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MOFFETT FIELD
SSIC NO. 5090.3.A.

CLEAN

Contract No. N62474-88-D-5086

Contract Task Order 0134

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NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

RESPONSE TO COMMENTS

SITE 9 ACTION MEMORANDUM

Prepared By

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1161
See Report # 143

NAS MOFFETT FIELD SITE 9

RESPONSE TO COMMENTS ON ACTION MEMORANDUM
MAY 2, 1991

INTRODUCTION

This report presents point-by-point responses to comments received from regulatory agencies for the Site 9 action memorandum dated May 2, 1991 for Naval Air Station (NAS) Moffett Field in Mountain View, California. Comments were received from Mr. Lewis Mitani of the U.S. Environmental Protection Agency (EPA) in a letter dated June 3, 1991; from Mr. Cyrus Shabahari of the California Department of Health Services (DHS) in a letter dated May 29, 1991; and from Mr. Steven Morse of the California Regional Water Quality Control Board (RWQCB) in a letter dated May 15, 1991.

Comments from Mr. Lewis Mitani, U.S Environmental Protection Agency

GENERAL COMMENTS:

Comment Number 1. It would improve the clarity of the text if figures were provided for each of the site areas within Site 9, showing monitoring wells, soil borings, soil gas locations, and HydroPunch locations along with the chemical concentration blocks for the constituents.

Response: *Plates showing contaminant distribution data for monitoring wells, soil borings, and HydroPunch sample locations within Site 9 are provided in the revised Site 9 Action Memorandum. Instead of using chemical concentration blocks for the constituents, isoconcentration contour maps were created which incorporate the contaminant concentration values associated with each data point.*

Comment Number 2. It would be helpful to include concentration distribution maps for soil and ground water contamination. Include separate maps for trichloroethene (TCE), tetrachloroethene (PCE), total petroleum hydrocarbons (TPH), metals, and others in the soil and ground water. Include cross sections of the degree of soil contamination with depth and show ground water contamination in the aquifers.

Response: *Isoconcentration contour maps were developed to illustrate the lateral extent of soil and ground water contamination in the A1 zone of the A aquifer. Isoconcentration maps for PCE; TCE; 1,2-dichloroethene (DCE); and TPH in ground water and soil were developed for Site 9. Isoconcentration maps for metals in ground water and soil were not developed because background levels for metals in ground water and soil at NAS Moffett field are not currently defined. Future sampling and analysis of metals concentrations at NAS Moffett Field will enable the determination of background values by applying geostatistical analysis methods. Because only TPH was widely distributed in soil samples, only TPH concentrations were presented on a soil isoconcentration map. Section 3.4 of the revised action memorandum discusses the isoconcentration maps.*

Adding contamination zones to cross-sections would require knowledge of hydraulic connection between the A1 and A2 zones. Because the degree of interconnection between the A1 and A2 zones is not well characterized, contaminated zones are not indicated on the cross-sections presented in Figures 8 through 11.

Comment Number 3. For each area of investigation, all results for all samples taken in the area should be presented in the text and tables to obtain a clear picture of the contamination. Samples where constituents showed a "not detected" should be reported as such on the tables.

Response: *Chemical data summary tables were revised to include all sample analytical results with respect to each site area within Site 9 with the exception of the Building 29 area. Section 3.4 of the revised action memorandum contains these summary tables. Chemical data summary tables for soil and ground water samples collected in the Building 29 area were revised to include all data collected by PRC during the Building 29 area investigation and the Phase I and II tank and sump removal activities. Information collected by IT in the vicinity of Building 29 was used to develop isoconcentration maps for Site 9 but was not added to the tables. Refer to IT quarterly reports and the Phase I characterization report for these data. The existing PRC data provide adequate coverage of the Building 29 area and allow a complete discussion of the current knowledge of the nature and extent of soil and ground water contamination near Building 29.*

Comment Number 4. In response to the response to comments report for the Site 9 draft action memorandum, general comment number 6, any results of past investigations that were determined not to be applicable to a particular source and therefore not incorporated in the report should be clearly described in each appropriate section for this report. As an example, when data are not available, explanation in the text is needed as to why the data are not available.

Response: *See response to comment 3.*

Comment Number 5. The performance of any thermal oxidation technology will have to be demonstrated to the regulatory agencies in a treatability study. A greater concern to EPA is the possibility of the formation of much more toxic products from the incomplete combustion (e.g. dioxins). Comprehensive tests will be necessary to demonstrate to EPA that emissions coming from the thermal oxidation unit have effectively destroyed any by-products. A routine long-term monitoring program will also be required to ensure this technology is fully protective of human health and the environment.

Response: *Thermal oxidation of off gases is a proven, effective technology that is widely used for air emission controls. Alternative controls have been evaluated (vapor phase carbon adsorption) and thermal oxidation has proven to be technically more appropriate and significantly less expensive. As agreed in the June 27, 1991 conversation between Lewis Mitani, Stephen Chao, and Tamara Muhic, performance testing of the thermal oxidation unit will be conducted during startup to demonstrate the effectiveness of the unit in treating air stripper off-gases and the unit will be monitored during its operation.*

SPECIFIC COMMENTS:

Comment Number 1. Page 6, First Paragraph. According to the federal facilities agreement (FFA), "The purpose of such source control removals is to eliminate any impediment to the effective implementation of the Middlefield-Ellis-Whisman (MEW) Regional Groundwater Remediation Program...." Please include this statement or similar text in the paragraph.

Response: *The text of this paragraph has been revised to include this source control objective.*

Comment Number 2. Page 6, Third Paragraph. Please provide a figure showing the MEW plume as indicated in the FFA (July 1989 record of decision (ROD)) and its relationship to Site 9. Indicate in which zones mixing has occurred at Site 9.

Response: *A figure has been added to the report illustrating the location of the MEW plume in the A2 zone based on data presented in the current quarterly report published by International Technology Corporation (IT, 1991). Field activities (including aquifer pumping tests) are planned to more fully investigate the potential for hydraulic connection between the A1 and A2 zones.*

Comment Number 3. Page 8, Figure 2. Please provide legible street names and building numbers. Outline Site 14 North on the figure. Show the previous location of Sump 61. Label all the tanks and sumps and include them in the legend.

Response: *This figure has been modified to enlarge street and building names and to indicate locations of former tanks and sumps at Site 9.*

Comment Number 4. Page 10, Second Paragraph. An explanation is needed on how the salt evaporation ponds form a buffer between the base and the bay.

Response: *The salt evaporation ponds north of NAS Moffett Field provide a physical separation between the facility and San Francisco Bay. However, because the evaporation ponds do not provide any other known buffer capacity, this statement has been removed from the text.*

Comment Number 5. Page 12, First Paragraph. Include that the Phase I remedial investigation (RI) report results that were incorporated into this report (IT, 1990c) were results from a draft report.

Response: *The revised version of the Site 9 action memorandum contains data from the revised Phase I characterization report submitted by IT in April 1991.*

Comment Number 6. Page 12, Section 3.1 "Site Background." The text should reference a figure showing all details of the contaminant sources that were discussed in this section.

