 and the Lindbergh Ave. ditch.

b. Residential/Non-Carcinogenic/Soil-Groundwater. (Figure H-2 and Plate 6-8). Comparing these two plots show great differences. No appreciable hazard quotients (HQs) appear on the east side or the Lindbergh Ave. ditch areas of the point risk map, yet on the area risk map, they do show up.

c. Occupational/Carcinogenic/Soil. (Figure H-5 and Plate 6-5). The areas of difference are parts of Lindbergh Ave. ditch, on the circle near the National Aeronautics and Space Administration (NASA) property (area 3782), and south of Site 12 (area 2516).

d. Occupational/Non-Carcinogenic/Soil. (Figure H-6 and Plate 6-6). The areas of difference are north of Hangar 3, south of Hangar 2, the eastern side of the Site 22 landfill (in the ditch), north of Site 1 in the pond, and on the northern end of the circle near the NASA property area 3782).

Response: *The discrepancies found between residential sample-by-sample and residential exposure area maps have been corrected and will be submitted in the final document.*

Comment 31. Many Section 4 figures were completely redone. It is unclear why this was done. The draft version's figures were generally sufficient. This additional work was an unnecessary cost, especially in light of the schedule problems caused by the amount of work required to simply respond to the agencies' comments on the draft.

Response: *Many of the figures in Section 4.0 were redrawn to promote consistency among these figures. The overall goal in revising the figures was to make the report easier to understand. The Navy believes that the increased clarity of Section 4.0 justifies the cost to revise the figures.*

Comment 32. Why wasn't Section 6's text, the section with the most changes, highlighted like the other sections? This made it more difficult to review the Draft Final for differences.

Response: *The comment is noted. Since Section 6.0 was completely reorganized, the entire section would have been redlined to reflect the changes.*

Comment 33. Response to Comment 79. The response says the exposure duration is 250 days/yr, but we believe you mean 350 days/yr. Was 350 days/yr used in the risk calculation?

Response: *The response to comment 79 should have stated that residential receptors would be exposed to soil for 350 days per year (days/yr), rather than 250 days/yr. An exposure frequency of 350 days/yr was used in the intake calculations for residential receptors.*

Comment 34. Section 4.10.1.1, page 4-38, last paragraph. It seems that the beginning of the first sentence should say Figure 3-5, not Figure 3-6.

Response: *This typographical error has been corrected as suggested.*

Comment 35. Table 6-2, page 6-115. The reason for eliminating the ingestion of fish and seafood exposure pathway contains the phrase "the bay is not part of the base." Please remove this irrelevant statement. The bay surface waters are connected to the base surface waters through sloughs and channels.

Response: *The comment is noted. The phrase "the bay is not part of the base" has been removed from Table 6-2.*

Comment 36. Appendix E, Section E.6.1, page E-35, paragraph 2. The last two sentences need to be corrected to reflect that this is the Draft Final version of this document.

Response: *The last two sentences have been removed from the text.*

RESPONSES TO COMMENTS FROM DTSC AND RWQCB

General Comments

Comment 1. Appendix E, Sites 21-23: The document requires revision. It might become acceptable upon adequate responses to our specific comments below. In particular, the treatment of background soil concentrations is not adequate.

Response: *The comment is noted.*

Comment 2. Appendix H, Basewide Risk Assessment: The basewide risk assessment is unacceptable as presented. Major changes are required. The material in Appendix H should be presented as a chapter in the main text immediately following Chapter 6. The assessment fails to quantify or depict risks which

overlap between or among operable units and the Navy provides virtually no interpretation of the station-wide assessment. Large areas of known contamination have been ignored. These and other specific comments are detailed below.

Response: *The comment is noted. A discussion of the sample-by-sample methodology results has been added to Section 6.0. However, the sample-by-sample methodology, text, maps, and tables remain in Appendix H. As outlined in the letter from EPA to the Navy (dated October 31, 1995) and discussed at the interagency meeting on February 23, 1996, the placement of the sample-by-sample risk analysis in an appendix is sufficient.*

Also, the risk assessment presented in Section 6.0 does provide risk estimates for the sum of groundwater and soil exposures. OUs were not separated in the station-wide risk assessment.

