MARINE CORPS AIR STATION
EL TORO, CALIFORNIA - CTO 0145
RESPONSE TO COMMENTS REGARDING DRAFT FINAL OU-1 INTERIM-ACTION FEASIBILITY STUDY REPORT DATED 09 AUGUST 1996
CLE-C01-01F145-B7-0018
Revision 0

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THROUGH:
CONTRACT #N68711-89-D-9296
CTO #145
DOCUMENT CONTROL NO:
CLE-C01-01F145-B7-0018

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MARINE CORPS AIR STATION EL TORO, CALIFORNIA

RESPONSE TO COMMENTS REGARDING THE 09 AUGUST 1996 DRAFT FINAL OU-1 INTERIM-ACTION FEASIBLITY STUDY REPORT

15 JANUARY 1998

PREPARED BY:
BRAC OPERATIONS OFFICE
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CONTENTS

ACRONYMS

acfy	acre-feet per year
AOC	Area of Concern
ARAR	Applicable and Relevant or Appropriate Requirement
BTEX	benzene, toluene, ethylbenzene, and xylene
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFEST	Coupled Fluid, Energy, and Solute Transport (groundwater model)
CLP	Contract Laboratory Program
COC	constituents of concern
COPC	chemical of potential concern
CRDL	contract-required detection limit
CRQL	contract-required quantitation limit
D&C	difficulty and cost
DCA	dichloroethane
DCE	dichloroethylene
DNAPL	dense nonaqueous-phase liquid
DTSC	(Cal-EPA) Department of Toxic Substance Control
DWR	(California) Department of Water Resources
EPA	(U.S.) Environmental Protection Agency
FAWQC	federal ambient water quality criteria
FOC	organic carbon fraction
FS	Feasibility Study
gpm	gallons per minute
GWPS	groundwater protection standard
HHRA	(Baseline) Human Health Risk Assessment
IAFS	Interim-Action Feasibility Study
IDP	Irvine Desalter Project
IRWD	Irvine Ranch Water District
K	hydraulic conductivity

L	liter
MCAS	Marine Corps Air Station
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg	milligram
NCP	National Contingency Plan
NPL	National Priorities List
OCWD	Orange County Water District
OU	operable unit
POC	point of compliance
ppb	parts per billion
ppm	parts per million
RA	Risk Assessment
RAB	Remedial Advisory Board
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
RI	Remedial Investigation
RT	(aquifer) restoration time
RWQCB	(California) Regional Water Quality Control Board
Station	MCAS El Toro
SVOC	semivolatile organic compound
SWRCB	State Water Resources Control Board
TCA	trichloroethane
TCE	trichloroethylene (also trichloroethene)
TFH	total fuel hydrocarbons
TOC	total organic carbon
TRPH	total recoverable petroleum hydrocarbons
TTLC	total threshold leaching concentration
µg	microgram
UST	underground storage tank
VOC	volatile organic compound

Response to Comments of DTSC (T. Mahmoud, S. Beard, and J. Christopher)

RESPONSE TO COMMENTS
FROM CAL/EPA - DEPARTMENT OF TOXIC SUBSTANCES CONTROL [DTSC] DATED 11 OCTOBER 1996
Regarding the MCAS El Toro Draft Final OU-1 Interim Remedial Investigation/Feasibility Study Report Dated 09 August 1996
MCAS El Toro OU-1 Interim RI/FS