Response: *Figure 3 of the revised Site 9 action memorandum has been modified to indicate the location of potential contaminant sources (tanks and sumps) within Site 9.*

Comment Number 7. Page 14, First, Second, and Fifth Paragraphs. Please explain how compliance was obtained for the closure of all 10 tanks in the Building 29 area and Tank 68.

When was Tank 68 closed in-place? Where was it located? What investigations were done to determine the location, depth, and contents of the tank?

Closure shall comply with provisions of Chapter 6.5 of Division 20 of the Health and Safety Code, and Subchapter 16 Underground Tank Regulations, Title 23 Waters of the California Administrative Code.

Response: *The 10 tanks in the vicinity of Building 29 are inactive but not closed. As noted in the text of Section 3.1, the tanks were filled with water and abandoned in 1964. Plate 1 shows the location of Tank 68. As indicated in Section 3.1, Tank 68 may have contained petroleum products or waste solvents. This information is contained in reports by ERM-West (1987) and IT (1991). The exact depth and closure techniques used for Tank 68 are not available. The provisions for tank closure included in the California Administrative Code are noted for future reference.*

Comment Number 8. Page 17, Third Paragraph. The text should give the reference or state the rationale for the method used to distinguish between the levels of contamination for soil gas (i.e., how was it determined that levels up to 10,000 parts per billion (ppb) constitute relatively low contamination?).

Response: *Areas covered by a soil gas survey were divided into general measurement groups which approximate areas of greater or lesser contamination. Because soil gas survey results are not directly equivalent to concentration of contaminants in soil, the ranking of areas only provides a qualitative means for relative comparison.*

Comment Number 9. Page 17, Fourth Paragraph. The text should explain what the Interphase 1990 reference is and should provide all data used from this Interphase report

in an appendix. (The contamination information and chromatographs [sic] are not legible in Appendix B.)

Response: *Section 3.2.2 has been modified to more clearly describe the soil gas survey conducted in the vicinity of Building 88 by Interphase, Inc. The inadvertent errors in document reproduction have been corrected to clearly present the data and chromatograms from the Interphase report.*

Comment Number 10. Page 17, Fifth Paragraph. The text should describe what the Hydro Geo Chem 1990 reference is. Include in the text the method(s) used for analysis of compounds.

Response: *Section 3.2.2 has been modified to more concisely describe the soil gas survey conducted in the Building 29 area by Hydro Geo Chem, Inc. A brief statement presenting the method of soil gas analysis has been added.*

Comment Number 11. Page 20, Table 2. Identify the detection limits for the "NDs" shown on the table. Detection limits for all analyzed constituents should be provided in this report.

Response: *Where detection limit data were available, detection limits were added to Table 2.*

Comment Number 12. Page 21, Second Paragraph. What were the names of the monitoring wells that were drilled in the Building 29 area? What were the names of the three additional wells in the Building 29 and Building 31 areas? What were the names of the two monitoring wells installed in the vicinity of Building 88? Please include this information in the text.

Response: *Section 3.2.4 has been expanded to more clearly identify the ground water monitoring wells installed at Site 9.*

Comment Number 13. Page 22, Table 3. Include HydroPunch names on the table so they can be related to names given on Plate 1. Include sampling dates for each.

Response: *Table 3 has been modified to include complete sample identifications and sampling dates.*

Comment Number 14. Page 28, First Paragraph. The text should identify the methods used for analysis for volatile organic compounds (VOCs), metals, and TPH.

Response: *A reference to Section 3.4, which discusses chemical analytical methods, has been added to this paragraph.*

Comment Number 15. Page 29, Fifth Paragraph. How was it determined that "Small variations in the A aquifer water level occur in response to tidal influence?" Does this variation occur in both zones? How far inland does the tidal influence penetrate? A figure showing the influence variations in the winter and the summer would be useful.

Response: *The magnitude of the tidal influence on water levels in the A aquifer is not well understood. The text has been modified to indicate this uncertainty and to indicate that upcoming field activities are planned to investigate the degree of tidal influence on the A aquifer.*

Comment Number 16. Page 44, First Paragraph. In the text, please support the conclusion that the "Concentrations of chlorinated VOCs in soils are generally less than 25 micrograms per kilogram (μg/kg)." What about W29-3 (TCE at 70 μg/kg) and W61-1 (TCE at 100 μg/kg)?

Explain in the text how it was determined that chlorinated VOCs in the ground water upgradient of Building 29 are eighty percent TCE and chlorinated VOCs in the ground water downgradient are ninety five percent 1,2-dichloroethene (1,2-DCE) and give the significance of this information.

What were the TPH determinations that indicated that the fuel is increasingly degraded with distance? Will more data be obtained to determine the lateral extent of fuel contamination in the area? Please present in the text data supporting the conclusion that there is no evidence of vertical migration of TPH contamination with relation to soil and ground water.

Specify the contaminant 1,2-DCE (i.e., cis-1,2-DCE, trans-1,2-DCE, or total 1,2-DCE?). This should be specified through the report.

Response: *The intent of the initial paragraph in Section 3.4.1 is to provide a brief synopsis of the contamination in soil and ground water near Building 29. Detailed discussions of the results appear in Sections 3.4.1.1 and 3.4.1.2.*

In general, concentrations of chlorinated VOCs are less than 25 µg/kg although several samples had higher concentrations. The discussion of chlorinated VOCs in soil has been modified to include a sentence stating 95 percent of the soils contain chlorinated VOC contamination at concentrations less than 25 µg/kg.

Changes incorporated into the text specify the results used to determine the percentage TCE of the total chlorinated VOCs upgradient of Building 29. The data used to determine the percent 1,2-DCE of the total chlorinated VOCs and the significance of the information are discussed in Sections 3.4.1.1 and 3.4.1.2.

Chromatograms of TPH extractable and purgeable in soils were compared to chromatograms of laboratory standards (JP-5) to determine the extent of fuel degradation. See the discussion and example chromatograms in Appendix B.

Results discussed in this report are for total 1,2-DCE. The VOA method in use [EPA contract laboratory program (CLP)] does not allow the quantification of the individual isomers.

Comment Number 17. Page 44, Third Paragraph. Clarify which wells were sampled for soils and the depth(s) for each. A table should be prepared showing all soil boring samples and well boring samples, the analyses performed for each, and the sampling depths.

Specify analytical methods used for analysis.

Response: *Tables 7 and 8 include results from all soil samples taken during the Building 29 Area investigation. Sampling depths appear in the tables. The introduction to Section 3.4 describes the analytical methods used during this investigation.*

Comment Number 18. Page 44, Fourth Paragraph. Reference a figure showing the 32 locations of soil gas samples for Building 29.

Response: *The plate containing soil gas sampling locations (Plate 1) has been referenced in the text.*

Comment Number 19. Page 45, First Paragraph. Please present data which indicate that the chlorinated VOCs found in the soil from W29-3(A1) was associated with pore water and not the sediment.

