N00296.002173
MOFFETT FIELD
SSIC NO. 5090.3

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY
PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737
(510) 540-3724

March 3, 1995

Commander
Department of the Navy
Engineering Field Activity, West
Naval Facilities Engineering Command
Attn: Mr. Stephen Chao, Project Manager
900 Commodore Drive, Bldg. 101
San Bruno, California 94066-2402

Dear Mr. Chao:

DRAFT FINAL FEASIBILITY STUDY, OPERABLE UNIT 5, MOFFETT FEDERAL AIRFIELD

The California Environmental Protection Agency (Cal/EPA), the Department of Toxic Substances Control (DTSC) and the San Francisco Regional Water Quality Control Board (RWQCB) has reviewed the subject document. Comments and the specific ARARs are enclosed for your consideration. Please respond to all comments in thirty days, then the document can be finalized. If you have any questions, please contact me at (510) 540-3830.

GENERAL COMMENTS

1. Throughout the OU-5 Feasibility Study Report (FSR), "background levels" are used to represent both naturally occurring levels of inorganic constituents and anthropogenic levels indiscriminately. According to EPA Risk Assessment Guidance for Superfund (1988), background samples should not be used if they were obtained from areas influenced or potentially influenced by the site. In Moffett Field, a highly industrialized area, it is almost impossible to find areas are not affected by site activities. The Navy's statistical and spatial analyses may provide some useful information to evaluate the distribution of the inorganics in the OU-5 groundwater. However, it is not adequate to conclude the inorganic constituents detected in the "background well" are all naturally occurred and the argument of "true background" can be time consuming and unproductive. The Navy should include the remedial alternatives and calculate the cost of cleaning up the inorganics in OU-5 groundwater.

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2. The State has formerly requested that the Navy should list all the areas where the petroleum products release commingled with other hazardous substances at Moffett Field and the entire plume should be investigated and remediated under the ongoing CERCLA response action. For example, two small petroleum product contaminated areas were identified close to Hanger 3, these sites should be addressed in the FSR and the cleanup levels should be consistent with the Maximum Contaminant Levels (MCLs) of individual constituent.

3. The FSR has included innovative and emerging technologies in the screening process for both in situ treatment, air sparging and permeable reaction cells, and ex situ treatment (collection, treatment, discharge), in the form of the electron injection treatment technology. Innovative and emerging technologies need to be evaluated for use at closing base activities when there are no available developed treatment technologies or it has been demonstrated that the subject technology can significantly increase the speed of cleanup. The state recommends the elimination of electron injection from the screening process as an ex situ treatment technology for collected groundwater based on the status of technology development (i.e., bench-scale) and the availability of multiple developed treatment technologies (i.e.,air sparging, UV/Oxidation) that can treat the contaminants of concern (COCs) at the indicated concentrations and flow requirements. It is suggested the inclusion of granular active carbon as an ex situ treatment technology in the screening process to treat the liquid waste stream directly if it is determined that secondary treatment after air stripping is required.

4. The FSR indicates that the petroleum contamination in groundwater at other sites (i.e., Site 9) will be addressed separately from OU5 by the IRP petroleum sites program, but the FSR has used results from an air sparging pilot test conducted at a petroleum contaminated site(Site 9) with different subsurface lithology, contaminants and groundwater depths to develop an air sparging/soil vapor extraction (AS/SVE) system that would address contamination in OU5 groundwater. This AS/SVE system is the basis for cost estimates and detailed analysis of the alternative. A site specific AS/SVE pilot test for OU5 is necessary to supply the information and data necessary to develop relevant estimates necessary for a detailed analysis of alternatives. The State recommends that the OU5 AS/SVE pilot test address the following issues in addition to the measurement criteria designated in the Site 9 AS/SVE pilot test:

The FSR indicates in the 6.0 DETAILED ANALYSIS OF ALTERNATIVES that the SVE system used for collection of

volatiles in the vadose zone would consist of a horizontal extraction well deployed in a trench. As pointed out by the FSR, the subsurface lithology at the OU5 indicates multiple layers of silt and clay layers that could contribute to extreme differences in horizontal and vertical permeability that could in turn contribute to horizontal migration of sparged air. This makes the control of volatiles in the vadose zone extremely important. The FSR indicates that the vadose zone is composed mainly of silt and clay material. The pilot test should demonstrate the advantages of a horizontal extraction well for this application.

