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15 MAY 1991

From: Commander, Western Division, Naval Facilities Engineering Command
To: Distribution

Subj: ACTION MEMORANDA FOR SITES 8 & 9 AT NAS MOFFETT FIELD

Ref: (a) Site 8 Waste Oil Transfer Area Action Memorandum
(b) Site 9 Action Memorandum, Volumes I and II

Encl: (1) Response to Comments, Site 8 Draft Action Memorandum, NAS Moffett Field
(2) Response to Comments, Site 9 Draft Action Memorandum, NAS Moffett Field
(Vol. I & II)

1. References (a) and (b) have been provided to you under separate cover on 1 May 1991 from our contractor for your review. Please provide any comments no later than 1 June 1991. This submittal fulfills the FFA Attachment 5 "Final Action Memorandum for Phase II Removals at Sites 8 & 9" schedule requirement. Enclosures (1) and (2) have been included for your information and review.

2. The conclusion of the Site 8 Action Memorandum is that no sources could be located and that no removal action is planned for that site.

3. If you should have any questions regarding this matter, the point of contact is Commander, Western Division, Naval Facilities Engineering Command (Attn: Mr. Stephen Chao, Code 1813SC, (415) 244-2552).

Sincerely,

Original signed by:

RICHARD SERAYDARIAN
Head, Installation Restoration Section

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RESPONSES TO EPA COMMENTS ON THE SITE 8 DRAFT ACTION MEMORANDUM
NAVAL AIR STATION MOFFETT FIELD

GENERAL COMMENTS

1. *All appendices should include references for all data presented.*

All appendices now reference the data presented. This reference appears on the cover sheet to each appendix.

2. *The regional groundwater plume should be shown on a figure and described in the text. Groundwater flow directions should be shown both at Site 8 and with respect to the entire NAS Moffett site. Compare concentrations found at Site 8 to regional plume concentrations. This will help in the determination of the necessity of source control at the site.*

The regional VOC plume is shown in Figure 2, *Site Location map*, and is referenced in Section 2.4, *Potential or Actual Release of Contaminants* (Revised text is shown below, new text is bold). (It is not shown in the other figures, because based on the last *regional* interpretation, the plume had not reached Site 8.) Groundwater flow directions are shown on the figures.

2.4 POTENTIAL OR ACTUAL RELEASE OF CONTAMINANTS

Based on the results of previous investigations, there was a presumed release of 1,1,1-TCA from the tank/sump at Site 8, although this cannot be confirmed without more upgradient information. The latest regional interpretation of the VOC plume (HLA, 1988), suggests that the 100 µg/L TCE contour line on the isopleth is approximately 1,000 feet upgradient of Site 8. It is possible that, given the three years that separate the MEW group results and the Site 8, Phase II investigation (IT Corp. 1990e), VOCs could have migrated as far downgradient as Site 8, especially considering the heterogeneity of the shallow permeable zones. With the exception of 1,1,1-TCA, VOCs detected in monitoring wells were less than 50 µg/L, which is less than the definable "edge" of the regional VOC plume.

3. *The soil boring logs did not reproduce well; the document should contain easily readable boring logs.*

Better originals were used in reproducing all boring logs for the Final Action Memorandum.

SPECIFIC COMMENTS

1. *Page 6, 3rd Paragraph*

The emphasis of source control could be soil remediation if soils were determined to be significantly contaminated and a health risk to humans (i.e., from airborne contaminants). This possibility should be considered in a paragraph.

The text has been revised to incorporate the comment:

The purpose of source control activities at Site 8, which is addressed in this AM, is to prevent vertical and areal migration of contaminants from a source (if any) at the site. The emphasis in source control is the remediation of contamination of the soils of the site (if contaminated), thus preventing groundwater contamination and reducing human health risks.

2. *Page 6, Section 2.1 Site Background*

How were the waste oils and solvents disposed of after being pumped into the transfer tank? Lindberg drainage ditch lies in close proximity to Site 8. Was it possible that the tank wastes were disposed of in Lindberg drainage ditch?

Additional text has been included to incorporate the comment:

Reports indicate that the contents of the transfer tank were collected by a waste oil recycling company. However, it is possible that some of the waste oil may have been used for dust and weed control.

3. *Page 8, Figure 3 Site Map*

Labeled streets, Lindberg drainage ditch, Site 8 boundaries and Navy/NASA property boundaries should be on the figure. Also, is there a CPT/HP8-9? Figure 3 should include all wells in the vicinity of Site 8, including all MEW wells to date.

The requested additions to the appropriate figures have been made. No HydroPunch sample was taken at CPT/HP8-9. All known monitoring wells within the limits of the figure are included.

4. *Page 10, Section 2.2.4 Base-Wide Hydrogeology*

This section should discuss tidal influence on groundwater levels.

Additional text has been included to incorporate the comment:

The groundwater elevations in the aquifer zones may be tidally-influenced. Currently, no data have been collected (*e.g.*, water level measurements at thirty minute intervals for a 24 hour period at NAS Moffett Field or NASA Ames) which can support this suggestion. Tidal influence is a function of:

- distance from San Francisco Bay;
- heterogeneity and anisotropy of the aquifer zone(s);
- degree of confinement of the water-bearing zone;
- hydraulic conductivity;
- distance from permeable, highly conductive lenses such as buried stream channels;
- possible influence from overlying or underlying aquifer zones.

5. *Page 16, Table 2*

Phase I activities included the installation of 6 monitoring wells. This should be reflected in the table.

As part of Phase I investigations, five wells were installed by IT Corp. W08-01(A) had been installed previously by Earth Sciences Associates (ESA, 1986). This previous activity is now reflected in the table.

6. *Page 17, 2.3.1 Soil Analytical Results, 1st Paragraph*

Were soil samples collected from all Phase I and II monitoring wells at Site 8? Specify which wells had soil samples and include in this section soil sample results from wells in the area including such wells as MEW wells.