Response: *Because the soil sample from well W29-3(A1) was collected from 21 feet below land surface (BLS) in the saturated zone, measured contaminant concentrations may be caused by pore water contained in the soil. Data which indicate soil sample W29-3(A1)-4 was collected in the saturated zone appear in Appendix D. The text has been revised to suggest the chlorinated VOC contamination in the soil may be, in part, associated with pore water.*

Comment Number 20. Page 45, Second Paragraph. Please clarify in the text how it was determined that "the contamination appears to have originally been an aviation fuel similar to JP-4 or JP-5."

This paragraph states that fuel was found in a narrow band between 9 and 13 feet below land surface (BLS). According to Table 7 (which does not show results for all 10 soil borings and all 17 monitoring wells that were soil sampled) approximately 24 percent of the borings had maximum petroleum concentrations at depths outside the "narrow band." Please clarify in the text.

The highest concentration of fuel mentioned in this paragraph [4,700 milligrams per kilogram (mg/kg)] is not shown on Table 7 as such. Please clarify. Petroleum hydrocarbon contamination was found in high levels upgradient of Building 29 [i.e., wells W29-6(A1), W29-4(A1) and W61-1(A1)]. This must be included in the text because, as it stands, the text refers only to contamination identified "in the immediate area and downgradient of Building 29."

The last sentence in the paragraph is confusing because high TPH concentrations have been found within the Building 29 area. Please explain the last sentence in more detail in the text.

Response: *A brief discussion of petroleum hydrocarbon fingerprinting analysis and degradation has been added to Appendix B.*

Table 7 has been modified to include results from all soil samples collected during the Building 29 Area investigation.

The five samples collected outside of the 9 to 13 foot interval all contained low levels of BTEX or TPH. Combined, the TPH and BTEX contamination from these five samples makes up less than 1 percent of the total petroleum hydrocarbon contamination measured in soils during the Building 29 Area investigation.

The concentration cited in the text (4,700 µg/kg) is a typographical error. The entry has been changed to reflect the correct concentration.

Fuel contamination was found in the immediate area and downgradient of Building 29. The immediate area of Building 29 is meant to include the two clusters of USTs. TPH contamination was not found upgradient of this area in soil or ground water samples. TPH constituents were not detected in the water sample from well W29-4(A1). The water sample from well W29-6(A1) contained 56 mg/L TPH purgeable as gasoline. Well W61-1(A1) is not considered to be upgradient of the Building 29 area and the soils and ground water associated with this well were not contaminated with TPH.

The last sentence in this paragraph was a typographical error. Section 3.4.1 discusses TPH contamination in the Building 29 area.

Comment Number 21. Page 45, Third Paragraph. To be complete, include all soil sample results in the Building 29 area with toluene concentrations greater than 100. What about W29-6(A1) with 170 µg/kg toluene?

Response: *The result for toluene from sample W29-6(A1) (170 µg/kg) has been incorporated into the text.*

Comment Number 22. Page 45, Fourth Paragraph. Diagrams should be presented to substantiate the assumptions. Provide all chromatograms of the upgradient and downgradient soil and water samples.

Response: *Appendix B contains example chromatograms in a discussion of petroleum hydrocarbon degradation. Chromatograms are not available for all TPH samples because they were not requested from the laboratory. In addition, many of the chromatograms received from the laboratory are poor reproductions of the originals.*

Comment Number 23. Page 46, Table 6. Show all 10 soil borings and 17 monitoring wells where soil samples were collected on Table 6. Include summary concentration data (i.e., maximums) for each (include a ND if contaminant was not detected).

Response: *Table 6 has been revised to include results for all soil samples collected during the Building 29 Area investigation.*

Comment Number 24. Page 47, Table 7. Please include maximum concentrations for each of the 10 soil borings and the 17 monitoring wells where soil samples were taken on the table. Breakdown benzene, toluene, ethylbenzene, and xylene (BTEX) to show the concentrations for each of the four contaminants.

Response: *Table 7 has been revised to include results for all soil samples collected during the Building 29 Area investigation. In addition, BTEX results are now reported for each individual compound.*

Comment Number 25. Page 50, Fourth Paragraph. Please indicate the significance of the statement regarding the correlation of metals in soil and ground water. Explain the reference to the "location" of the metals in soil and ground water.

Response: *The paragraph has been modified and moved to Section 3.4.1.2. Correlation between concentrations of analytes in ground water and soil samples from the same location would indicate that metals in soils may be a source of inorganic constituents in ground water.*

Comment Number 26. Page 50, Fifth Paragraph. Specify the names of the seven A1 zone wells and the four A2 zone wells that were sampled. Table 9 does not show seven A1 wells. Indicate analytical method used for the sample analysis.

Specify the names of each of the HydroPunch samples and the analytical method(s) performed one each sample.

Response: *Table 9 has been modified to include results from all the wells sampled during the Building 29 Area investigation. A statement concerning the analytical methods used during this study has been added to the introduction of Section 3.4.*

Comment Number 27. Page 51, First Paragraph. VOCs found in the ground water included more than TCE; 1,2-DCE; and PCE. PCE was found in more than one sample. Please clarify in the text.

Response: *The text has been changed to reflect PCE was found in more than one sample. Table 10 contains concentrations of all target analyte list chlorinated VOCs detected in ground water samples.*

Comment Number 28. Page 51, Second Paragraph. Give evidence in the text or cite the reference for stating that PCE rapidly converts to TCE in the A1 zone at this site.

In the text, support the statement that the high PCE and TCE concentrations in HP29-100 may be associated with activities at Hangar 1 and specify the activities.

Response: *Evidence that PCE is converted to TCE in the A1 zone is provided in Section 3.4.1.2.*

The chlorinated VOC contamination found in HydroPunch sample HP29-100 is not conclusively known to be associated with activities at Hangar 1. The aircraft cleaning and maintenance activities known to have taken place at Hangar 1 and a lack of alternative sources provide the rationale for this statement. The text has been modified to more clearly reflect this interpretation.

Comment Number 29. Page 51, Third Paragraph. Provide data in the text supporting the conclusion that TCE contamination in W61-1(A1) is likely associated with wastes from Building 45 and Hangar 1 (Sump 61).

Information to support the high TCE concentrations found in W29-6(A1), W29-3(A1), HP29-52, HP29-66, and HP29-91 were the result of upgradient contamination should be present in the text. They were all sampled in the Building 29 area.

How was it determined that the percentage TCE of the total chlorinated VOC contamination entering the Building 29 area averages 81.5 percent? This investigation did not sample upgradient of the Building 29 area. Only two ground water samples were taken south of the Building 29 area (HP29-100 and HP29-102). Please explain in the text.

Response: *Historical evidence has been cited in support of the statement that TCE contamination in W61-1(A1) is associated with wastes from Building 45 and Hangar 1.*

Information documenting high TCE concentrations in ground water upgradient of the Building 29 area appears in Section 3.4.1.2. An example illustrating the calculation of the ratio of TCE to the total concentration of chlorinated VOCs also appears in Section 3.4.1.2.