Traditional SVE well radius of influences (ROI) has been based on the ability of the well to create a minimum negative pressure, usually 0.1 inch water column. In the case of soil vapor extraction only a very slight gradient is required to ensure the flow of air toward an extraction well and replacement by unsaturate air. In the case of SVE used in conjunction with air sparging the SVE system must be able to control the pressures created in the vadose zone by air sparging. The depth at which air sparging would be required at this site will require significant sparging pressures just to reach the minimum entry pressure required. This would create significant pressure fronts in the vadose which need to be controlled by the SVE system. Since the pressure gradient of an extraction well appears to decrease exponentially with distance from the well, it is questionable of the ability of a horizontal extraction well to control the vadose zone pressures created by air sparging at the distance indicated no matter how much air is extracted. It may be necessary to implement multiple vertically small ROI to fully control the vadose zone.

A complete analysis of the physical and biochemical characteristics of the OU5 groundwater should be included in the FSR, as an excessive concentration of anions or high concentrations of iron and manganese may lead to fouling of the sparging wells. This can lead to the necessity of abandoning the well after only a short period of use.

Helium could be used as a tracer gas in air sparging pilot tests in addition to the parameters indicated in the AS/SVE pilot test performed at Site 9 to help determine the ROI of sparging wells. The procedure would be similar to the helium tracer used in the pilot test at Site 5.

The FSR indicates in Section 6.5.1 Alternative 4B-Entire Plume Treatment, that the AS/SVE system would be constructed only within the sand channels. The FSR indicates that constructing the AS/SVE to intersect the channels will capture the majority of contamination because once

contaminates desorb from silts and clays, they will follow natural flow patterns. Part of the problem with pump and treat in the past has been the inability of this technology to treat saturated zone solids and the gradual diffusion of contaminants from the most highly contaminated types of soils, silts and clays, acting as continued saturated zone source of groundwater contamination. Air sparging has shown the potential to address contamination in saturated zone solids of this type and thereby eliminate these groundwater contamination sources. To allow sparging air to reach these soils it may be necessary to fracture these clay lenses by use of hydraulic fracturing. It is recommended that the AS/SVE pilot test evaluate the possible use of hydraulic fracturing as an enhancement to the application of air sparging.

5. The FSR indicates that the Navy has funded a pilot-scale study of permeable reaction cells at MFA to be conducted in the summer of 1995. The pilot study should specifically address the ability of the clay/silt layer located at approximately 50 feet bgs to act as footing material for construction of barrier walls and the continuity of this layer to act as a barrier to groundwater flow from zone A1/A2 to the B2 aquifer. In addition, the Navy should consider building low permeability slurry wall at both sides of the in-situ treatment wall to contain and direct the flow through the treatment wall.

6. It is stated in the document that the bench-scale study report of the permeable reaction system is not available for review yet; the pilot-scale study will not be conducted until summer 1995. Therefore, a contingency plan or an alternative should be considered by the Navy, in case the permeable reaction cells pilot study reveals unfavorable result. The same scenario could also apply to air sparging/soil vapor extraction.

7. The cost estimates that have been developed by the FSR and shown in Appendix D of the document appear to include all the capital equipment necessary to construct the respective systems and the estimates appear reasonable. However, the comparative analysis for lifetime O&M costs are based on a lifetime of 50 years for all the alternatives. It would appear that a treatment technology such as reactive cell, which is dependent on groundwater gradient to pass the entire plume past a stationary wall, would have a different expected duration that a treatment technology such as air sparging, which could actively address the asymptotic contamination levels faster than pump and treat. These differences in duration could have a major affect on alternative cost analysis.

8. The FSR addresses the issue of possible inorganic contamination in groundwater at the OU5 Site. The FSR indicates that the elevated levels of inorganics in groundwater (i.e., arsenic, chromium) are related to elevated background levels. If inorganic levels in groundwater are found to be unrelated to background levels and require treatment, the screening process may need to select an ex situ treatment option since there are currently no developed treatment technologies that can treat inorganics in groundwater in situ. It would appear that the concept of reactive cells could be applied to the treatment of inorganics in groundwater by the use of ion exchange resins in the treatment cells.