Comment 3. Consensus: It seems clear that the Navy and DTSC do not agree on what constitutes an adequate method for quantifying and depicting risks and hazards across operable units (OUs). DTSC recommends that risk assessors from the Navy and regulatory agencies meet and reach agreement on such a method.

Response: *The comment is noted. DTSC, EPA Region 9, and the Navy met on February 23, 1996, to discuss the issues of exposure area size and summation of risks across OUs. It was agreed that although the plates included in Section 6 of the RI do present risks (and hazard indices) summed for soil and groundwater exposure, this would be more clearly depicted by using acetate overlays for each medium investigated. Furthermore, exposure area size need not be changed, but additional discussion of the effect of a smaller area will be added.*

Specific Comments

Comment 1. West-Side Aquifer, p. ES-2: It is stated that "the Navy is controlling contaminants in groundwater from Navy sources in conjunction with the MEW groundwater

remediation program from the regional VOC plume in the west side aquifer." However, it is still not clear why the potential human health risk from the west-side aquifer (and petroleum sites) were not included in the station wide risk assessment.

Response: *EPA determined that aquifers on the west side of MFA are subject to the Middlefield-Ellis-Whisman (MEW) Record of Decision (ROD) (EPA 1989b). The MEW ROD presents a risk evaluation for the west-side aquifers, therefore, no HHRA for the west-side aquifers was done for the station-wide RI. This is briefly explained in Section 1.2.4, page 1-8 of the draft final RI report. However, the following text has been added to the Executive Summary, page ES-2 for clarification:*

> *A risk summary for the west-side aquifers is presented in the MEW ROD. Therefore, the west-side aquifers were not included in the human health risk assessment (HHRA) of the station-wide remedial investigation (RI).*

The western MFA areas which are subject to the MEW ROD have been noted on the appropriate figures in Section 6.0.

Section 1.2.4, page 1-8 also explains that (1) contamination from petroleum and petroleum constituents are excluded from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), (2) such constituents are covered under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and (3) petroleum sites are addressed in a manner consistent with the Resource Conservation and Recovery Act (RCRA). The following text has been added to the first paragraph under the Petroleum Sites heading, page ES-6 for clarification:

> *Petroleum sites at MFA are being addressed in a manner consistent with the Resource Conservation and Recovery Act (RCRA) and are not subject to regulations of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Therefore, petroleum contamination is not included in the HHRA.*

Comment 2. <u>Petroleum Sites, page ES-6.</u> Please explain how the soil vapor extraction (SVE) and air sparging (AS) system will be coordinated with Site 9 source control measure activities.

Response: *The third paragraph under the Petroleum Sites heading on page ES-6 has been revised as follows:*

> *Site 9 is the old fuel farm located on 11 acres in the western portion of MFA. Soils and groundwater were contaminated with fuels from leaking pipes and USTs. Chlorinated VOCs from the regional plume are also present in groundwater. A pump-and-treat system has been installed in this area as part of the MEW groundwater remediation program. In addition, a soil vapor extraction and air sparging system is being designed for remediation of petroleum contamination in soils and groundwater. Air sparging is the injection of air into the saturated zone to promote volatilization and biogradation of contaminants in the soil.*

In addition, the following text has been added to the second paragraph under the Site 9 heading on page 1-16, and the Site 9 Source Control Measure Final Design Report (PRC 1992) will be referenced.

In addition, a pump-and-treat system has been installed at Site 9. (PRC 1992).

Comment 3. Human Health Risk Assessment (HHRA), p. ES-10: A summary of "sample-by-sample" method should be included in this section.

Response: *A brief description of the sample-by-sample methodology has been included in the Executive Summary.*

Comment 4. Commingled Plume, Sec. 1.2.4, p. 1-8 and Sec. 6.2.1, p. 6-4: Please clarify if the commingled petroleum contamination in underground Tanks 2 and 43 area were not included in the station wide risk assessment.

Response: *Petroleum contaminants were addressed in the area of former underground Tanks 2 and 43.*

Comment 5. Spatial Analyses of Metals in Soil and Sediment, Sec. 4.22, p. 4-94 to 4-97:

a. Please clarify what are the criteria to select the soil and sediment samples used in the spatial analyses.

b. Figures 4-49 through 4-54 provide concentration ranges of arsenic, antimony, and chromium which is useful to observe the spatial distribution of those inorganics. However, in lack of summary tables or the histograms as presented in Appendix A of the OU5 FS, it is still very difficult to review this section.

c. Please explain whether the elevated metal concentrations are evenly distributed in the stormwater retention ponds and the Northern Channel.