Section 3.4.2.2 has been modified to include the calculation used to determine the percentage of TCE of the total chlorinated VOCs leaving the Building 88 area and entering the Building 29 area.

Comment Number 30. Page 51, Fourth Paragraph. This paragraph mentions "the area affected by fuel contamination." Please define the area affected by fuel contamination in the text.

How was it determined that the TCE to 1,2-DCE reaction appears confined to this area? How was it determined the reduction of TCE to 1,2-DCE is nearly complete within 300 to 400 feet downgradient of Building 29? Wells W29-7 and W29-1 and HydroPunch HP29-18 showed high TCE levels and relatively low 1,2-DCE levels.

The major pathway of TCE transformation is to cis-1,2-DCE. The transformation from TCE to trans-1,2-DCE is only a minor pathway. To support the TCE to 1,2-DCE reaction, provide data on the concentrations of both cis- and trans-1,2-DCE as compared to TCE.

Response: *Figure 13 indicates the extent of TPH contamination in soils at Site 9. The text has been revised to include a reference to the figure.*

IT data collected in 1990 and 1991 were used in conjunction with Building 29 Area investigation results to determine the area affected by microbial degradation of the chlorinated VOCs. Two ground water samples contain TCE in excess of 1,2-DCE concentrations [W29-7(A2) and HydroPunch HP29-18]. These two samples are discussed in greater detail below.

Well W29-7(A2) is screened in an area unaffected by TPH contamination (the A2 zone), thus, results indicating TCE concentrations in excess of 1,2-DCE levels would be expected. HydroPunch sample HP29-18 was collected near the locations of wells W29-1(A1) and W29-7(A2) at a depth of 26 feet BLS. Chlorinated VOC results for ground water samples from W29-1(A1) are consistent with a microbial reduction scenario (98 percent of the total chlorinated VOC contamination is 1,2-DCE). Chlorinated VOC results for sample HP29-18 are intermediate between those for W29-1(A1) and W29-7(A2). Because the HydroPunch sampling point (26 feet BLS) is also intermediate between the screened intervals of the two wells, the intermediate TCE to 1,2-DCE ratio may indicate communication between the A1 and A2 zones in this area.

Results discussed in this report are for total 1,2-DCE. The VOA method in use (EPA CLP) does not allow the quantification of the individual isomers.

Comment Number 31. Page 52, Table 9. This table should show all 11 chlorinated VOC HydroPunch sample results.

Response: *Table 9 has been revised to include chlorinated VOC results for all HydroPunch samples.*

Comment Number 32. Page 53, First Paragraph. What was the TCE to 1,2-DCE reduction rate observed in the samples?

Substantiate the claim that the lower reduction rate of vinyl chloride is attributed to lower concentrations of the petroleum hydrocarbons downgradient of the Building 29 area. Only one location was sampled 600 to 700 feet downgradient of Building 29 for this investigation.

Response: *An absolute reduction rate for the TCE to 1,2-DCE reaction has not been calculated. The reduction rates discussed in the text are estimates intended for comparative purposes within Site 9.*

Results for ground water samples from wells W29-1(A1) and W9-24(A1) support the hypothesis that TPH concentrations may affect chlorinated VOC reduction rates. However, microbial plate count data are not available to substantiate the hypothesis. The text has been altered to provide both explanations without preference.

Comment Number 33. Page 53, Third Paragraph. In the text, give the names of the wells and HydroPunch locations that were sampled for petroleum hydrocarbons. On Table 10, present maximums for all wells and HydroPunch locations sampled (include a ND for samples that did not detect the contaminant).

Clarification is needed for the statement "The majority of samples containing petroleum hydrocarbons were from Building 29 or downgradient of this area." The text should clarify that contamination exists in the Building 29 tank cluster areas. Of the only two locations where the ground water was sampled downgradient of the southern cluster of four USTs, high TPH concentrations were found in both (W29-6 and HP29-79).

Response: *Table 10 has been modified to include all wells and HydroPunch samples collected during the Building 29 Area investigation.*

The text has been revised to indicate TPH contamination was found in the Building 29 area, specifically in the vicinity of the northern tank cluster.

Comment Number 34. Page 57, First Paragraph. All existing data upgradient, in the vicinity, and downgradient of Building 88 should be analyzed to determine contaminant dispersion. The names and locations of all monitoring wells, soil borings, and HydroPunch samples should be specified.

Response: *All existing data from the Building 88 area have been analyzed during this investigation. In some cases, data were not incorporated into the discussion because the results had little bearing on the source control investigation.*

All monitoring wells, soil borings, and HydroPunch samples discussed in this report are identified on Plates 1 and 2.

Comment Number 35. Page 57, Second Paragraph. The text should reference the soil gas survey mentioned and include results in an appendix.

Response: *The text has been changed to include a reference for the soil gas survey discussed in Section 3.4.2.1. Appendix B contains results for this soil gas survey.*

Comment Number 36. Page 57, Third Paragraph. What is the significance of the information "PCE was found in 70 percent of the soil samples?"

The statement that PCE was not found below 17.5 feet is misleading. No soil samples were taken between 17.5 and 25.5 feet. Clarify in the text that at 25.5 feet, PCE was not detected in the soil.

In the text, give the sampling depths for the soil borings and monitoring well. At what depth was 1,1-dichloroethane (1,1-DCA) (6 μg/kg) found?

Include that toluene was also found in SB68-2.5 at a concentration of 12 μg/kg.

Response: *PCE in soil and ground water samples may identify source areas because PCE is not found in significant quantities in ground water samples collected upgradient of Site 9. However, the statement is not appropriate for this section of the text and has been removed.*

Section 3.4.2.1 has been modified to present additional detailed information concerning contaminant concentrations in soil samples collected from soil boring SB-68 and monitoring well W68-1(A1).

Section 3.4.2.1 contains sample collection depths corresponding to concentration values. The sampling depths for monitoring well W68-1(A1) and soil boring SB-68 are approximate because the well was installed at a 45° angle. Tables 13 and 14 present sample collection depths for soil samples collected near Building 88.

Comment Number 37. Page 58, Second Paragraph. The PCE averages of 2,600 μg/kg and 550 μg/kg between 12 and 19.5 feet are confusing. Is it 2,600 μg/kg or 550 μg/kg? Include that cis-1,2-DCE was detected. Include that toluene was detected in SU66-WX at 28 μg/kg. Include that 1,1-dichloroethene (1,1-DCE) was detected in ERM4-19.5 at 8 μg/kg.

Include TPH discussion in this section. Benzene, TPH, and toluene information are left out of the discussion. Benzene is not even included on Table 12. Please show benzene concentrations on Table 12. Please be more accurate and complete in all data presentation.

Response: *The text has been modified to reflect the average concentration of TCE between 12 and 19.5 feet was 550 μg/kg. The text indicates that 1,2-DCE was detected in the three well and three soil boring samples. (See comment 30 for more information concerning 1,2-DCE isomers.) The toluene concentration measured in soil sample SU66-WX appears in Table 14. The 1,1-DCE concentration in soil sample ERM4-19.5 appears in Table 14.*

Section 3.4.2.1 has been modified to present additional detailed information concerning contaminant concentrations in soil samples collected from the Sump 66 excavation, borings SB-68 and ERM-B13, and wells W67-1(A1), W68-1(A1), and ERM-4. Table 14 indicates benzene was not detected in soil samples from well W67-1(A1), ERM-4, and soil boring ERM-B13.