The text has been revised to incorporate the comment (new text in bold):

Soil samples to approximately five feet were collected also from all Phase I and II borings that were completed as monitoring wells.

Soil sample results from the monitoring wells are discussed in the section. Results from MEW wells are not included because these wells are not within Site 8 boundaries and thus are not relevant for source control determinations.

7. *Page 17, 3rd Paragraph and Figure 7*

The development of the baseline metal content of soils in the Draft Phase I Characterization Report is being re-evaluated due to the inherent erroneous assumptions. In the draft Phase I Report, values below the detection were not used in estimating background levels. Because values below the detection are an integral part of the normal range, they cannot be dismissed. Background values have yet to be established and will likely be less than reported in the Phase I report. Soil contamination should be re-examined in light of this fact.

The Final Phase I Characterization Report has not been published to date, hence, the newly developed baseline metal concentrations cannot be incorporated into this AM. While the values may indeed be lower than those used in the Draft Phase I Characterization Report, the conclusions drawn regarding Site 8's potential source control activities likely will not change.

8. *Page 18, Table 3*

This table needs explanation. What is the Well 18 information? What wells were sampled and at what depths in order to obtain the given information? Specify what area of the country the USGS range relates to. The table should show specific Site 8 soil information for comparison purposes.

Background information is provided for city of Mountain View Well 18, which is upgradient of NAS Moffett Field. The USGS range covers undisturbed soil samples throughout the country. Because a "background" boring was not drilled at Site 8, site-specific background information cannot be developed. (Using a statistical method with only Site 8 data, similar to what was done by IT Corp. for the entire base, is not valid because of the small sample population.)

9. *Page 19, Figure 6*

Soil sample results were not given for MEW82 and MEW92. Include results or state the reason for not including the results.

Soil sample results were not given for W08-01 and W08-03. Please include on the figure.

Results for SB8-08 are directed to what looks like W8-10. Please clarify.

SB8-3 detects MEK at 20 ug/kg (at 3'). Please rectify.

Results from MEW wells are not included because these wells are not within Site 8 boundaries and thus are not relevant for source control determinations. Soil samples from the boring W08-01(A) were only sampled for metals (ESA, 1986). W08-03 The results for W08-10 have been clarified in the figure. The figure now indicates that MEK was detected at 20 $\mu\text{g}/\text{kg}$ at the three-foot depth of SB8-3.

10. *Page 20, Top (from the paragraph on the previous page)*

See specific comment 7. The baseline values from the Draft Phase I Characterization Report were used in this paragraphs's comparison; however, background values are likely to change for the final Phase I report or as more data is generated during the RI.

See response to EPA comment 7.

11. *Page 22, Table 5*

Information on MEW92 is missing.

This well was not sampled as part of the Navy RI. Results from the MEW RI have been added to Table 5. However, these are not shown graphically (Figure 8) because of the difference in sampling periods (1986 versus 1989).

12. *Page 25, Figure 7*

Soil results for W8-01, MEW82, and MEW92 are missing from the figure.

Results from MEW wells are not included because these wells are not within Site 8 boundaries and thus are not relevant for source control determinations. Results from boring W08-01(A) have been included in the figure.

13. *Page 26, Figure 8*

An organic contaminant block should be shown for hydropunch CPT/H8-17. Why are results for H8-4 and H8-5 not available? Hydropunch CPT/H8-19 should show PCE at 5 ug/L. Hydropunch CPT/H8-6 should have TCE at 24 ug/L. Well W8-5 (A2) should have 1,1,1 TCA from 22-37 ug/L. Well W8-1(A2) should have 1,1,1 TCA from 6-18 ug/L. Hydropunch H8-2A is presented but H8-2B is not. Hydropunch H8-2A should not have 1,1, TCE at 19 ug/L in the block. MEW92 data should be shown on the figure.

Results for CPT/H8-17 have been included. CPT/H8-4 and CPT/H8-5 were not sampled/analyzed. Results for CPT/H8-19 and CPT/H8-6 have been corrected. Results for wells W08-05(A2) and W08-01(A2) have been corrected. Results from CPT/H8-2B have been included. Results for CPT/H8-2A have been corrected. See response to EPA comment 11.

14. *Page 28, 2nd Paragraph*

See specific comment 7 regarding the Draft Phase I Characterization Report.

See response to EPA comment 7.

15. *Page 29, Table 7*

See specific comment 7. Why is data from Site 10 (well W10-06(C)) provided? This does not relate to Site 8. Site 8 information should be provided on the table for comparison.

See response to comment 7. There are no "background" wells for Site 8. Well W10-06(C) has been used previously as a NAS Moffett Field-specific background well (IT Corp., 1990d). Because this well is screened in a deeper aquifer, the concentrations of inorganic constituents are probably lower than what would be background for A1- and A2-aquifer zone wells and are therefore, conservative values.

RESPONSES TO RWQCB COMMENTS ON THE SITE 8 DRAFT ACTION MEMORANDUM
NAVAL AIR STATION MOFFETT FIELD

SPECIFIC COMMENTS

1. *Page 17, second Paragraph*

It states here that certain organic compounds found in soil, i.e. acetone, methylene chloride, and MEK, may be associated with sampling and/or analytical method contamination. Before dismissing data a quantitative comparison of concentrations in samples and in various QA/QC blanks needs to be made and only samples with a similar range of concentrations as shown in the blank should be eliminated.

The text has been revised to the following:

These compounds are common laboratory contaminants. Their distribution suggests no areal pattern and there are no known sources of these chemicals in the area.

2. *Page 17, last Paragraph*

This references the metal background data contained in the draft Phase I Characterization Report. This part of the Characterization Report was extensively commented on by the agencies and is currently being revised. Any comparison of data in this Site 8 Report with conclusion of the Characterization Report should await finalization of the Characterization Report. At this time the Characterization Report should not be used to define background concentrations.