Response

a. All soil and sediment samples with detections were used in the data set for the spatial analysis with the following exceptions:

Samples collected from soil that was subsequently excavated and disposed of off site (for example, from a tank removal or soil remedial measure) were excluded because these soils were most likely to be contaminated by facility operations.

Samples analyzed by Eureka Laboratories, Inc. were excluded because the integrity of these data is questionable.

Sample results qualified as "R" or rejected by the data validators were excluded.

b. A summary table and histograms depicting the distribution of arsenic, antimony, and chromium detections have been added to Appendix I.

c. Relatively higher concentrations of arsenic and antimony were measured in sediment samples collected from the storm water retention ponds. Similarly, relatively higher concentrations of chromium were detected in sediment samples from the Northern Channel. However, increased metals concentrations in surface water outfall areas such as the storm water retention ponds and the Northern Channel are expected due to the nature of the materials composing the samples from these locations. Outfall areas, more than any others across the facility, have increased amounts of fine-grained,

clay-sized sediments which preferentially sorb metals. Antimony and arsenic concentrations in sediment samples from the storm water retention ponds do not indicate any trends. Likewise, chromium concentrations in sediment samples from the Northern Channel do not show any consistent pattern.

Comment 6. HHRA for Sites 21, 22, and 23, Sec. 6.0, p. 6-1: In the second paragraph of Section 6.0, it is stated that the HHRA for Site 21, 22, and 23 is presented in Appendix E. On the contrary, the Navy's response to DTSC's specific comment 3 on the Draft SWRI report mentioning that "Screening investigations have found no contamination and there is no reason for a risk assessment". Please explain the inconsistency between these two statements.

Response: *The Navy's response to DTSC specific comment 3 on the draft station-wide RI report referred to three newly designated sites: weapons storage bunkers, industrial wastewater flux ponds, and a potential runway wetland. Screening investigations conducted at these sites indicated no contamination was present, and therefore, no HHRAs were necessary. Sites 21, 22, and 23 consist of the Patrol Road ditch, golf course landfill 2, and golf course landfill 3, respectively. HHRAs for Sites 21, 22, and 23 are presented in Appendix E.*

Comment 7. Lot Size, Sec. 6.3.2, p. 6-19: It is correct that a standard single family house lot size is 50' x 100' (5,000 square feet) in City Mountain View or Sunnyvale. However, it is not conservative or appropriate to use one-half acre (21,780 square feet) as an average lot size for exposure area scenario.

Response: *A review of minimum Santa Clara County lot sizes indicates that lot sizes may range from 5,000 square feet to 160 acres (County of Santa Clara, Environmental Resources Agency Planning Office 1995). One-half acre may not be representative of average residential lot sizes in the cities of Mountain View and Sunnyvale; however, it must be emphasized that an exposure area may not necessarily be equivalent to lot size. EPA guidance (1994c) defines an exposure area as "that geographic area in which an individual may be exposed to contamination over time." Therefore, the text has been modified to state that the one-half acre area is representative of a potential residential exposure area and may not be equivalent to an average residential lot size. DTSC's*

preferred size of 1,000 square feet (ft^2) (DTSC 1992) is referenced in the text. Additionally, a qualitative evaluation of the effects of exposure area size is detailed in the text, which explains that changing the exposure area size does not appreciably change the human health risk assessment results.

Comment 8. Section E.3.2.3, Background Chemicals and Tables E-4 and E-5: The treatment of background is inadequate. The locations of the reference background samples listed in Table E-4 should be described. The Navy should respond to the following several questions. Where were the Hetch-Hetchy, Wahler, and USGS samples taken and why are those samples appropriate for use in estimating background metals concentrations at MFA? What is the nature of the values presented as "background" values in Tables E-4 and E-5? Are they average, maximum, minimum, upper 95th percentile values?