Comment Number 38. Page 58, Fourth Paragraph. Table 13 shows six wells and five soil borings. Please clarify.

Response: *Table 15 includes the results for all the soil samples in the Building 88 area.*

Comment Number 39. Page 58, Fifth Paragraph. PCE concentrations exceeded 120 μg/kg (see Table 12). Specify which wells and soil borings are being considered in this paragraph. PCE was not detected in W09-14, W09-35, SB9-6, SB9-7, and SB9-11 according to Table 13. Please clarify. According to Table 13, TCE ranges from 1 to 210 μg/kg, not 10 to 130 μg/kg. Please correct. The same discrepancies should be corrected for the other compounds as well.

Response: *Section 3.4.2.1 has been modified to more clearly present concentrations of chlorinated VOCs detected in soil samples collected downgradient from Building 88.*

Comment Number 40. Page 61, Second Paragraph. PCE in the soil at W09-21 is reported to be 99-120 μg/kg on Table 13. Why is the paragraph stating that PCE and TCE contamination in soils probably does not extend from Building 88 area to W09-21? If the contamination does not extend from the Building 88 area, then where are the contaminants coming from in the area of W09-21?

Response: *As stated in Section 3.4.2.2, the PCE contamination in soil boring W9-21 (A2) was found between 3 to 5 feet BLS. It is unlikely that PCE and TCE, both with densities greater than water, could migrate 500 feet laterally without some downward migration. In addition, cone penetrometer test (CPT) results from sample H9-12 suggest a less permeable zone exists between well W9-18(A1) and W9-21(A2). The source of the chlorinated VOCs in the soil from W9-21(A2) is unknown, but it is unlikely that the contamination is from the Building 88 area.*

Comment Number 41. Page 61, Third Paragraph. Why aren't the results available?

Response: *Metals data for soil samples collected from well W9-20(A2) and soil borings SB9-6, SB9-7, SB9-10, SB9-11, and SB9-12 are not present in PRC's copies of IT's quarterly reports or Phase I characterization reports (draft or final).*

Comment Number 42. Page 61, Fifth Paragraph. TPH is discussed in the middle of the metals discussion. Please re-arrange the paragraphs.

Response: *The discussion of TPH detected in Building 88 area soil samples has been moved to the discussion of other organic compounds in Section 3.4.2.1.*

Comment Number 43. Page 63, Section 3.4.2.2 Ground Water Contamination. This section should include petroleum hydrocarbon and TPH information for the area.

Summary tables are needed for petroleum hydrocarbons and metals. Include results for MEW66 which is upgradient of the Building 88 area.

Response: *Petroleum hydrocarbons were not found in ground water samples in the Building 88 area. Section 3.4.2.2 and Table 18 present concentration ranges for inorganic constituents in ground water samples from the Building 88 area. Results for water samples collected from well MEW-66 are not contained in IT or ERM-West reports available to PRC.*

Comment Number 44. Page 63, Sixth Paragraph. Present all chlorinated VOC concentration results from the ground water in the Building 88 area. Missing wells include the following:

W9-12(A2), W9-18(A1), W9-23(A1), W9-29(A1), W9-37(A1), ERM-5 Upgradient -- W9-41, W9-38, ERM-6, MEW-66

Support the conclusion that chlorinated VOC contamination in the A1 zone from off-site sources is not extensive. Give results of mentioned upgradient wells.

Please define "minor amounts."

Response: *Results from wells W9-18(A1), W9-29(A1), W9-37(A1), ERM-5, and ERM-6 were inadvertently omitted from Table 15. The table has been revised to incorporate these results. Results from the remaining wells have not been incorporated for the following reasons. Consideration of results from well W9-12(B2) in the B2 aquifer is beyond the scope of this investigation. Well W9-23(A1) is considered as part of the Building 29 area investigation and discussion. Wells W9-38(A1) and W9-41(A2) are considered upgradient of the southwest quarter and are discussed in Section 3.4.4. Results for well MEW-66 are not contained in ERM-West or IT reports available to PRC.*

Because very few data are available to define upgradient ground water quality, the statement concerning the extent of upgradient contamination has been removed.

Minor amounts are defined as less than 5 percent of the total chlorinated VOCs.

Comment Number 45. Page 65, Third Paragraph. What is the significance of the discussion of channel systems? Explain in the text how the data suggest that two channel

systems are controlling contaminant migration in the area. How was it determined that the trend of the shallow channel system parallels Severyns Avenue and passes east of Building 88? Figures would be helpful.

Response: *In the unsaturated zone, sequences of sands would provide fewer sites for the adsorption of chlorinated VOCs compared to silts and clays. In the saturated zone, ground water flow rates could be much higher in areas with thick sands, and could result in the rapid transport of contaminants. In addition, increased ground water flow rates could have an adverse effect on the performance of ground water extraction systems.*

The text has been modified to more clearly present the two-channel system discussion, including a sand isopach map (Figure 7) and chlorinated VOC contamination maps for PCE; TCE; 1,2-DCE (Figures 14, 15, and 16, respectively).

Comment Number 46. Page 68, First Paragraph. Specify the contents of each of the four removed tanks. Include that Tank 56A contained waste oil.

Response: *Section 3.4.3 lists the contents of Tanks 56A, 56B, 56C, and 56D.*

Comment Number 47. Page 68, Second Paragraph. The statement that "The lack of detection of chlorinated VOCs in the soils suggests that the source of this contamination is upgradient of the Building 31 area." needs to be substantiated in the text to follow. Out of the eight locations (SB9-5, Tank excavations 56A, 56B, 56C/D, the two trenches, W56-1, and W56-2) where soil samples were taken, how many were analyzed for chlorinated VOCs (Table 20 does not show chlorinated VOC results?) Provide a table with maximum values of chlorinated VOCs at each of the eight locations. Indicate where there were "non-detects" and "not analyzed." Table 18 is redundant. The same results are provided on Table 19.

Table 19 shows significant contamination discrepancies for BTEX. Why are two results being presented for BTEX and why are there such discrepancies? Please explain in the text.

Table 20 shows results for FP9-2 but the text does not mention this sample. Please include in the text.

No soil sample results were presented for chlorinated VOCs in the vicinity of Tanks 56A and 56B. Tank 56A was a waste oil tank which potentially could have contained chlorinated VOCs. Explain in the text why chlorinated VOC results were not presented for Tank 56A. Table 17 should present chlorinated VOC results for tanks 56A and 56B.

It cannot be concluded that chlorinated VOCs are not significant in soils in this area until soil samples are analyzed in this area and results presented.