The Final Phase I Characterization Report has not been published to date, hence, the newly developed baseline metal concentrations cannot be incorporated into this AM. While the values may indeed be lower than those used in the Draft Phase I Characterization Report, the conclusions drawn regarding Site 8's potential source control activities likely will not change.

3. *Page 28, first Paragraph*

This paragraph concludes that the solvent plume from this site may not be as areally extensive as suggested by the Hydropunch data. This is based on the fact that data from one well-Hydropunch pair did not have strong agreement, and the fact that equipment blanks were not collected for Hydropunch samples. (Note that another well-HydroPunch pair, W8-5(A2) and CPT/H8-1/, showed the same four chemicals and three of the four concentrations were similar. We believe this conclusion is inappropriate and that the Hydropunch data should be considered valid until shown otherwise.

HydroPunch data are non-enforceable and are only intended to show major trends and help in monitoring well siting. Values below 100 µg/L are generally suspect. In general, the distribution of contaminants interpreted from HydroPunch samples and monitoring wells is dissimilar. As part of the North Base Area investigations, HydroPunch samples (including equipment rinsates) will be collected in the vicinity of Site 8 and can be used to assess the validity of previous HydroPunch work.

4. *Page 28, second Paragraph*

This refers to the background water data contained in the Characterization Report. Our comment is the same as for page 17, last paragraph.

See response to RWQCB comment 2.

5. *Page 28, third Paragraph*

This paragraph concludes that the plume is defined. However, different aquifers were used to reach this conclusion. The A2 aquifer was used for lateral definition and the A1 for downgradient definition. There does not appear to be lateral definition of the A1 or downgradient definition of the A2. Also, the Hydropunch data indicate that the plume is not defined.

The 1,1,1-TCA "plume" appears to be confined to the A2-permeable zone. Despite the aquifer designation associated with its well name, W08-08(A1) appears to be screened in the same permeable zone as the "A2" wells (See Figure 9, Geologic Cross-Section A-A'). Therefore, W08-08(A1) does define the downgradient extent of contamination. Likewise, W08-02(A2) is screened below the A2-permeable zone (and below other "A2" wells) and therefore, defines the vertical extent of 1,1,1-TCA.

6. *Page 31, first Paragraph*

This states that the A2 aquifer is not a potable aquifer. This Board has defined potential sources of drinking water as those aquifers which have a TDS of less than 3000 ppm and are able to be pumped at a sustained rate of 200 gallons per day. Any conclusions of whether an aquifer is potential source of drinking water should be made in comparison to our definition. This definition is part of our Basin Plan and we therefore consider it an ARAR.

The text has been revised to the following:

Although the A2-permeable zone is defined as a potable aquifer, it is not currently (or projected to be) used for drinking water supply. No production wells screened in that aquifer exist near the site.

While the intent of the Basin Plan in protecting resources is understood, the current use of the aquifer is what is germane in consideration of source control activities.

7. *Page 31, last Paragraph*

Our position is that chemicals in groundwater are a source for further migration. Therefore we believe that interim control measures to prevent further migration are appropriate.

As discussed in the Monthly Managers' Meeting on April 23, 1990, the intent of source control is to prevent the present or future migration into the environment of contaminants potentially associated with Site 8 at NAS Moffett Field. However, based on the site characterization a source has not been identified at Site 8, and therefore removal actions are not warranted. Further remedial actions may be necessary to remove relatively low concentrations of chlorinated solvents from shallow groundwater at the site. Additional site characterization and permanent remedial actions may be implemented in subsequent RI/FS phases, as appropriate. Site 8 remains an IRP site; a record of decision has not been written stating that no further investigations are necessary, rather Site 8 is no longer considered appropriate for source control measures. Navy is currently defining operable units and Site 8 may be a candidate to be included.

8. *Page 32, first Paragraph*

We concur that interim measures are not intended to be a final solution for groundwater remediation. We also concur that area wide remedial measures may be more efficient. However, we do not believe that source control should be limited to removal actions. As noted above preventing the further migration of contaminated groundwater is also all appropriate interim action.

See response to RWQCB comment 7.

RESPONSES TO DHS COMMENTS ON THE SITE 8 DRAFT ACTION MEMORANDUM

GENERAL COMMENTS

1. *The data generated from tank and sump removals are not available for review. The results of the removal investigation may indicate the need for further investigation.*

Previous investigations are outlined in the Confirmation Study (ESA, 1986). A PCB was detected in a grab sample (7.8 mg/kg) and Arochlor 1260 was detected in a surface soil sample (25 mg/kg). Neither of these results were confirmed in the other five borings drilled by ESA, nor in two phases of the RI.

2. *An explanation is needed as to why there are only two A1 aquifer monitoring wells which are located 1000 feet apart (Figure 10). As of now the investigation results are inconclusive and do not support the recommended postponement of the removal action.*

This AM is based on previous investigations, hence, rationale for well location selection cannot be addressed here. The "A2" wells were screened in the first encountered permeable zones, as recorded in the field. Subsequent CPT work has revealed a thin (less than about five feet thick) permeable zone (A1) located above the A2-permeable zone. This zone, as well as the aquitard separating A1 and A2-permeable zones is thin and laterally discontinuous. The A2-permeable zone is the one in which solutes are expected to migrate. In addition, HydroPunch samples were collected from the A1-permeable zone in some cases. Because an interpretation of area distribution of VOCs using these data does not suggest a source at Site 8, existing data are sufficient to support the recommendation of the AM.

3. *The recent discovery of DCE plume on the NASA and Moffett Field property boundary stretching to the marshlands suggests a possible connection to the west side of site 8. There should be further investigation.*

As part of the North Base Area investigations, HydroPunch samples will be collected in the vicinity of Site 8 and can be used to assess the validity of previous HydroPunch work and the possible connection of chlorinated solvents detected in the URS study to Site 8.