Reference (P. = Page; C. = Comment; S. = Section/Subsection; T. =Table; App. = Appendix)		Comment	Response
Comment No.	**RI/FS Report Reference**	**from DTSC (Tayseer Mahmoud, Sherrill Beard, and John Christopher)**	**by the Department of the Navy (DON)**
C.1	General Comment	A review of the IAFS (October 15, 1995), the IAFS Addendum, and available historical groundwater data have shown that there are groundwater data gaps, especially at the western boundary of the contaminant plume. If an alternative is chosen which includes a joint Navy/OCWD project, a long-term groundwater monitoring plan must be approved by the regulatory agencies before submittal of the draft Record of Decision (ROD).	If a joint project Navy/OCWD alternative is selected, DON agrees that the long-term groundwater monitoring plan will require approval by the regulatory agencies before submittal of the draft ROD. DON has already proposed groundwater monitoring activities associated with each of the alternatives in the OU-1 IAFS and OU-1 IAFS Addendum.
	General Comment	If an alternative is chosen which includes a Navy stand alone alternative for the principal aquifer, a long-term monitoring plan, including additional monitoring wells installed at the toe of the plume, with aquifer tests performed and the data evaluated with regard to capture zone analysis must be submitted to the regulatory agencies for approval prior to submittal of the draft ROD.	If a DON "stand-alone" alternative is selected, DON will consider installing and sampling one or more monitoring wells near Culver Drive to investigate the leading edge of the plume (the toe of the plume) prior to the approval of the Record of Decision.
C.2	General Comment	Based on the previous review of the IAFS (dated December 13, 1995) and the subject documents it should be restated that one of the remediation goals for the contamination detected in the shallow aquifer should be containment. Specifically, to prevent further migration downward into the principal aquifer.	The remediation goal requested by the reviewer is a remedial action objective (RAO) of Site 24 (VOC Source Area). Therefore, DON believes modifications to the list of RAOs for the OU-1 interim action (both the OU-1 IAFS[Volume IV] and OU-1 IAFS Addendum [Volume IX]) are not required.
C.3	General Comment	The groundwater model presented in Volume VI or an expanded version of the groundwater and solute transport models used for OU-2A (Site 24, VOC Source Area) should be refined during the design phase. We suggest that the nodal spacing for the groundwater model reflect a finer grid and the assigned hydrogeologic parameters, such as hydraulic conductivity and retardation, more accurately reflect the actual groundwater	Sufficient modeling has been completed to select the OU-1 remedy. The reviewer's recommendations will be considered during the Remedial Design phase if additional modeling is required.

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		regime.	
Specific C. 1	Volume 1, Executive Summary, Evaluation of Alternatives in the IAFS Addendum, Contingency Plan, S. 4.3.1 P. ES-49	Refer the reader of this Executive Summary where to turn for additional information regarding the contingency plan.	A reference to the location of more detailed discussions of the contingency plan will be added to the Executive Summary (Volume I). The contingency plan, which includes groundwater monitoring for additional protection of beneficial uses and potential mitigative actions, is discussed in Section 5.3 of the OU-1 IAFS Addendum (Volume IX).
Specific C. 2	Volume 1, Executive Summary, Evaluation of Alternatives in the IAFS Addendum, S. 4.3.2	Reference to Table ES-5 is a typographical error. The correct reference is E-6.	The text will be modified to indicate the correct reference is Table ES-6.
Specific C. 3	Volume II, Draft Final Remedial Investigation, Attachment 1, Response to Comments	Please provide the date of comments in your responses. Also, provide copies of the agencies comments for the public to see the actual comments. This comment also applies to Volume IV, Attachment A.	Comments acknowledged. The date of the response to regulatory agency comments is August 09, 1997, the date of the draft final document submittal. The response to regulatory agency comments include the original comments submitted by the regulatory agencies.

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Specific C. 4	Volume IV, Draft Final IAFS Report, S. 2.0, T.2-2, RAOs and ARARs	Some chemicals in this table did not have risk base concentrations (RBCs). The following information on three chemicals might be useful:	
		a. **Dichlorodifluoromethane:** This compound is also known as Freon 12. As of August 1996, USEPA Region IX gives residential Preliminary Remediation Goals (PRG) of 94 mg/kg in soil and 390 µ/L in water. These are based on an oral reference dose (RfD_0) of 0.2 mg/kg-day and an inhalation reference dose (RfD_1) of 0.057 mg/kg-day.	RBCs for these three compounds were not previously calculated, because they were not listed as chemicals of potential concern (COPC) in the MCAS El Toro Phase I RI Technical Memorandum (SWDIV, 1993). Maximum detected concentrations of these three chemicals listed in the OU-1 RI Report (Vol. II) are much less than the three new RBCs. The RBCs for dichlorodifluoromethane, 2-butanone, and 2-hexanone will not be added to Table 2-2 of the IAFS Report.. Inclusion of DTSC's comments (from John Christopher) will provide useful information to the reviewers of the draft final document.
		b. **2-Butanone:** This compound is also known as methyl ethyl ketone. As of August 1996, USEPA Region IX gives residential PRGs of 7,100 mg/kg in soil and 1,900 µg/L in water. These are based on an RfD_0 of 0.6 mg/kg-day and an RfD_1 of 0.6 mg/kg-day. c. **2-Hexanone:** This compound is also known as methyl-n-butyl ketone. No PRGs or reference doses are published for this chemical. However, *n*-hexane is metabolized in mammals first to 2-hexanone then to the neurotoxic 2,5-hexanedi-one. Therefore, *n*-hexane is an adequate surrogate compound. As of August 1996, USEPA	