Response: *The text has been modified to include a discussion of the soil samples analyzed for chlorinated VOCs. Because chlorinated VOCs were detected only in soil samples from wells W56-1(A1) and W56-2(A1), no chlorinated VOCs (with the exception of methylene chloride) are listed on Tables 19 and 22. Table 18 inadvertently repeated results from Tanks 56A and 56B and has been replaced to indicate results from soil samples from the Tank 56C/56D excavation.*

There are no differences in the analytical methodology which would account for the discrepancies in the BTEX results. However, the high levels of BTEX and the lack of reproducibility suggests the presence of free product in the soil samples. When free product is present in samples, it is possible, as a result of field sampling techniques or laboratory aliquoting, for free product to be in one sample but not in another.

The text has been modified to include results from well FP9-2 in the BTEX discussion.

Section 3.4.3.1 has been modified to clearly present the rationale for the conclusion that chlorinated VOCs are not significant in the soils in the Building 31 area.

Comment Number 48. Page 71, Table 19. Why do results for W56-(2) show blank spaces for 1,1-DCA, 1,1-DCE, total 1,2-DCE, benzene, and 2-butanone? Please clarify the table.

Response: *Results for 1,1-DCA; 1,1-DCE; 1,2-DCE, benzene, and 2-butanone from the soil sample from well W56-2(A1) were inadvertently omitted from Table 19. The table has been revised to include these results.*

Comment Number 49. Page 78, First Paragraph. Please name all the wells and HydroPunch samples used for the characterization and give the analytical methods performed for each. Results should be provided for all of the wells, not just W56-1(A1) and W56-2(A1) as seen on Table 22. The metals table is incomplete as well.

Response: *The text and tables have been modified to include all well and HydroPunch samples used in the characterization. Discussion of analytical methods appears in the introduction to Section 3.4.*

Comment Number 50. Page 79, Third Paragraph. Describe in the text the local source of PCE (as shown by W56-1(A1)).

Response: *The local source of PCE is unknown. Additional sampling and analysis will be necessary to locate this source, although TCE and 1,2-DCE concentrations indicate chlorinated VOC contamination in this area may be connected to a regional source (refer to the discussion in Section 3.4.3.2).*

Comment Number 51. Page 82, Second Paragraph. Reference in the text a figure where Building 14 is shown (Building 14 is not identified on Plate 2).

Response: *All plates indicate the location of Building 14. The southwest quarter of Site 9 has been redefined to include the area west of Building 88 between South Akron Road and Wescoat Road.*

Comment Number 52. Page 82, Third Paragraph. Define "low" as related to chlorinated VOCs in soils and ground water.

Response: *The text has been revised to quantitatively summarize chlorinated VOC contamination in soils and ground water. The actual contaminant concentrations appear in Tables 26 and 28.*

Comment Number 53. Page 82, Fifth Paragraph. Indicate the names of the soil borings and monitoring wells that were sampled for VOCs, petroleum hydrocarbons, and metals. Give results for all on Table 24.

Response: *The locations of the soil and ground water samples collected for VOC, petroleum hydrocarbon, and metal analyses appear in Tables 26, 27, 28, and 29. All soil analyses from the southwest quarter are included in Tables 26 and 27. Table 28 contains all HydroPunch ground water samples collected in the southwest quarter. Analyses from all monitoring wells screened in the A aquifer within the southwest quarter appear in Table 29.*

Comment Number 54. Page 84, Third Paragraph. Reference an appendix where results are shown for the southwest quarter of Site 9. Were petroleum hydrocarbons "not detected" for all monitoring boreholes as well?

Response: *Tables 26, 27, 28, and 29 include all the analytical results listed for the southwest quarter. Sections 3.4.4.1 and 3.4.4.2 have been modified to indicate TPH constituents were not detected in soil or ground water samples from the southwest quarter of Site 9.*

Comment Number 55. Page 84, Fourth Paragraph. Indicate in the text the soil boring names where samples were analyzed for metals. Specify the 23 elements that were analyzed for. Indicate in the text the method used for analysis and reference in appendix containing the results.

Response: *Table 27 contains results for soil samples analyzed for inorganic constituents. A discussion of analytical methods appears in the introduction to Section 3.4.*

Comment Number 56. Page 86, Third Paragraph. Include in the text the names of the HydroPunch samples and monitoring wells that were sampled for VOCs, TPH, semivolatile organic compounds (SVOCs), and metals. Give the analysis methods. Reference in the text where the analytical data can be found for the HydroPunch and monitoring well samples.

Response: *Tables 28 and 29 present the ground water samples analyzed for VOCs, SVOCs, TPH, and metals. Plates 1 and 2 show the sample locations. A discussion of analytical methods appears in the introduction to Section 3.4.*

Comment Number 57. Page 86, Fourth Paragraph and Table 26. The table should show the results of all samples taken for ground water analysis for chlorinated VOCs.

Response: *Table 28 presents analytical data for ground water samples collected from the southwest quarter.*

Comment Number 58. Page 86, Seventh Paragraph. What is the significance of the channel discussion? Present detailed information describing the sand channels.

Response: *Lithologic data suggest buried channels exist in the A aquifer at Site 9. The channel deposits may provide preferential paths for ground water flow. Supporting references have been provided in the text and cross sections (see Plate 3 for locations) have been constructed from the limited available data.*

Comment Number 59. Page 90, Second Paragraph. Explanation is needed on the statement "... ground water contamination appears to be primarily confined to the A1 zone on-site." Contamination has been identified in the A2 zone. The report does not support the claim that the contamination is primarily confined to the A1 zone.

Response: *Because contamination has been identified in both the A1 and A2 zones, the statement that contamination is confined to the A1 zone has been removed. However, the objectives of the source control actions for Site 9 focus exclusively on containment of contamination occurring in the A1 zone.*

Comment Number 60. Page 90, Fourth Paragraph. Seven metals were found in soils at least two times above reported Moffett range and seven metals were found in the ground water above maximum contaminant levels (MCLs) in the Building 29 area. Please indicate in the text what action NAS Moffett intends to take to address metals contamination in soil and ground water. Include detailed rationale for the proposed action.

Response: *Actual background levels for metals in soil and ground water at NAS Moffett Field are currently not defined. The draft action memorandum compared metals concentrations with a site-wide range based on IT's draft Phase I characterization report (1990). The revised action memorandum compares metals concentrations in soil samples only to concentrations presented by Shacklette and Boerngen (1984). Future sampling and analysis of metals*

concentrations at NAS Moffett Field will enable the determination of background values for soils and ground water by applying a geostatistical approach.

Based on data from soil and ground water samples, there are no consistent patterns of metals concentrations that would enable treatment of a specific area at Site 9. Furthermore, source control actions at Site 9 are focused on containment of specific contaminants of concern associated with identified sources. There are no known sources of metals contamination within Site 9.

Comment Number 61. Page 90, Fifth Paragraph. The previous Section 3.4.2 (Building 88) did not provide results and discussions on BTEX and TPH in soils and ground water in the Building 88 area. Include information in this paragraph on removal actions related to petroleum hydrocarbons and TPH.