4. *The high level of TCE at CPT/H-8 needs further interpretation as to its origin, extent, and remediation.*

There is nothing to suggest that there is a local source of TCE near CPT/H8-1. HydroPunch samples are collected from a sampling device that has not been completed, developed, and purged in the same manner as monitoring wells and data generated from these samples should only be viewed as qualitative indicators of contaminants. Oftentimes suspended solids (with sorbed contaminants) are introduced into the sample bottle because of the nature of the sampling device, and therefore the analytical result may suggest a much greater concentration than is in groundwater. In addition, the TCE concentration from the HydroPunch sample collected from CPT/H8-1 is isolated. Recommendations and decision concerning site remediation cannot be made from a single, unconfirmed value.

NAS MOFFETT FIELD SITE 9
RESPONSE TO COMMENTS ON DRAFT ACTION MEMORANDUM
VOLUMES I AND II, MARCH 1, 1991

INTRODUCTION

This report presents point-by-point responses to comments received from regulatory agencies for the Site 9 draft action memorandum dated March 1, 1991 for Naval Air Station (NAS) Moffett Field in Mountain View, California. Comments were received from Mr. Lewis Mitani for the U.S. Environmental Protection Agency (EPA) in a letter dated March 29, 1991; from Mr. Cyrus Shabahari of the California Department of Health Services (DHS) in a letter dated March 27, 1991; and from Mr. Steven Morse of the California Regional Water Quality Control Board (RWQCB) in a letter dated April 3, 1990.

In general, responses to comments refer to sections within the revised action memorandum dated May 2, 1991.

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

GENERAL COMMENTS:

Comment Number 1. All tables, figures, and plates should show the reference(s) to make the report more useful and complete.

Response: Figures have been referenced to the sources they were reproduced from. References for tables are provided in the narrative of the revised action memorandum.

Comment Number 2. Migration patterns of the contaminants should be better described, especially in terms of the vertical migration from the A aquifer to the B aquifer. Ground water flow directions for Site 9 should be provided on a figure.

Response: Previous investigations have shown that the A1 and A2 permeable zones are hydraulically interconnected (NEESA, 1984 and SAI, 1983). Currently, the migration of contaminants and the extent of hydraulic interconnection between the A1 and A2 zones is not clearly defined. Additional site characterization

data are essential to more clearly define the hydraulic characteristics of the A aquifer.

Ground water flow direction and gradient were determined using International Technology Corporation (IT) quarterly reports. Potentiometric maps for the A1 and A2 zones were reproduced from the November 1990 and February 1991 quarterly reports and are presented in Appendix E (Volume II) of the revised action memorandum.

Comment Number 3. Because the design costs are based on disposal of the effluent to the publicly owned treatment works (POTW), Sunnyvale POTW should be contacted in the early stages of planning to verify discharge capability.

Response: The feasibility of discharging treated ground water to the Sunnyvale POTW cannot be determined until the POTW receives and reviews a discharge permit application for this action. The Navy will submit the application to the POTW after receiving field investigation data (flow rate data) necessary for preparing the application. Based on preliminary discussions with POTW personnel, no problems are anticipated with receiving approval to discharge treated ground water to the Sunnyvale POTW.

Comment Number 4. The "regional Middlefield, Ellis, Whisman (MEW) plume" and its relationship to Site 9 should be described and identified on a figure.

Response: The objectives of the source control for Site 9 are limited to the A1 zone. The regional MEW plume is not known to be present above the A2 zone, and is therefore beyond the scope of these objectives; therefore, the plume has not been delineated on a figure. The relationship of regional contamination to the specific sources within Site 9 has been described in Sections 3.0 and 4.0 of the revised action memorandum.

Comment Number 5. All analytical data in the report should be included in appendices or specifically referenced throughout the report.

Response: Analytical data incorporated in the revised action memorandum have been referenced in the narrative.

Comment Number 6. To accurately characterize the site, all available information about the site's contamination should be investigated and discussed in this report. All wells in the vicinity of Site 9 should be shown on a figure and all pertinent past analytical results presented.

Response: *All pertinent analytical data including results from the remedial investigation (RI), the tank and sump investigations, and the Building 29 investigation were considered in preparing the revised action memorandum. In some cases, results were determined not to be applicable to a particular source and have not been incorporated in the report.*

SPECIFIC COMMENTS:

Comment Number 1. Page 10, Third Paragraph. Explain how the ponds act as a buffer zone 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. The reducing estuarine environment of the evaporation ponds, also, supports the growth and reproduction of bacteria, which may consume contaminants. Surface and ground water flowing north from NAS Moffett Field pass through this area before reaching San Francisco Bay.*

Comment Number 2. Page 13, Figure 4. IT Corporation labeled the uppermost aquifer the "A1" aquifer, not the "A" aquifer. Please clarify.

Response: *The "A" aquifer designation for the uppermost permeable zone has been changed to the A1 zone within the A aquifers, to agree with the definition used previously by IT. All references to the "A" zone have been corrected in the text, in tables, and on figures of the revised action memorandum.*

Comment Number 3. Page 17, Figure 5. What information supports the location of the hypothetical divide between areas of hydrocarbon contamination and chlorinated solvent contamination? As given in Table 2 (page 22), areas 9E, 9F, and Building 88 contain benzene at or above 1,000 parts per billion (ppb) and 9E and Building 88 contain toluene at or above 1,000 ppb. Additionally,

areas 9A, 9B, and 9C contain chlorinated organics above 1,000 ppb. Contamination values do not support the hypothetical divide.

Response: The reference to a divide between areas of hydrocarbon and chlorinated solvent contamination has been eliminated in the revised action memorandum.

Comment Number 4. Page 28, Section 3.2.5 Water Level Measurements. Plate 2 references W09-07 as a B1 aquifer well and this section references it as an A aquifer well. Please clarify.