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		Region IX gives residential PRGs for *n*-hexane of 110 mg/kg in soil and 350 µg/L in water. The PRG in soil is the saturating concentration, while the PRG for tap water is based on an RfD_0 of 0.06 mg/kg-day and an RfD_1 of 0.057 mg/kg-day.	
Specific C. 5	Volume VII, Draft Final IAFS Report, App. B, Evaluation of ARARs, T. B2-3	See comment #4 above regarding RBCs.	See response to Specific Comment 4 presented above.
Specific C. 6	Volume IX, Draft Final IAFS Addendum, S. 1.3.1, Site History	Reference to off-Station TCE highest concentration of 34 µg/L is not accurate. OCWD data reflects higher numbers up to 47.8 µg/L. Please make the corrections throughout the document.	The scope of the OU-1 RI Report is to document the activities and results of OU-1 Phase I RI investigation which occurred between 1992 and 1994. Data reported in the RI Report, and used in the OU-1 RI/FS Report (including the RI Addendum, the OU-1 Risk Assessment, the IAFS, and the IAFS Addendum) consisted of two rounds of groundwater monitoring data that were fully validated following the protocols established under USEPA's Contract Laboratory Program (CLP). For completeness, historical and contemporary data of existing wells in the Irvine Subbasin (i.e., water supply wells and other monitoring wells) provided by OCWD for the same time period were also included in the RI Report. However, the data obtained from the additional existing wells were not subjected to CLP protocols. Although all available data was used in the IAFS, DON believes the evaluation of the alternatives should primarily rely on fully validated data. Based on the first two rounds of groundwater monitoring data, 34 µg/L was the highest TCE concentration detected in the Principal Aquifer (collected

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			during the second sampling round, June to December 1993). The reviewer correctly points out that higher concentrations have been detected in the Principal Aquifer since December 1993. However, the higher detected concentrations were based on monitoring data obtained outside the umbrella of USEPA's CLP. Recent groundwater monitoring data for the MCAS El Toro monitoring wells (including Phase I RI wells and wells installed during the Phase II RI for OU-2A and OU-3), fully validated following the CLP protocols, is available in the MCAS El Toro Quarterly Groundwater Monitoring Reports prepared for the Navy by CDM Federal Programs. The most recent quarterly monitoring report is dated October 1997 and contains data through the Round 6 sampling, completed during July 1997. It is important to note that the higher TCE concentrations reported by OCWD (47.8 µg/L) do not change the conclusions on the extent of groundwater contamination or evaluation of remedial alternatives.
Specific C. 7	Volume IX, Draft Final IAFS Addendum, S. 1.3.3, Nature and Extent of VOC Contamination	Table 1-3 is referenced on page 1-11 but not provided in the document.	Acknowledged. Table 1-3 is missing and will be included in the Final version for public review.
Specific C. 8	Volume IX, Draft Final IAFS Addendum,	Reference to IAFS in this section should be changed to draft IAFS.	References in this section to the IAFS refer to the Draft Final IAFS, Volume IV of the 9-volume Draft Final RI/IAFS reports (09 August 1996). The Draft Final IAFS report includes revisions to the