Four metals in the soils were found above Moffett range and two metals were found in ground water above MCLs. Please indicate in the text what action NAS Moffett intends to take to address metals contamination in soil and ground water. Include detailed rationale for the proposed action.

Response: *Relatively low levels of TPH (compared to Building 29 area results) in soil occur near the fuel oil tank (Tank 67, which was removed) adjacent to Building 88. TPH constituents were not detected in most soil samples including wells W67-1(A1), W68-1(A1), and ERM-4 and borings SB-68 and ERM-B13. TPH concentrations ranging from 36 to 63 mg/kg were detected only in soil samples collected from the Sump 66 excavation. TPH constituents were not detected in ground water samples collected from the Building 88 area. Section 3.4.2 briefly discusses the extent of TPH contamination surrounding Building 88. However, due to the limited extent of TPH contamination in this area, the emphasis in source control is mainly the containment of chlorinated VOCs.*

For metals contamination in soil, see the response to specific comment 60.

Comment Number 62. Page 91, First Paragraph. For Tank 56A, no chlorinated VOC soil results were given in Section 3.4.3 (Building 31) so no conclusions can be drawn on the soil for Tank 56A.

Response: *The narrative concerning Tank 56A has been revised to clarify the discussion on the extent of contamination associated with this tank.*

Comment Number 63. Page 91, Third Paragraph. Metals were found in soils above Moffett range and metals were found in ground water above MCLs in the Building 31 area. Please indicate in the text what action NAS Moffett intends to take to address metals contamination in soil and ground water. Include detailed rationale for the proposed action.

Response: *See response to specific comment 60.*

Comment Number 64. Page 91, Fourth Paragraph. This paragraph states that VOCs in soils and ground water in the A1 zone are low or not detected. Define "low."

Results were not given for BTEX and TPH in the soil and ground water in the southwest quarter. Removal action decisions cannot be made until results are presented in Section 3.4.4 (southwest quarter).

Metals were found in soils above Moffett range and in water above MCLs. Please indicate in the text what action NAS Moffett intends to take to address metals contamination in soil and ground water. Include detailed rationale for the proposed action.

Response: *This paragraph describes low levels of contamination in the southwest quarter of Site 9 relative to higher VOC contaminant levels that occur in the Building 88 area analytical results. Further investigation of the southwest quarter of Site 9 is needed to determine whether a source of contamination exists within this area.*

Sections 3.4.4.1 and 3.4.4.2 have been modified to indicate petroleum hydrocarbons were not detected in soil or ground water samples from the southwest quarter of Site 9.

For metals contamination in soil, see the response to specific comment 60.

Comment Number 65. Page 92, Last Sentence. The report did not present supporting information for the statement that fuel contamination at Site 9 is primarily confined to the

A1 zone. Detailed evidence is needed which includes tables and figures to substantiate this sentence.

Response: *The Site 9 action memorandum text has been revised to state that existing data suggest fuel contamination at Site 9 is prevalent in the A1 zone.*

Comment Number 66. Page 95, Section 4.4.1 Building 29. Please define "primary" contaminant. According to Section 3.4.1, the contaminants of concern for Building 29 area include TPH, chlorinated VOCs, toluene, and metals. Please include this in the section.

Response: *The term "primary" contaminant is synonymous with "most prevalent" contaminant. This implies that a specific contaminant occurs in relatively high concentrations and is the most common contaminant in an area associated with an identifiable source. The text has been revised to read "most prevalent contaminant ...."*

Comment Number 67. Page 95, Section 4.4.2 Building 31. Please include metals as contaminants of concern or present the rationale for not including them.

Response: *See response to specific comment 60.*

Comment Number 68. Page 96, Section 4.4.3 Building 88. Please include metals and possibly BTEX as contaminants of concern or present the rationale for not including them.

Response: *See response to specific comment 61.*

Comment Number 69. Page 135, Section 7.4.1 Second Paragraph. The use of a thermal oxidation process to "polish the off-gas emissions from the stripping tower" will require a treatability study. This will be a time consuming process with regulatory agency concerns that must be addressed. As such, the selection of a thermal oxidation process will have extensive institutional considerations.

Response: *See response to general comment 5.*

Comment Number 70. Page 153, First Paragraph. The treatment system should be decided upon no later than the 35 percent design phase because the 100 percent design

document should describe in detail the system that will be implemented at the site. By the final design stages, all major design issues and questions should be resolved.

Response: *The design basis will be presented in the 35 percent design. This will be based upon the analysis presented in this action memorandum and the results of further field investigations which will occur prior to the submission of the 35 percent design. The 100 percent design will be an in-depth description of the treatment system that will be used for source control. Before submission of the 100 percent design, all design issues will have been resolved.*

Comment Number 71. Page 153, Third Paragraph. Please give a detailed explanation as to the reasons for not characterizing the soils well enough to effectively implement an active soil treatment alternative at the Building 88 area and the Building 31 area. Treatment of contaminated soil in these areas should be implemented so that continued contamination of the ground water from contaminants in the soil does not occur.

Response: *Previous investigations in the areas of Building 31 and Building 88 have focused only on the removal of active sources in each area. These actions have eliminated continued contamination of the soils. At this time, however, the extent of the contamination of the soils is not completely defined. Prior to treatment of contaminated soils in these areas, investigations must be conducted to fully determine the extent of the contamination. Investigations to more fully characterize the extent of soil contamination are planned for July 1991. Based upon the results of these investigations, it will be determined whether an active soil treatment alternative will be implemented near Buildings 31 and 88.*

Comment Number 72. Page 163, Third Paragraph. See specific comments 66, 67, and 68 related to contaminants of concern at Site 9 area.

Response: *See responses to specific comments 66, 67, 68.*

Comment Number 73. Page 164, Section 10, Third Paragraph. The use of an off-gas catalytic oxidation unit will require extensive treatability studies to document the performance of the unit. Due to time constraints and the nature of the

removal action the selection of a catalytic oxidation for off-gas treatment is inappropriate. Also see general comment 5 and specific comment 69.

Response: *See response to general comment 5.*

Comment Number 74. Plate 2. Different monitoring well symbols and soil boring symbols for each episode (i.e., RI sampling, tank and sump removal sampling) should be used for delineation. The plate should also distinguish between monitoring wells that were sampled for soils and those that were not.

Response: *Placing different symbols on the map for each sampling, and boring episode would be confusing and would not provide significant additional information. The information on the extent of each investigation is included in the text.*

Comments from Mr. Cyrus Shabahari, California Department of Health Services

GENERAL COMMENTS:

Comment Number 1. It is evident that the underground storage tanks (USTs) around Building 29 are not fully investigated. It is therefore, important to initiate the needed investigation. The results could provide crucial information and contribute to the remedial design. Please state how the additional field activities will be undertaken to characterize the site further.