   It should be noted, however, that regardless of the outcome of the evaluation of inorganic levels in groundwater at OU5 compared to background levels the current levels of inorganics in groundwater at the site indicated in the FSR would not necessitate the precipitation of metals prior to air stripping to protect the integrity of the process from scaling. The FSR indicated that TDS levels were as high as 10,000 mg/l. These levels of dissolved solid could pose a process problem for both air stripping and UV/oxidation. This issue needs to be evaluated and if collected groundwater pre-treatment is required could affect the alternative cost analysis.

9. The data that was developed during the AS/SVE pilot test at Site 9 and reported in the text of the FSR along with a brief description of the pilot test protocol should be included with the FSR as an appendix.

10. The FSR addresses two distinct treatment options of treating the entire plume or the leading edge of the plume while maintaining the same alternative number for both options. This is very confusing to the reader. It is recommended to use different number to distinguish one from another (i.e., Alternative 4A-1: Entire Plume; Alternative 4A-2: Leading Edge).

SPECIFIC COMMENTS

1. <u>Page 6, 2nd Para., Sec. 1.2.2</u>

   It states that Site 22 and 23 are included as potential contamination sources to OU5. However, no descriptions of these two sites are included in the section. The Navy should clarify if these two sites will be discussed in other reports.

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MOFFETT FIELD
SSIC NO. 5090.3.

PAGE 6

COMMENTS ON THE DRAFT FINAL
FEASIBILITY STUDY REPORT, OPERABLE UNIT 5

THE ABOVE IDENTIFIED PAGE IS NOT
AVAILABLE.

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DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
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SOUTHWEST
1220 PACIFIC HIGHWAY
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9. Page 31, 2nd Para., Sec. 1.4.2.1

As it is stated in the General Comment No. 2, the commingle plume at Tank 2 and 43 should be addressed in the OU5 FSR not petroleum sites corrective action. The cleanup level should be based on the MCLs of individual chemical. The 700 ug/L treatment goal for diesel or JP-5 should only apply to the isolated petroleum sites.

10. Page 33, Sec. 1.4.2.1

Please explain why antimony is not included in the discussion of A1 Aquifer. Antimony is ubiquitous in the shallow A1 zone.

11. Page 33, 3rd Para., Sec. 1.4.2.1

Detailed information of the analytical data from sampling activity in Nov. 1994 should be presented in the FSR, otherwise, it is extremely difficult to review this document. What are the total chromium and arsenic concentration from different wells? Please explain how to distinguish the "historical values" and "previous high detections"? Please clarify the how many samples have been taken from well WT-1, W43-1 and W43-2 after 1990.

12. Page 34, 3rd Para., Sec. 1.4.2.2

It is agreeable that chloroform and acetone detected in the B2 aquifer may come from laboratory contaminants. However, the source of TCE or other non-laboratory contaminants should be further discussed.

13. Page 34, 4th Para., Sec. 1.4.2.2

Please clarify if the statement "Detections of antimony at Sites 3 and 4 were not consistent in any one well between various sampling dates and probably do not indicate groundwater contamination in the B-aquifer zone." implies the existence of antimony contamination in the A1 zone since antimony was frequently detected in the A1 zone. The frequency of detection of inorganics cannot determine if the chemicals are naturally occurred or from anthropogenic sources.

14. Page 35, 4th Para., Sec. 1.4.2.3

Please see Comment No. 13.

15. Page 36, 3rd Para., Sec. 1.4.3

Future residential scenario should be included in Appendix C if the appendix remains in the final FSP.

16. Page 37, 5th Para., Sec. 1.4.3

Please provide a table to summarize how many groundwater samples were collected and analyzed for hexavalent chromium. More hexavalent chromium data should be collected through ongoing quarterly sampling program to compare with the resampled results from November 1994.