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	S. 2.0, Summary of Remedial Alternatives Evaluation		previously submitted Draft IAFS based on regulatory agency comments. No modifications to the text will be made.
Specific C. 9	Volume IX, Draft Final IAFS Addendum, S. 3.2, Applicable or Relevant and Appropriate Requirements, P. 3-2	The last paragraph regarding additional ARARs for the new alternatives should be revised. On September 17, 1996, MCAS El Toro requested the State to provide any additional ARARs. Please note that the State provided ARARs for Site 24 which has similar alternatives as Site 18.	The ARARs provided by the State for Site 24 pertain to the OU-2A IAFS. No response was received from the State to the request for additional ARARs for OU-1. However, DON has thoroughly reviewed potential State ARARs, and included a discussion of potential ARARs for the new alternatives described in the Addendum. No modifications to the text will be made.
Specific C. 10	Volume IX, Draft Final IAFS Addendum, S. 5.2.1, Alternative 7A, P. 5-2	Alternative 7A assumes that wells 18_TIC113 and 18_IRWD78 will continue to be operational throughout the duration of the required monitoring period, therefore, cost for the implementation does not include the extra expenditure if these wells need to be replaced, recondition, and/or purchased.	Alternative 7B, which is a contingency for Alternative 7A, includes the costs of DON acquiring and operating Wells 18_TIC113 and18_IRWD78 if their use is phased out after 10 years . These costs include the costs of installing new wells adjacent to 18_TIC113 and 18_IRWD78, a VOC treatment system, conveyance pipelines, and upgradient injection wells for disposal of the treated groundwater. Alternative 7B likely provides an upper bound of contingency costs for Alternative 7A. In the event that elevated VOC concentrations threaten the use of the Culver Drive wells, the costs for VOC wellhead treatment also have been included (see Attachment D-2 of the IAFS Addendum [Volume IX]). DON would consider paying for the reconditioning of the two wells while they operate as irrigation wells.
Specific C. 11	Volume IX, Draft Final IAFS	The Navy should shorten the screen length for the proposed new monitoring wells and increase monitoring locations and depths	The screen length for the proposed monitoring wells was agreed to by the regulatory agencies during a 07 June 1996 telephone

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	Addendum, S. 5.2.2, Alternative 7B, P. 5-3	by either constructing multiple port monitoring wells or install more than the proposed number of conventionally constructed monitoring wells.	conference call with DTSC (Sherrill Beard), U.S. EPA (Herb Levine), and the RWQCB (Larry Vitale) present. The main concern with VOC monitoring at the leading edge of the plume lies in the detection of TCE concentrations in production wells on Culver Drive that have screen lengths of several hundred feet. Instead of using the production wells to assess the movement of the plume, it was agreed to use 50-foot screen lengths for the proposed monitoring wells. The 50-foot well screen was agreed to be the best screen length that would allow good vertical coverage of the aquifer without diluting TCE "stringers" below the detection limit. DON believes that the proposed monitoring network is appropriate. The proposed wells at the leading edge of the plume (or toe of the plume) in the Principal Aquifer will be located with input from the regulatory agencies.
Specific C. 12	Volume IX, Draft Final IAFS Addendum, S. 5.3.2.1, One Half the MCL, P. 5-7	The term "relevant MCL" should be further defined with regard to state and federal MCL regulatory concentrations.	The term "relevant MCL" refers to the state and federal MCL for TCE. Currently, the state and federal MCLs are the same value for TCE (5 µg/L). The text will be revised to clarify this issue.