We have attached a set of useful recommendations (Attachment A) from DTSC on how to define ambient concentrations of metals for the purpose of defining constituents of potential concern (COPC). These guidelines were used by PRC's office in San Francisco as they recently completed an excellent study of background concentrations at Mare Island Naval Shipyard, a base with similar problems in background determination to MFA, i.e. soil from multiple sources. Although this method is preferable, we realize that time constraints might preclude its use at this base. Although Mare Island is located some distance from MFA and may not have similar soil types, it is still located in the San Francisco Bay Area. Therefore, we have provided for comparison as Appendix B a compilation of values used to define ambient conditions at Mare Island. Some of these values are simple parametric estimates of the 95th quantile (mean + 2s), while others are the lower 80 percent confidence limit on the 95 quantile, estimated either parametrically or non-parametrically, depending on the type of distribution encountered. Please contact Dr. John Christopher of DTSC (916-327-2491) with any questions on the use of this method.

Also, the Navy should provide data on sampling results for hexavalent chromium.

Response: *The Navy appreciates DTSC's recommendations regarding methodology to define background (ambient) concentrations for metals. However, background metal concentrations were the subject of numerous discussions with the regulatory agencies in late 1993 and early 1994. These background values were approved by EPA as*

appropriate for MFA for expediency and because they had previously been approved for use at OU2. It was agreed that there would be little benefit to further study background at MFA. The agencies also agreed that the background analysis for groundwater presented in the OU5 FS was adequate and could be applied station-wide. The following description has been added to the text:

Soil samples collected from four locations were used in the evaluation of background metals concentrations: Hetch-Hetchy, Mountain View well 18, Wahler, and U.S. Geological Survey (USGS). Samples identified as Hetch-Hetchy were collected from the right-of-way for the Hetch-Hetchy aqueduct between Whisman Road and Tyrella Avenue, approximately 2,000 feet south of MFA. Samples collected near Mountain View well 18 were located near the intersection of Easy Street and Gladys Avenue, about 4,000 feet south of MFA. Samples from the Wahler study were collected approximately 2.5 miles east of MFA. Samples collected from the USGS study were collected at locations along the San Francisco peninsula. All these samples were reportedly collected from unimproved areas unlikely to be affected by manmade contaminants and believed to represent background conditions. Composite soil samples collected at each of these four locations form the basis of the results presented in Table E-4. These results were summarized in the OU RI reports previously prepared for MFA. Concerns including variations in sample depths, local depositional environments, and analytical methods as well as the limited number of samples were evaluated, and these samples were accepted as usable by the regulatory agencies. EPA summarized this decision in a letter to the Navy dated March 4, 1994.

Background values presented in Table E-5 represent the lowest of all the values or ranges listed on Table E-4 for each metal. For example, Table E-5 lists four values for arsenic:

USGS	*6.0*
Hetch-Hetchy	*5.6 - 6.3*
Mountain View Well 18	*5.9 - 11*
Wahler	*11*

The background value for arsenic listed on Table E-4 is 5.6. For metals that were not detected at any of the four locations, the contract required quantitation limit (CRQL) was used as the background comparison level. The CRQL value was used for antimony, selenium, silver, and thallium.

Soil and sediment analytical results for hexavalent chromium have been added to Appendix I.

To complete the HHRA, 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. Soil and sediment analytical results for hexavalent chromium have been included in Appendix I.

Comment 9. Section E.4.4.4, Inhalation of Vapors and Table E-9: Please provide more detail concerning the estimation of the concentrations of volatile organic chemicals.

Response: *A volatilization factor was used to estimate the concentrations of volatile organic chemicals in air. The exposure parameter tables were previously 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 10. Table E-3: Review of this table suggests that just two samples were taken for Site 23 and that analyses for lead were not conducted. If this is so, site characterization might not have been adequate. The Navy must provide either an explanation of why these data are adequate or how more samples will be collected and analyzed, including analyses for lead.

Response: *At Site 23 (golf course landfill 3), 4 subsurface and 10 surface debris samples were collected and analyzed for VOCs, semivolatile organic compounds (SVOCs), total petroleum hydrocarbon (TPH) purgeables and extractables, pesticides, polychlorinated biphenyls (PCBs), and metals. Soil samples from 0- to 2-feet bgs are combined to estimate potential risks to residential and occupational receptors because it is unlikely*

that these receptors will directly contact soils at greater depths. As a result, additional samples will not be collected because lead exposure is not anticipated to a problem at this site.