17. Page 42, 2nd Para., Sec. 1.4.4

According to U. S. Fish & Wildlife Service (personal communication with Dr. Jim Haas), Marriage Road ditch should be considered as functional wetland since it may receive not only surface water runoff but groundwater discharge. In addition, it also supports hydrophytic vegetation under normal circumstances.

18. Page 43, 3rd Para., Sec. 1.4.4

It is stated that the COCs detected in OU5 groundwater were compared to ecological benchmarks as shown in Table 1-4. However, Table 1-4 only listed the chemical and physical characteristics of the COCs. No ecological benchmarks were listed.

19. Page 57, 2nd Para., Sec. 2.2

See Comment No.6

20. Page 58, 2nd Para., Sec. 2.2

The Navy should explain how to reach the conclusion that salt water intrusion has extended to former Tank 43 and the northern portion of Site 7. In Figure A-3, W4-3 is the only well has TDS exceeded 2,500 mg/L. Furthermore, the last sentence of this paragraph seems contradictory to the statement that salt water intrusion has progressed to the mentioned area.

21. Page 60, 1st Para., Sec. 2.2

Again, it is important to include the complete resampled results in the FSR. The descriptive statement such as " Total chromium values from the samples collected in November 1994 indicate concentrations similar to historical values" is insufficient for the reader to evaluate the relationship between previous data and resampled results.

22. Page 60, 4th Para., Sec. 3.0

Please add the sentence "An ARAR may be either "applicable," or "relevant and appropriate," but not both." after the second sentence.

23. Page 61, 1st and 3rd Para., Sec. 3.0

Please add the sentence "Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable." to these two paragraphs.

24. Page 71, 1st box

Since California is authorized to implement its own program in lieu of RCRA, the appropriate state regulations should be cited as ARARs in lieu of the federal regulations. Since the Federal Register is not promulgated, it should not be listed as an ARAR. The regulation itself should be cited.

25. Page 72, last box

The word "occur" should be deleted.

26. Page 74, 2nd-7th boxes

For each of these potential actions except "Miscellaneous Units", both federal and state regulations are cited. Since California is authorized to implement its own program in lieu of RCRA, and since California's regulations must be as or more stringent than federal regulations, only California's regulations will be ARARs, and the federal citations should drop out. With respect to the potential action "Miscellaneous Units", the appropriate state regulation should replace the federal regulation cited.

27. Page 95, Table 4-2

Several site specific factors may affect the implementability of "chemical reaction cells" such as the reactive capacity, pH level variation, depth of barrier, and biological activity.

28. Page 130, 2nd Para., Sec. 6.3

The statement "the northern plume area is already protective of human health and the environment based on the available data" is questionable. According to Figures 1-6 and 6-1, approximately one-third of the "northern plume" area has the TDS below 3,000 mg/L. Therefore, part of the northern plume

could be qualified as potential drinking water aquifer and the same cleanup level (MCLs) for the southern plume may apply.

29. Page 134, 2nd Para., Sec. 6.4

Since "iron curtain" is not a well proven technology, a treatability testing should be conducted to ensure it can effectively remediate the target contaminants in the OU5 groundwater. If the pilot study reveals unfavorable result of the iron curtain system, the Navy may need to reevaluate different alternatives.

30. Page 141, 1st Para., Sec. 6.4.1

In addition to the proposed iron curtain, the construction of slurry walls might be useful to contain the plume and direct groundwater flow.

31. Page 190, 4th Para., Sec. 7.0

The State believes that it is appropriate for the Navy to provide detailed information, including the cost analysis of inorganic treatment plant in the FSR.

32. Page A-5, 3rd Para., Sec. 2.1

Is there any statistical significance to select 2,500 mg/kg as the borderline to separate the high TDS and low TDS area? According to our observation, no significant "break" has been found at the 2,500 mg/L TDS level. In fact, along the distribution curve, it may be more appropriate to use 3,000 mg/L as the boundary if necessary.

If you have questions regarding these comments, please contact me at (510) 540-3830 to ensure a coordinated approach for all regulatory comments.