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Specific C. 13	Volume IX, Draft Final IAFS Addendum, S. 6, Figures 6-1, 6-3, 6-5, 6-7, 6-9, etc.	Figures showing the placement of the shallow groundwater extraction wells; Shallow groundwater extraction well placement should be close enough to the source to both maximize mass contaminant removal and maintain hydraulic containment. Please consider this recommendation while evaluating the design of the shallow groundwater extraction well network.	Acknowledged. The locations of the shallow groundwater extractions wells in the IAFS are conceptual and were located to meet the RAOs for the OU-1 IAFS. During the remedial design and implementation phases, the locations of the wells will be refined with these recommendations in mind. The containment of the VOC source area is the focus of Site 24 (OU-2A).
Specific C. 14	Volume IX, Draft Final IAFS Addendum, P. 6-8, Figures 6-8, 6-14, 6-20, 6-26, 6-32, and 6-38	The pumpage rates and pumping schedules (Table 6-2) are similar for both irrigation wells 18_TIC113 and 18_IRWD078 yet the figures illustrating particle tracking indicated most simulated path lines migrating toward 18_IRWD078 and 18_NLAKE. This is most likely due to the prevailing hydraulic gradient, however, it may be helpful to overlay the simulated groundwater elevations over the particle tracking figures illustrating the effect or non-effects of pumpage from specific wells (i.e., 18_TIC113).	The particle tracking results (Figures 6-8, 6-14, 6-20, 6-26, 6-32, and 6-38) show the particles are not being influenced by Well 18_TIC113 because the well is situated cross gradient with respect to the TCE plume in the Principal Aquifer. At the leading edge of the plume, most of the particles are captured by Well 18_IRWD78. The few particles that appear to escape initial capture by Well 18_IRWD78 are ultimately captured (particles are within the capture zones of these wells, which are based on water levels) as depicted in Figures 6-6, 6-12, 6-18, 6-24, 6-30, and 6-36. DON believes that information the reviewer hopes to gain from overlaying the figures presenting simulated groundwater elevations over those of particle tracking is already included. The additional effort required is not commensurate with the information gained.
Specific C. 15	Volume IX, Draft Final IAFS Addendum, S. 6.9, Cleanup Time to TCE MCL Simulation, 3rd paragraph,	According to Table 6-9, the simulated cleanup time to TCE MCL in the Principal Aquifer for Alternatives 2A, 7A, and 7B, ranges from 43 to 60 years. Also, for Alternatives 6A, and 8 are 49 and 70 years, respectively. Please correct the 3rd paragraph.	The reviewer is correct. The text will be revised to reflect the correct cleanup time ranges, 43 to 60 years for Alternatives 2A, 7A and 7B, and 49 to 70 years for Alternatives 6A and 8.

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	P. 6-29		
Specific C. 16	Volume IX, Draft Final IAFS Addendum, S. 7.2.4.2, Compliance with ARARs - Alternative 7A	This section needs to discuss compliance with ARARs for the principal aquifer or refer to the discussion if provided in another section of the report. This comment also applies to Section 7.2.5.2, Alternative 7B, and Section 7.2.6.2, Alternative 8.	ARARs for the Principal Aquifer are discussed in detail in Appendix B of the IAFS Appendices (Volume VII), Section B2.1.1 Groundwater ARARs Conclusions, and Section B2.2 Groundwater ARARs. The text will be modified to direct readers to these references.
Specific C. 17	Volume IX,Draft Final IAFS Addendum, Attachment E, Cost Estimates	Cost estimates for all alternatives which include injection into both the shallow aquifer and/or the deep principal aquifer should include operational costs that will be needed to maintain a successful injection well, such as maintenance to control mineral scaling in the injections wells and the air stripping treatment unit.	The costs were included under the operations and maintenance (O&M) costs for each alternative that includes reinjection.
Specific C. 18	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, P. G-1	Please include the reference to the Groundwater Monitoring Plan (28 April 1995) in the Reference section of Volume IX.	Acknowledged. The reference is: SWDIV, 1995. *Final Groundwater Monitoring Plan, MCAS El Toro.* Prepared by Jacobs Engineering Group Inc., 28 April 1995.
Specific C. 19	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring,	Based on the available information to date, air sparging should not be considered as a remedial technology.	Acknowledged. The list of bulleted items are a "list of goals considered" for monitoring. These goals were developed before the CLEAN II team completed their air sparging tests and subsequent evaluation. Based on an evaluation of the results, air sparging has been eliminated as a viable technology at MCAS El Toro.