Response: Well W09-07 is an "A2" aquifer well as defined by IT. References to all wells have been corrected on the revised base map and in the text and in tables of the revised action memorandum.

Comment Number 5. Page 28, Section 3.3.1 Soil Contamination. This section states that analytical results for monitoring wells W09-20 and W09-24 were not available. Explanation is needed on the reason(s) for the unavailability of the results for these wells.

Response: Copies of IT quarterly reports reviewed to prepare the Site 9 action memorandum did not contain results for these samples. This situation should improve with the establishment of the centralized data base being undertaken by James M. Montgomery Consulting Engineers, Inc. (JMM).

Comment Number 6. Page 30 and 31, Table 5. See general comment 1.

Response: See response to general comment 1.

Comment Number 7. Page 33, Second and Third Paragraphs. Wells are referred to as "FP9-1" and "FP9-2" here and throughout the report but they are not shown as such on Plate 2. Please clarify. Wells W09-01 and W09-02 should be included in the report (i.e., Table 8, trichloroethene (TCE) concentrations).

Response: Wells FP9-1 and FP9-2 have been added to Plate 2. Wells W09-01 and W09-02 have not been included in the revised action memorandum, because data for these wells were not available.

Comment Number 8. Page 33, Fourth Paragraph. Background values have not been finalized to date and may be less than referenced background values. The development of the baseline metal content of soils in the draft phase I characterization report is being re-evaluated due to inherent erroneous assumptions. In the draft phase I report, values below the detection were not used in estimating background levels. Because values below the detection are an integral part of the normal range, they cannot be dismissed. Background values have yet to be established and will likely be less than reported in the phase I report. Soil contamination should be re-examined in light of this fact.

Response: Ranges of metals concentrations in soils reported in the Draft Phase I Characterization Report were used for comparison, due to the lack of finalized information. These comparisons will be updated when ranges have been finalized. To avoid confusion caused by the use of the term "background ranges," changes were incorporated into the text of the revised action memorandum to refer to them as "NAS Moffett Field range."

Comment Number 9. Page 34, Table 6. See general comment 1. Why have results for W09-03, W09-14, and W09-27 been omitted from the table? The draft phase I characterization report (August 1990) contains analyses reporting that chlorinated organic contaminants were found in soils at these locations.

Response: Table 6 of the draft action memorandum lists the maximum concentrations of chlorinated volatile organic compounds (VOCs) in soils. Soil samples collected from well W09-03 contained these compounds in only low concentrations. Results for the soil sample from W09-14 were inadvertently left out and have been included in Section 3.4.2 of the revised action memorandum. The soil sample from W09-27 was not included in summary tables because concentrations were below detection limits.

Comment Number 10. Page 38-40, Table 8. See general comment 1. According to the phase I characterization report (August 1990, page 9.1.14), W09-06 contained 1,1-dichloroethene (1,1-DCE) at a concentration of 6 micrograms per liter ($\mu\text{g/L}$). Please note on table.

See general comment 6. HydroPunch sampling results are not included for H9-16, H9-18, H9-23, H9-26, H9-32, H9-34, H9-38, H9-40, H9-42, H9-44,

and H9-45B. These HydroPunch results should be included in the report and reviewed to obtain an accurate characterization of the site.

H9-1 should be H9-11 in the table and on Plate 1.

The 4th quarter 1990 report contains higher levels than reported for W9-18, W09-30, W09-16, W09-31, and W09-23. Also, show MEW-81 on Plate 2. See general comment 6.

Response:

See response to general comment 1. The concentration of 1,1-DCE in ground water sample W09-06 was entered incorrectly in Table 8 of the draft action memorandum. However, results for this ground water sample were also not incorporated in the revised action memorandum, because the well appears to be screened in a less permeable zone.

See response to general comment 6. Hydropunch Sampling results for H9-23, H9-40, and H9-44 have been included in summary Table 15, page 64 of the revised action memorandum. Results for samples H9-29 and H9-42 are included in summary Table 26, page 87 of the revised action memorandum. No analytes were detected in the remaining six samples.

References to H9-1 have been changed to H9-11 in the narrative and on the accompanying base map in the revised action memorandum.

Discussions of chemical data in the revised action memorandum have been updated to include the 1990 fourth quarter results for all locations. In addition, MEW-81 has now been shown on Plate 2. See response to general comment 6.

Comment Number 11. Page 41, First Paragraph. What criteria were used to determine that in the vicinity of Building 45 the A aquifer is "moderately contaminated?" What determines a "moderate" amount of contamination? Why are H9-19 and W09-31 results inconsistent? Report H9-19 sample depth and W09-31 screen interval.

Response: *The relative degree of contamination in the A1 zone near Building 45 was based on a comparison with other contaminated areas (Buildings 29, 31, and 88). The distinction is arbitrary and has been removed.*

Currently, there is no explanation for the apparent discrepancy in results for samples H9-19 and W09-31. Possible explanations for the inconsistency are sampling bias, heterogeneity of the contamination, or intersection of more permeable material by the well screened interval.

Comment Number 12. Page 42, Table 9. See general comment 1.

Response: *See response to general comment 1.*

Comment Number 13. Page 44, Table 10. See general comments 1 and 6. According to the February 1990 quarterly report, W09-06, W09-07, W09-13, and W09-27 detected metal species in ground water (i.e., 9.1-20). Also, W09-24 is not shown on the table. Please complete the table.

Response: *See responses to general comments 1 and 6. Metals data for ground water samples at Site 9 have been summarized in Tables 11, 16, 23, and 27. Other summary tables have been added incorporating additional data. Wells for which constituent analyses were not completed or no analytes detected were not included on summary tables. Data for well W09-24 were not available.*

Comment Number 14. Page 46, First Paragraph. The reference should be included for the statement "Petroleum hydrocarbons in the soils were found only at the saturated/unsaturated zone interface." Sample depths, water levels, and other information should be provided to support this conclusion.