Sincerely,

C. Joseph Chou
Remedial Project Manager
Base Closure Unit
Office of Military Facilities

Enclosure

cc: See next page

cc: Mr. Michael Bessette
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

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STATE OF CALIFORNIA PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
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2101 WEBSTER STREET, SUITE 500
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
REGIONAL
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STATE OF CALIFORNIA, EPA
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February 27, 1995
File No. 2089.8009 (MMB)

Mr. Joseph Chou
DTSC Region 2
Office of Military Facilities
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2737

SUBJECT: RWQCB's Comments on the Draft Final Operable Unit 5, Feasibility Study Report, for Moffett Federal Airfield dated January 30, 1995.

Dear Mr. Chou:

Enclosed are RWQCB staff's comments on the above referenced report. Please contact me at (510) 286-1028 if you have any questions or comments.

Sincerely,

Michael M. Bessette
Remedial Project Manager

Enclosure

Prepared By:	Michael M. Bessette	Phone No.:	(510) 286-1028
Date:	February 27, 1995	File No.:	2189.8009 (MMB)
Subject:	Operable Unit 5 Draft Final Feasibility Study Report, January 30, 1995		

General Comments:

- Analytical laboratory data validation needs to be included if a COC is proposed to be removed because of laboratory contamination. Provide trip blank or method blank analysis in a separate analytical data table to demonstrate laboratory contamination. What steps are being taken to prevent future laboratory contamination.
- The OU5 Study Area, shown Figure 1-2, does not cover the total area of OU-5 as shown in the BCP, please revise. Clarify the status of investigations at Sites 10, 11, and 12 with respect to TPH commingling with other COCs. Detection of 1302μg/L chromium in groundwater collected from well W11-1 at Site 11, as shown in Figure A-21, should be addressed.
- The FS must address TPH within OU5 where commingling with other COCs has occurred.
- Clarification of background contaminant levels verse ambient contaminant levels needs to provided. The RWQCB uses the term background contaminant levels to indicate the concentration at which naturally occurring chemical constituents of the media in question are present without any anthropogenic sources. Ambient contaminant level includes both the naturally occurring background and the anthropogenic sources. Please include an additional table presenting: each COC being proposed for removal, ambient concentration levels, range of detection, and frequency of detection.
- Cross sections are essential to the acceptability of a geologic interpretation of depositional environments and should be included. Are there any horizontal conduits that should be examined other than the channel deposits, e.g., French drains. Additionally, has the potential impact of the interpreted sand channels on Site 2 (OU1) been considered?
- The location of the stream channels and the location of contaminant plumes appear to be somewhat unaligned; what is the effect of this on the locating of the treatment array? The location of the treatment array along the Marriage Road Ditch needs clarification; why would the location shown in the treatment configuration be preferable to locating the array perpendicular to the interpreted channel? The FS should include additional remedial designs which incorporate wing walls to direct groundwater flow to the treatment arrays to insure better capture of the contaminants.
- The dark shaded text is difficult to review, please consider an alternative method of highlighting in the future.

Prepared By: Michael M. Bessette Phone No.: (510) 286-1028
Date: February 27, 1995 File No.: 2189.8009 (MMB)
Subject: Operable Unit 5 Draft Final Feasibility Study Report, January 30, 1995

General Comments (continued):

- The Navy should provide information regarding how future changes of land usage will affect the FS. Specifically, the continued operation of pump station at Building 191 should be identified as an integral part of the management of OU5 and what management mechanisms will be incorporated to insure its operation.
- To provide cohesiveness between ARARs and remediation efforts, the delineation between high and low TDS areas should be set at the 3,000 mg/L level for both the A1 and A2 aquifers.

Specific Comments:

Page 3, Figure 1-2: The indicated OU5 study area does not include the entire OU5 as indicated in the BCP, please revise and clarify the status of Site 10 - Runways, and Site 11. Locate Sites 16 and 17 and identify Site 3. Align Site No. 1.

Page 6, Sec. 1.2.2: Information regarding the status of Sites 22 and 23 should be included in this section.

Page 8, Sec. 1.2.2: Figures for Sites 15 and 16 indicating the locations of the sumps, oil/water separators and tanks should be included.

Page 9 Sec. 1.2.3, 1st par.: A table presenting the status of the all operational units and the site included within each OU would be helpful. Does detection of PCE at concentrations of 260 μg/L in well W43-2 on July 1991 preclude Site 19 from the petroleum sites program.