Response: *Proposed field activities for the tanks in the vicinity of Building 29 include: (1) trenching to determine the location of each tank, (2) sampling the contents of each tank, (3) removing and disposing of tank contents, and (4) drilling soil borings adjacent to the excavations to further characterize the soils in the vicinity of the tanks. Aquifer tests are also planned to characterize the hydrologic properties of the A1 zone in the vicinity of the tanks. Proposed field activities are described in the Site 9 Field Work Plan (PRC, June 1991).*

Comment Number 2. The document fails to provide a contour map of the contamination. The data gathered from the previous investigations could be utilized into a three dimensional contour map.

Response: *Isoconcentration contour maps were developed to illustrate the lateral extent of soil and ground water contamination in the A1 zone of the A aquifer. These maps are presented in Section 3.4 of the revised action memorandum (see Figures 13 through 17).*

Comment Number 3. The documents focus the ground water removal only on A1 zone. However, the contamination has appeared in both A1 and A2 zones. Furthermore, it is not clear how the aquifer zoning will affect the removal design and hence, the remedial action. Please provide an explanation.

Response: *Contamination has been identified in both the A1 and A2 zones beneath Site 9. Recent studies have shown that contaminated ground water from the MEW study area has migrated beneath NAS Moffett Field in the lower A2 permeable zone. However, the emphasis in source control at Site 9 is the containment of hazardous chemical constituents within the shallow soils and the ground water within the A1 permeable zone beneath Site 9. The source control actions*

focus on specific contaminants associated with identified sources. This response action is designed to implement source control and containment of on-site contamination to prevent contaminants from migrating horizontally and vertically from source areas and entering the regional (A2 zone) ground water system.

Comment Number 4. The documents fail to discuss the soil remediation at Buildings 88 and 31. The provided data show copious signs of soil contamination at both areas. Please provide an explanation.

Response: *Previous investigations in the areas of Building 31 and Building 88 have focused only on the removal of active sources in each area. These actions have eliminated continued contamination of the soils. At this time, however, the extent of the soil contamination is not completely defined. Prior to treatment of contaminated soils in these areas, investigations must be conducted to fully determine the extent of contamination. Investigations to more fully characterize the extent of soil contamination are planned for July 1991. Based upon the results of these investigations, it will be determined whether an active soil treatment alternative will be implemented near Buildings 31 and 88.*

Comment Number 5. The documents identify and propose the wells to extract the ground water and treat approximately 4.2 million gallons of contaminated ground water. It is not clear how the ground water volume was established. And secondly, which downgradient wells will be chosen to ascertain the progress.

Response: *Approximately 4.2 million gallons of water would be generated by pumping at a combined rate of 8 gallons per minute continuously for one year (24 hours per day, 365 days per year). Appropriate downgradient monitoring wells will be chosen (or installed) based on the results of the planned aquifer tests at Site 9.*

SPECIFIC COMMENTS:

Comment Number 1. Page 53, First Paragraph. The value of vinyl chloride is not given. Moreover, it is not clear how the conversion of 10 to 20 percent of 1,2-DCE to vinyl chloride was derived. Please explain.

Response: *Section 3.4.1.2 has been revised to include the vinyl chloride concentrations. An example of the calculation of VOC ratios also appears in Section 3.4.1.2.*

Comment Number 2. Page 63, Fifth Paragraph. It is not clear which document the "RI" is referring to. Please clarify.

Response: *References to the RI include IT quarterly reports and the Phase 1 characterization report.*

Comment Number 3. Page 65, First Paragraph. If the lateral extent of the contamination is not known how do you assume that the downgradient well of W68-1(A1) is W09-18(A1)? Plate 2 identifies the locations of this well to be northeast of W68-1(A1). Please provide an explanation.

Response: *The potentiometric surface map (Figure 11) for the A1 zone indicates ground water in the vicinity of Building 88 flows north-northeast toward well W9-18(A1).*

Comment Number 4. Page 156, First Paragraph. Please provide the zone of the new proposed well.

Response: *The designated zone for the proposed well (the A1 zone) has been included in Section 9.0.*

Comment Number 5. Page 164, First Paragraph. Please explain how much time is required to perform bench scale studies to confirm the effectiveness of the proposed design.

Second Paragraph. Please provide an explanation as to what will happen to the ground water extraction system after one year.

Third Paragraph. It is not clear what areas will be included in the soil bioremediation. Please clarify.

Response: *Bench scale studies will require approximately 1 month to complete (measured from the time samples are collected).*

According to the National Oil and Hazardous Substances Contingency Plan (NCP), extraction and treatment would cease after 1 year. However, the NCP allows the lead agency to continue operations if the extraction and treatment is appropriate and consistent with overall remedial actions to be taken at NAS Moffett Field.

Section 7.7 describes details of the proposed in-situ soil bioremediation system. The system will include soils from the vicinity of the 10 USTs near Building 29.

Comments from Mr. Steven Morse, California Regional Water Quality Control Board

SPECIFIC COMMENTS:

Comment Number 1. Page 90, Section 3.5. This states that water in the A1 zone is not used, nor planned to be used, as a drinking water source. If the water meets our definition of a potential source of drinking water, i.e. TDS less than 3,000 parts per million (ppm) and being able to pump the zone at greater than 200 gallons per day, then it should be considered to have that beneficial use. This definition is in our Basin Plan and is an applicable or relevant and appropriate requirement (ARAR).

Response: *Section 3.5 has been revised to more accurately describe the A aquifer in relation to RWQCB drinking water criteria.*

Comment Number 2. Page 91, Last Paragraph. This stated that in the southwest corner of Site 9 VOC concentrations in the A1 ground water were low or not detected. Therefore, no removal actions were recommended for this portion of the site. However, in Table 26 the data for the three A1 wells show total VOCs to range from 224 to 6,173 ppb. We do not consider these concentrations low and recommend the no action recommendation be reconsidered.

Response: *Additional field activities are planned to investigate the potential for contaminant sources in the southwest quarter of Site 9. It should be noted that although the lack of an identified source would exclude the southwest quarter from source control activities, it does not preclude the area from future treatment as part of the facility-wide remedial investigation/feasibility study process.*

Comment Number 3. The action-specific ARARs on page 98 only consider discharge of treated ground water to a publicly owned treatment works (POTW), however, on page 100, Section 5.1.1.3 states the discharge could be to either a POTW, surface water, or reinjection. This discrepancy should be resolved. Also on page 98 it should be noted that there are state ARARs corresponding to 40 CFR 261 and 268 contained in the Health and Safety Code and 22 CCR.

Response: *Section 6.1.1 discusses discharge options for extracted ground water and the rationale for selection of discharge to a POTW. Relevant State of California regulations are noted for future reference.*

Comment Number 4. Appendix F, First Page. The Public Water Supply Branch has been changed to the Office of Drinking Water.

Fourth Page. The RWQCB, rather than DHS, is the regulatory agency for the Porter-Cologne Water Quality Act.

Fifth Page. The last two items under land disposal are repetitious except for the regulation citation. The one citing 23 CCR chapter 15 should be modified to read "Porter-Cologne Water Quality Control Act, California Water Code" for the statute, "Regulates all discharges of waste to land, including both hazardous and solid waste." for the applicability section, and RWQCB for the regulatory agency.

Response: *Appendix F has been modified accordingly.*