Only two surface soil samples, collected from the 0- to 2-foot depth interval, were used in the risk assessment. Lead was not detected in either sample nor was there any reason to suspect there was a release of lead from any Naval source in this area. Analytical results for all soil samples relevant to the HHRA collected at Site 23 are presented in Table 2-2.

Comment 11. Table E-7: Departmental guidance requires the use of 1.0 mg/cm^2 as the default value for adherence of soil to skin for the reasonable maximum exposure (RME). The value employed by the Navy, 0.2 mg/cm^2, is not congruent with this guidance and is unacceptable to DTSC. The correct value of 1.0 mg/cm^2 is used in Table E-7. We have informed the Navy and its contractor of the correct value to use for this parameter in a number of previous memoranda.

Response: *A dermal adherence value of 0.2 mg/cm^2 was used for Sites 21, 22, and 23 because EPA Region 9 uses this value to derive residential and occupational PRGs (EPA 1995b). Table E-7 has been corrected to present a dermal adherence value of 0.2 mg/cm^2.*

Comment 12. Purpose of the Basewide Risk Assessment: In both the Executive Summary and Appendix H, the Navy fails to state a purpose for constructing a basewide risk assessment, other than to meet a requirement of the Department and USEPA. Other risk assessments presented for MFA have been focused on individual operable units (OUs), some of which were created by artificially separating environmental media or areas of the base. In fact, current and future users of the base can be exposed to all sections of the base and to all environmental media. Somewhere, somehow, the Navy must show the full picture which will exist when the base goes out of its control. The purpose of a basewide risk assessment is then twofold: first, to quantify and depict any risks which might overlap between or among OUs, and second, to act as a vehicle for communicating risk to the public.

Overlapping risks can exist now or might come to pass in the future. For instance, future users of the base might be exposed to both soils and groundwater. Remedial alternatives have been or will be selected for these environmental media for their health-protectiveness, at least in part. If no exposure setting is ever constructed in which humans come into contact with both media, then those selecting the remedial alternatives might never have occasion to consider that adverse health effects can be additive across media. Thus, an adequate level of health protection might be selected for each medium, but the summed exposure might not be acceptable.

At Sacramento Army Depot, a closed base in Sacramento County, the Department, USEPA, and the Army learned the value of isopleths of risk for depicting the magnitude and location of risks for the public. The Army's contractor constructed isopleths of risk by environmental medium for a beginning condition, for the present, and for the future or cleaned up condition. Isopleths of risk were easily understood and accepted by the public. The Army was pleased that the value of their cleanup was effectively conveyed by showing the amount of risk reduction. The Department and USEPA were satisfied that all risks were taken into consideration in selecting final remedies. The "sample-by-sample" method suggested to the Navy was the one used to such good effect at Sacramento Army Depot. However, without figures showing the isopleths of risk, the effort is incomplete.

Response: *Overlapping risks were determined for future residential receptors using both the exposure area and sample-by-sample approaches. The future residential risks for soil and groundwater are presented in Plate 6-7 and Figure H-1. Risk isopleths were not included in the draft final station-wide RI report or the draft RI report because they are difficult to interpret, a great deal of professional judgement was required to complete the isopleths, and the isopleths may misrepresent risks due to the heterogeneity of COCs across the base. In addition, during the interagency meeting on February 23, 1996, it was agreed that risk contouring of sample-by-sample maps will not be added to the final report. As discussed in Section 6.0 of the RI report, the only remedial activities depicted on Plates 6-9 and 6-10 are capping of landfills and treatment of the southern OU5 groundwater plume. A footnote will be added stating that these are the only remediation efforts depicted on these plates. Any additional areas requiring remediation identified in this report and in the station-wide ecological*

assessment (SWEA) report will be evaluated in the station-wide FS report. Risk contouring of the sample-by-sample maps will not be added to the final RI report. Acetate overlays have been included to show the cumulative risk from soil and groundwater exposure. These overlays were developed from the exposure area maps. These maps are actually similar to isopleths depicted in the Sacramento Army Depot report.