A paragraph describing the MEW ROD would to be helpful for a site-wide perspective.

Page 16, Sec. 1.3.3.2, 2nd par.: The referenced document "1986 Water Resources Sub-Element" is nine years old, can the present conditions demonstrate the validity of its forecast.

Page 18, Sec. 1.3.3.2, 1st par.: Include a figure locating all past and present agricultural and/or supply wells indicating the depth and screen interval to insure proper abandonment for the prevention of cross communication of aquifers.

Prepared By: Michael M. Bessette Phone No.: (510) 286-1028
Date: February 27, 1995 File No.: 2189.8009 (MMB)
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Page 20, Sec. 1.4.1, 4th par.: A comparative discussion referencing the position of the stream channels in Figure 3.6-2 of the IT 1993 OU5 RI and Figure 1-5 in this report, with additional cross sections, will help provide continuity between the RI and the FS.

Page 25, Sec. 1.4.2.1; Please include a figure indicating the location and depth of wells screened in the A1 and A2 aquifers.

Page 27, Sec. 1.4.2.1: Correlate or replace the bls measurements given in the text with the msl measurements given in the figures.

Page 27, Sec. 1.4.2.1, Figure 1-6: Verify the color coding and detection for W7-8. Verify the detection for CPTU5-12, CPTU5-16, and CPTU5-17. Verify color coding for W6-5. Include an arrow for WU5-3.

Page 28, Sec. 1.4.2.1, Figure 1-7: Verify the color coding and detection for W3-19, and W7-8. Verify the detection for CPTU5-1. Verify color coding for W6-5. Include an arrow for WU5-3.

Page 29, Sec. 1.4.2.1, 1st par.: The detection of 51μg/L of 1,2-DCE should be noted in the text.

Page 34, Sec. 1.4.2.2: Please include a figure indicating the location and depth of wells screened in the B2, B3, and C aquifers.

Page 35, Sec. 1.4.2.3, 1st par.: "Most organic contaminants" should be revised to specify each contaminant.

Page 45, Sec. 1.4.4, 1st par.: Are the TCE analytical results of 3 and 4 μg/L presented in a Table?

Page 57, Sec. 2.1, 2nd par.: Define background and ambient metal values.

Page 58, Sec. 2.1, 2nd par.: Please provide the background information on the how concentrations of metals in groundwater differ in low-TDS versus high-TDS regions with references to the source of the metals.

Page 60, Sec. 2.1, 1st par.: Where is the chromium detected in well W11-1 discussed?

Page 82, Sec.4.1.6, 2nd par.: The statements "The hydraulic parameter estimations were based on site specific lithologic information" appear to conflict with the statement in appendix E, page 9, 3rd paragraph, which states that the final parameters were higher than the initial estimates and that the ratio of channel deposit K to that of the other parameter zones was lower. The text in the appendix further states that these values were necessary to prevent mounding in the model when using boundary heads that were estimated from the fourth

quarter 1994 potentiometric map. The inclusion of this information is very appreciated but a discussion of the applicability of the MODFLOW model in the bay fringe environment should be include to demonstrate its validity.

Page 83, Sec. 4.1.7: Please provide the basis on which the OU5 aquifer is stated as being on an average of 7 feet thick. Have a number of pore volumes been estimated to obtain remediation goals?

Page 85, Sec. 4.2.3: The statement that OU5 contaminants cannot migrate off site without passing through the Building 191 permitted outfall needs to be expanded and should incorporate the groundwater contour maps.

Figures A-3,-4, -5: Consider using isocontour lines to represent TDS concentrations. Delineation between high and low TDS areas should be set at the 3,000 mg/L level.

Appendix E, page 4 , Boundary Conditions items 3 and 4: To what depth or layer was the drain cells used?

Appendix E, page 5, Boundary Conditions items 9 and 10: Please provide a cross section to clarify the basis on which cell selection was determined.

Appendix E, page 9: Discuss the applicability of MODFLOW in the bay fringe environment to demonstrate its validity with revised conductivity values.

Concurred by: Ron Gervason Date: 3/1/95

Ron Gervason, DOD Section Leader