Response: *References to the locations of the petroleum hydrocarbon contamination have been modified to indicate a depth below land surface. Total petroleum hydrocarbon (TPH) contamination was found in a band between 9 and 13 feet BLS. Section 3.4.1.1 on page 45 of the revised action memorandum contains additional information concerning petroleum hydrocarbon contamination in soils near Building 29.*

Comment Number 15. Page 48, Section 3.4.3 Building 88. This section should discuss Building 88 in view of the high levels of benzene and toluene found in the area (see Table 2, page 22). A brief history of Building 88 with regards to it being a possible source of benzene and toluene would be helpful.

Response: *Table 2 should not have indicated that benzene and toluene are major contaminants in the area of Building 88. The table has been corrected in the revised action memorandum and no longer indicates that benzene and toluene are major constituents in the Building 88 area.*

Comment Number 16. Page 49, Section 3.5 Potential or Actual Impacts on Surrounding Populations. See general comment 2. This report presents contamination in the A aquifer at Site 9 and does not evaluate the contamination in the B aquifer. How is it known that ground water contamination is primarily confined to the A aquifer? In order to state this, sufficient evaluation of the B aquifer needs to be presented. As evident in the 4th quarter 1990 report and the phase I characterization report, TCE and other chlorinated organics are present in the B aquifer. Additionally, there is close proximity between the A and B1 aquifers and they are likely to be hydraulically connected. Site 9 has been in operation for many years and it is likely that contamination from Site 9 has migrated from the A aquifer to the B1 aquifer and further.

Response: *Contamination has been identified in both the A1 and A2 zones. The objectives of the source control action, however, focus exclusively on containment of contamination found in the A1 zone. The statement in Section 3.5 on page 90 of the revised action memorandum referring to contamination being confined to the A aquifer has been removed.*

Comment Number 17. Page 53, Section 4.4.1, Building 29. According to this report (page 46), results suggest that a source of 1,2-dichloroethene (1,2-DCE) is near Building 29. The A aquifer in the vicinity is contaminated with chlorinated organics. Include in this paragraph that additional information for Building 29 may indicate that other target compounds will be included.

Response: *Section 4.4.1 on page 95 of the revised action memorandum has been modified to include chlorinated VOCs as potential contaminants of concern in the Building 29 area.*

Comment Number 18. Page 53, Section 4.4.3, Building 31. The Navy Exchange (NEX) service station had one 500-gallon waste oil tank. Chlorinated organics were found in the A aquifer in high concentrations. As stated in this report (page 47), data from sample HP-22 suggests the regional contaminant plume is not contributing to the chlorinated compounds found at the site. Shouldn't chlorinated organics be added to the list of target chemicals to meet the removal action objectives?

Response: The source of chlorinated VOCs in the A1 zone in the Building 31 area has not been identified. Further investigation has been recommended and chlorinated VOCs have been added to the list of target compounds to meet source control action objectives.

Comment Number 19. Page 56, Table 11. The following should be corrected on Table 11:

Barium:	Federal maximum containment level goal (MCLG) is 2,000 µg/L
1,1-DCA:	State maximum contaminant level (MCL) is 5 µg/L
1,1-DCE:	State MCL is 6 µg/L
cis 1,2-DCE:	State MCL is 6 µg/L
trans 1,2-DCE:	State MCL is 10 µg/L
cis 1,2-DCE:	Federal MCLG is 70 µg/L
trans 1,2-DCE:	Federal MCLG is 100 µg/L
Methylene chloride:	Federal MCLG is 0.0 µg/L
Selenium:	Federal MCLG is 50 µg/L
Toluene:	Federal MCLG is 1,000 µg/L
Xylenes:	Federal MCLG is 10 ppm

Also include California total threshold limit concentration (TTLC) (soil) for lead (1,000 milligrams per kilogram (mg/kg), chromium VI (500 mg/kg), arsenic (500 mg/kg), and chromium (2,500 mg/kg).

Clarification is needed on the RWQCB cleanup goal of 100 parts per million (ppm) for TPH. Please include a reference supporting this cleanup level.

Clarification is needed on the RWQCB cleanup goal of 100 parts per million (ppm) for TPH. Please include a reference supporting this cleanup level. According to the Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks (June 2, 1988), "The 100 ppm level is not a cleanup level. The origin of the 100 ppm level was to develop a method to prioritize the case load and indicate whether a significant volume of fuel had been released or discharged. The level of cleanup is to be determined by assessing the potential impact of residual soil contamination on the ground water. In many cases it may not be appropriate to leave soil in-place which is contaminated with total petroleum hydrocarbons or other compounds at any concentration."

How were the Proposition 65 applicable or relevant and appropriate requirements (ARARs) obtained? Title 22 levels are presented in micrograms per day ($\mu\text{g}/\text{day}$). Also, regulatory levels exist for methylene chloride (50 $\mu\text{g}/\text{day}$), chromium VI (0.001 $\mu\text{g}/\text{day}$), and arsenic (10 $\mu\text{g}/\text{day}$). Beryllium and cadmium should also be included on the table.

Response:

Table 11 in the draft action memorandum identified chemical-specific ARARs and to be considered requirements (TBCs). However, upon further evaluation, it has been determined that chemical-specific ARARs are not applicable to this source control action. The following discussion of this determination is summarized from Section 4.5.1 of the revised action memorandum.

This source control action is only part of a total remedial action. The site-wide RI/FS will establish site cleanup goals and action levels. This report only addresses ARARs that the source control must achieve to be in compliance with applicable laws, rules, and regulations. These ARARs are based on the action undertaken. Therefore, treated ground water discharged to a publicly owned treatment works (POTW) must meet the POTW acceptance criteria, not MCLs. Consequently, no chemical-specific ARARs were identified for this action and Table 11 has been deleted from the revised action memorandum.