Comment 13. Uncertainties in the Exposure Assessment: Because COPC varied greatly from one area of the base to another and from soil to groundwater, expressions of chemical concentrations cannot be added to produce estimates of risk in different samples. Therefore, it is necessary to convert concentrations of COPC to the common denominators of risk and hazard via defined exposure settings. This method of quantification of risk and hazard for each sample carries the implicit assumption that a receptor will be exposed to exactly those concentrations for the entire length of the chosen duration of exposure. If concentrations of a chemical are high in one area and low in another, actual risks will be correspondingly overestimated in one sample and underestimated in another. Thus, isopleths of risk constructed from a data base do not represent the exposure of any one receptor. This uncertainty is balanced by the fact that the isopleth of risk is a rubric which allows the potential adverse health effects of all contaminants to be displayed at once.

The Navy states that depiction of any of the "high values" violates USEPA's concept of selecting the RME for quantification of risks. We note that the Navy fails to point out that the "sample-by-sample" method underestimates risks in some areas. DTSC recommends that the Navy present a more balanced discussion of the uncertainties inherent in this method of assessing exposure. Until the Department is presented with an alternative method for simultaneous depiction of risks from several OUs, we must reject the Navy's complaint about overestimates of risks.

Response: *The disagreement over the utility of isopleths stems from the Navy's understanding that these isopleths included contouring for soil samples that were not necessarily for the same site, and did not represent the same COCs. After discussions between the Navy, DTSC, and EPA on February 23, 1996, the intent and content of the requested isopleths were clarified. To that affect, it was explained that the Sacramento Army*

Depot HHRA had calculated site risks for soil, which were then overlaid by acetate slides showing groundwater and air risks. The Navy believes that an appropriate representation has been shown in the exposure area HHRA. This is illustrated by presenting separate media as overlays. Therefore, the final HHRA exposure area maps show soil risks by exposure area and the groundwater risks in the identified plumes as an overlay. Risks from particulate and volatile compound inhalation were included in the media presenting the source term and will not be shown as a separate medium. The text has been revised to explain the new maps.

Comment 14. Isopleths vs. "Area Risk": Isopleths of risk are not necessarily the only rubric acceptable to the Department. As an alternative, we have stated we will accept estimates of risk for the residential setting based on averages over areas of 1,000 ft^2, the recommended default for the size of a backyard in California. As another alternative, we stated we would accept estimates based on the average lot size for Mountain View, California, the local community near MFA.

The Navy has presented in Chapter 6 of the current document a construction based on average chemical concentrations over 0.5 acre (21,780 ft^2), including the groundwater beneath those areas. The Department has repeatedly rejected this as inadequate. We agreed that if the Navy desired to present their "half-acre" assessment, it could be placed side-by-side with estimates based on methods of which we approve. The Navy chose instead to display prominently the assessment we rejected, while placing in an appendix another assessment of no value.

It seems that the Navy and the agencies have not yet agreed on a method of estimating and displaying these risks which is acceptable to all parties. DTSC urges the Navy, in the strongest possible terms, to have its risk assessors meet with their counterparts from the Department and USEPA to resolve this technical issue. At other bases, additional sampling and chemical analysis has not been required as a result of such consensus-building; existing data bases have proved adequate.

Response: *Please refer to the responses to specific comments 7 and 12. Residential risks presented for the exposure area approach will not change if the exposure area is restricted to 1,000 square feet because the highest risks are posed by exposure to the*

OU5 southern plume, as shown by both Figures 6-6 and 6-7 and Plates 6-7 and 6-8. The grid density does not change the risks associated with the groundwater plume. The other area of high risk is near Lindbergh Avenue and the storm water retention ponds. These risks are due to PCBs and dieldrin in five soil samples and are summarized on pages 6-146 through 6-149. Adjusting the exposure area sizes will not change the results. The text has been modified to indicate that using a smaller exposure area size does not appreciably alter the risk assessment results. DTSC, EPA Region 9, and the Navy met on February 23, 1996, to discuss the issue of exposure area size. It was agreed that exposure area size need not be changed, but additional discussion of the effect of a smaller area will be added.

Comment 15. Sample-by-Sample Approach, Appendix H, Figure H-1: Please explain why there are 2 to 3 orders of magnitude difference of risk for the same location presented in Figure H-1 through H-8 and Plate 6-3 through Plate 6-10. If it is simply caused by different database, all figures need to be corrected accordingly. Otherwise, more discussion should be presented in the document.