Comment Number 20. Page 63, Section 5.2.2 Soils. Because soil treatment technologies requiring excavation of soils were not evaluated in this draft action memorandum, the final action memorandum should contain an evaluation of such.

Response: Excavation is considered logistically infeasible under this source control action (see Section 5.1.2 of the revised action memorandum). As a result, soil treatment technologies requiring excavation of soils were not evaluated in the revised action memorandum.

Comment Number 21. Page 72, Fifth Paragraph. Explain why discharge to the POTW is quicker. Design time may take longer with the addition of reinjection, but this may be outweighed by the shorter operation time.

Response: Reinjection of treated water would require design, permitting, and installation of injection wells which would, in turn, delay implementation of source control activities. Discharge of treated water to a POTW is more expeditious because the only task involved is obtaining a discharge permit.

Comment Number 22. Page 85, Section 7.2.3 Implementability. How will fill (sic) product be removed and be disposed?

Response: Recovery of free product phases is not anticipated at Site 9. If encountered the presence of free product phases would require significant modifications to the planned removal and treatment system design. However, screen placement and material composition are designed to consider the potential for free product phases, and to maximize the utility of the extraction wells under several possible aquifer conditions.

Comment Number 23. Page 85, Top and Page 87, Figure 7. Are these wells part of Moffett's wells? If so, have they been sampled? What were the results? Include locations on Plate 2. See general comment 6.

Response: Wells W29-02(A1), W56-02(A1), and W61-01(A1) were installed in December 1990. These wells were sampled in January 1991. Locations of these wells are shown on Plate 2. Results from these samples are included in Sections 3.4.1 and 3.4.3 of the revised action memorandum. Complete analytical data for these wells are contained in Appendix F of the Building 29 area field

investigation technical memorandum and in Appendix D of the tank and sump removal summary report.

Comment Number 24. Page 106, Figure 8. Indicate the approximate treatment unit location (as referenced in the legend).

Response: Drawings have been improved in the revised action memorandum to clearly indicate the approximate locations of ground water treatment units.

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

GENERAL COMMENTS:

Comment Number 1. It should be noted that this report does not provide sufficient data on Buildings 29, 45, and 88. The results of the fuel farm investigation are not included in this report as well. The interpretation of tank and sump investigations is also lacking thus, postponing the DHS concurrence. These data gaps will not allow to arrive at a comprehensive understanding of this study area. Such data are needed to be included to ascertain the source(s). DHS will review the Revised Final Action Memoranda including the above data to arrive at a decision. However, the proposed alternative remedy might remain the same.

Response: The chemical characterization of the areas around Buildings 29, 45, 31, and 88 in Section 3.0 of the revised Site 9 action memorandum includes data from the Building 29 area field investigation and the tank and sump removal summary report.

Comment Number 2. PRC Environmental Management's (PRC) definition of aquifers and renaming them differently will confuse further the complexity of this study area. IT has defined the aquifers into different zones, for example, A1, A2, etc. An explanation is required if PRC wishes to differ on its understanding of zoning the aquifers with IT. And if it is found to be justified then, IT has to follow the same zoning. It is imperative that Naval Facilities Engineering Command Western Division (WESTDIV) adopts one set of definition to attenuate furthering the confusion. In addition, Site 9 has been divided into different

subsites. It is not clear if the Navy wishes to adopt this division. A clarification is required.

Response: The revised action memorandum incorporates the IT definition of the uppermost A aquifer zones, A1 and A2.

The presence of different contaminant sources within Site 9 required division of Site 9 into subsites. The use of subsites allowed discussion of individual contaminant sources.

SPECIFIC COMMENTS:

Comment Number 1. Page 17, Figure 5. The site boundary in this report and in the IT's last quarterly report are not the same. A clear and consistent site boundary is needed to focus the cleanup process.

Response: None of the sites at NAS Moffett Field have rigidly defined site boundaries. Site boundaries have been, and should continue to be, addressed in terms of sources and extent of contamination.

Comment Number 2. Page 37, Last Paragraph. If it is determined that the large range observed for the well 9 is due to poor sampling, then it must be explained and documented as to why you believe such range occurred. Furthermore, what do you propose to stop repeating such occurrences in the future?

Response: Laboratory analysis problems may also explain the lack of reproducibility of sample results from W09-07. Results from the latest IT ground water sampling event suggest the contamination in many areas of Site 9 is heterogeneous. This may be the case for samples from W09-07. Samples should continue to be collected from this well to further investigate changes in concentration over time.

Comment Number 3. Page 46, Paragraph 3. The MCLs are ARARs and must be identified as such. For example, pursuant to California Code of Regulation Title 22 Article 5.5 the maximum contaminant level of benzene for the primary drinking water should not exceed 1 milligram per liter (mg/L).

discussion of this determination is summarized from Section 4.5.1 of the revised action memorandum.

This source control action is only part of a total remedial action. The site-wide RI/FS will establish site cleanup goals and action levels. This report only addresses ARARs that the source control must achieve to be in compliance with applicable laws, rules, and regulations. These ARARs are based on the action undertaken. Therefore, treated ground water discharged to a publicly owned treatment works (POTW) must meet the POTW acceptance criteria, not MCLs. Consequently, no chemical-specific ARARs were identified for this action.

Comment Number 4. Page 47, Paragraph 1. It is to be noted that the 100 mg/kg cleanup level of xylene in the soil is not a cleanup level. It is merely a cleanup target. The cleanup level will be determined upon the results of the base-wide risk assessment.

Response: References to cleanup levels and/or cleanup targets were removed from the revised action memorandum.

Comment Number 5. Page 114, Paragraph 1. The number of underground tanks is nebulous. It has been reported that there are 11 tanks on page 18, however, on page 45 it is said "10 or 11." And on page 114 it is said to be 10. This uncertainty should be clarified.

Response: Ten underground storage tanks are believed to exist near Building 29. Further site characterization activities are planned to determine the exact number and location of these tanks. References to these tanks in the revised action memorandum have been modified to indicate ten underground tanks (see pages 14 and 165).

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

SPECIFIC COMMENTS:

Comment Number 1. Page 33, Last Paragraph. This references the metal background data contained in the draft phase I characterization report. This part of the characterization report was extensively commented on by the agencies and is currently being revised. Any comparison of data in this Site 9 report with conclusions of the characterization report should await finalization of the characterization report. At this time the characterization report should not be used to define background concentrations.

Response: Ranges of metals concentrations in soils which were reported in the Draft Phase I Characterization Report were used for comparison, due to the lack of finalized information. These comparisons will be updated when ranges have been finalized. To avoid confusion caused by the use of the term "background ranges," changes were incorporated into the text of the revised action memorandum to refer to the "NAS Moffett Field range."

Comment Number 2. Page 41, Fifth Paragraph. It states here that certain organic compounds found in soil, i.e., acetone, methylene chloride, and methyl ethyl ketone (MEK), may be associated with sampling and/or analytical method contamination. Before dismissing data a quantitative comparison of concentrations in samples and in various QA/QC blanks needs to be made and only samples with a similar range of concentrations as shown in the blanks should be eliminated.

Response: Comparison of field sample analytical results to QA/QC sample results was made to evaluate the potential for introduction of laboratory contamination into samples. Field samples that contained a compound which was detected in the corresponding QA/QC samples were examined further. Field samples that contained a compound at a concentration less than 10 times the concentration in the QA/QC sample were considered to contain laboratory-introduced contamination.

Comment Number 3. Page 47, Second Paragraph. The 1985 Regional Board document referred to has been superseded by 1990 recommendations for dealing with leaking underground tanks. Also, the 100 ppm concentration is for total petroleum hydrocarbons, not xylenes or any other single constituent.

Response: *Reference to the RWQCB document (1985) has been eliminated from the revised action memorandum.*

Comment Number 4. Page 49, Last Paragraph. Our position is that chemicals in ground water are a source for further migration. Therefore, we believe that interim control measures to prevent further migration are appropriate.

Response: *Currently, drinking water for NAS Moffett Field is not supplied by ground water from the A1 or A2 zones. No A1 or A2 production wells are located in the surrounding area. The A1 and A2 zones are, however, potential sources for drinking water according to the RWQCB definition of potable water. Any future discussion of developing potential drinking water sources at Site 9 will take into consideration this definition.*

Comment Number 5. Page 56, Table 11. We would like to make it clear that the TTLC and soluble threshold limit concentration (STLC) concentrations from Title 22, California Code of Regulations (CCR), are only intended for waste definition purposes. They are not environmental cleanup concentrations. These concentrations presume the waste will be disposed of in an appropriately lined landfill and therefore just because a waste is determined to be non-hazardous under these criteria does not mean it can remain uncontained and uncontrolled in the environment. Also on this table the 100 ppm TPH is listed as a cleanup goal. This concentration is not a cleanup goal. It is intended only to prioritize sites requiring cleanup. MCLs when available, and the one in a hundred thousand cancer risk when not available, when dealing with potential sources of drinking water. Therefore, the concentrations in the MCL and Proposition 65 columns should be the same for carcinogens.

Response: *Table 11 in the draft action memorandum identified chemical-specific ARARs and TBCs. However, further evaluation of ARARs has determined that chemical-specific ARARs are not applicable to this source control action (see*

Section 4.5.1 of the revised action memorandum). Therefore, Table 11 has been deleted from the revised action memorandum.

Comment Number 6. Page 79, Third Paragraph. This paragraph presents arguments for eliminating soil vapor extraction (SVE) as a source control technology at this site. We have found SVE a very successful method of remediation at cleanup sites in the Bay Area and would like to respond to each of the three arguments separately.

1. This uses soil data from Site 14 South to conclude that the soil at Site 9 is too impermeable for SVE. No information is given to show that the soils at the two sites are similar. Also, this argument is partially contradicted by the second argument.
2. This states that the soils are highly heterogeneous and preferential pathways would be formed through more permeable units if SVE were used. While this is true in general, it is possible to design a system to deal with this in some cases. Also, the more permeable soils can also be a preferential pathway for chemicals and if the chemicals are still present in these types of soils it would be appropriate and feasible to remove them.
3. The third argument is that the lighter components of fuels have likely already been removed from the soil by natural processes and SVE is not appropriate for the heavy components of fuel. No data is presented to show that the lighter components are actually gone. Also, at the beginning of the paragraph it states that SVE is appropriate for removal of VOCs at the site.

We believe the conclusion to eliminate SVE from further consideration should be reevaluated in response to these comments.

Response:

SVE has not been recommended for treatment of contaminated soils. This decision was primarily based on the fact that SVE is ineffective at removing contaminants from saturated soils (soil contamination is present predominantly in the saturated zone at suspected source areas). In addition, SVE is an inappropriate treatment method for the majority of the contaminants found at

Site 9 (for example, heavy fuel constituents). Lastly, it should be remembered that SVE has only been screened from these short-term temporary source control activities; it will be reconsidered during the remedial investigation/feasibility study (RI/FS) for the actual site remediation.

Comment Number 7. Appendix F. In the Table for action-specific ARARs the following should be added: For discharges to State waters, either surface or ground waters, the applicable statute is the Porter-Cologne Water Quality Act, California Water Code and Division 3 of Title 23 CCR; for land disposal Chapter 15 of Title 23 CCR (pursuant to the California Water Code) and Chapter 30 of Title 22 CCR (pursuant to the California Health and Safety Code) are applicable.

Response: The above mentioned ARARs have been incorporated in Appendix F of the revised action memorandum.