Response: *Please see response to EPA comment 30.*

Comment 16. Metals in Surface Water, Sec. H.1.2, p. H-2: In the absence of relevant data on ambient concentrations of metals in surface water, the Navy may not eliminate antimony, arsenic, beryllium, and chromium as COPC in surface water at MFA.

Response: *Antimony, arsenic, and chromium were not eliminated as surface water COCs as indicated in the text on page H-2. All inorganic chemicals, except beryllium, were retained as COCs unless they were essential nutrients. The text cited in the comment has been corrected.*

Comment 17. Risk Characterization, Sec. H.4, p. H-8: The Navy's interpretation of station-wide risks and hazards amounts to three sentences. No mention is made of risk drivers, affected media, overlapping risks among OUs, etc. This presentation is inadequate, and essentially ineffective. We suggest that the Navy meet with risk assessors from the Department and USEPA to define what is required in an assessment of this type.

Response: *Please refer to response to DTSC specific comment 12. Additional narrative and tables have been provided in Appendix H presenting results from the sample-by-sample risk assessment approach.*

Comment 18. "Expediency", Sec. H.4.1, p. H-7: Please strike the word "expediency" and substitute "convenience".

Response: *The text in Section H.4.1 has been modified by substituting the word "convenience" for "expediency."*

Comment 19. Supporting Data: The Navy presents some 128 pages of tables which we presume are intended to support the figures which follow. We find no reference to these data in the text. We find no key for understanding how these tables are arranged or how they can be read. We find no summed risks or hazards within or across media for each sample location. These data must be organized into tables in a fashion that the public might be expected to understand.

Response: *Appendix H has been revised to describe the organization of the sample-by-sample data tables. The summed risks and hazard indices are presented in separate tables for each sampling location.*

Comment 20. Figures H-1 through H-8: These figures do not convey risks which overlap between OUs. They are not acceptable because they defy interpretation. This situation is not improved by the lack of such interpretation offered by the Navy. Without a presentation of isopleths of risk, the figures are simply maps of uninterpretable dots. The best way to communicate station-wide risk is with contours, separated by environmental medium, although other constructions might be equally acceptable (see comment 7 above).

The colors selected by the Navy to delineate difference levels of risk or hazard are much too similar. For instance, finding a difference between Figures H-2 and H-4 requires extremely close examination. What subtle differences may be found will certainly vanish if these pages were to be photocopied. Does the Navy wish risk and hazards before and after cleanup to appear identical? Contour lines showing isopleths of risk or hazard would remove the ambiguity of color schemes and we recommend they be employed.

Response: *Please see the responses to DTSC specific comments 7 and 12. The color scheme on the sample-by-sample risk and hazard maps has been changed to be consistent with the exposure area maps. A disclaimer has been added to the figures stating that uncolored photocopies do not present risks and hazard indices which are depicted by color. The use of different symbols was unsuccessful. The areas of the base with high sampling density caused the symbols to be uninterpretable.*

Comment 21. Fuels and Trichloroethene, Figures H-1 through H-8: During the course of the various remedial investigations at MFA, the Navy discovered significant contamination of groundwater which is not depicted anywhere in the "station-wide" risk assessment. We refer to trichloroethene in groundwater west of the runways and to sizable leakage of fuels from tanks east of the runways. The Navy chose to use cross-hatching to show special treatment of the landfills. Something similar should be done for these other two, quite large areas of contamination. To label these figures "station-wide" while including only a fraction of the contamination is inadequate.

Response: *Please see the response to DTSC specific comment 1.*

Comment 22. Missing Values, Fig. H-1 *et seq.*: We find that risks and hazards depicted for some samples in the areas of the landfills for current exposures are missing from future exposures. Volumes of soil which show hazard indices between 1 and 10 for current exposures must either increase or stay the same upon remediation, which is the future exposure condition. It is not possible for points to disappear. Please correct this.

Response: *Hazard and risk estimates for occupational and recreational receptors were removed in the post-remediation maps and figures for all landfill areas. The effects of planned remediation (landfill capping) would cause exposure pathways for these receptors to be incomplete. The lack of future exposure is shown as the absence of risk.*

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