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	bullet 2, P. G-2		
Specific C. 20	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Table G-1	The CFEST groundwater model has served well as a comparative tool for the evaluation of the different alternatives presented in the FS, however, future groundwater modeling for the purposes outlined in Table G-1 should not be limited only to the CFEST model.	Primarily, empirical groundwater elevation and water quality data will be used to assess whether groundwater monitoring objectives for the selected alternative are met. As inferred in footnote 1 of the table, the CFEST model (or another model of the Irvine Subbasin) will be used to assist with re-evaluating hydraulic containment and migration of contamination.
Specific C. 21	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, S. G.2 and G.2.1, P. G-3	The additional monitoring wells proposed as part of the long term monitoring network throughout the IAFS Addendum should be installed before the reconnaissance phase. One of the primary objectives stated as part of the reconnaissance phase is to identify data gaps that need to be addressed to assess whether the proposed monitoring well network meets groundwater monitoring objectives. The IAFS and the IAFS Addendum have already shown that data gaps exist. Therefore, the proposed additional monitoring wells should be installed and included as part of the reconnaissance phase. If, after the reconnaissance phase, the groundwater data shows further data gaps, then additional wells should be installed if determined necessary by the BCT.	If a DON "stand-alone" alternative is selected, DON will consider installing and sampling one or more monitoring wells near Culver Drive to investigate the leading edge of the plume (or toe of the plume) prior to the approval of the Record of Decision.
Specific C. 22	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring,	Groundwater from all newly constructed monitoring wells should be analyzed not only for the proposed VOCs and TDS, but also for general chemistry during the reconnaissance phase and then evaluated and reduced to VOCs and TDS, if appropriate. The new monitoring wells will be installed at locations that are considered "data gaps" therefore it is necessary to collect and	At the new monitoring wells, DON will collect and analyze parameters that will support an evaluation of the effectiveness of natural attenuation. These parameters may include, as appropriate, oxidation-reduction potential (Eh), dissolved oxygen (DO), chloride, sulfate, nitrate, soluble iron and soluble manganese. Eh and DO would be additional field measurements. VOCs and TDS are

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	S. G.2.1, Reconnaissance Phase, P. G-4	analyze the requested data to adequately evaluate the water-quality of the aquifer at the additional monitoring well locations. Other field measurements to be collected besides electrical conductivity (EC), pH, and temperature, are dissolved oxygen (DO) concentration, turbidity, and oxidation-reduction potential (Eh). These additional aquifer geochemical parameters are necessary to evaluate the water-quality, integrity of the groundwater sample, and to evaluate the contribution of biodegradation to the attenuation of the contaminant plume. While DTSC understands that at present biodegradation of the contaminate plume may be a minor portion of the attenuation of the plume, monitoring DO, Eh and general chemistry will provide data to gage future biodegradation rates.	already specified for monitoring (see Tables G-4a to G-4f).
Specific C. 23	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, S. G.2.2, Compliance Phase, P. G-5	Groundwater elevation measurements should be collected a minimum of twice a year throughout the duration of the compliance phase to monitor summer/winter groundwater fluctuations.	The monitoring frequency for the first year (Reconnaissance Phase) is monthly for groundwater elevations. The monitoring frequency for subsequent years (Compliance Phase) will be refined based on data collected during the Reconnaissance Phase. For illustration purposes, groundwater elevation measurements may be collected quarterly during the early stages of the Compliance Phase. Less-frequent monitoring intervals (such as twice a year) may be possible at selected wells at later stages. For purposes of costing (Section G.4), during the Compliance Phase, the cost of labor for groundwater elevation measurements is assumed to be one-third of the cost during the Reconnaissance Phase.
Specific C. 24	Volume IX, Draft Final IAFS Addendum,	This table and the September 30, 1994 Groundwater Quality Data Report describes the well screen interval for 18_MCAS08 as 205-410 feet below ground surface (a 205-foot screened	Table G-3 is incorrect. The screen interval for Well 18_MCAS08 should be 392-410 feet bgs as listed in the Groundwater Monitoring Plan (Draft Final publication date is 28 April 1995) and in the RI

RESPONSE TO COMMENTS
FROM CAL/EPA - DEPARTMENT OF TOXIC SUBSTANCES CONTROL [DTSC] DATED 11 OCTOBER 1996
Regarding the MCAS El Toro Draft Final OU-1 Interim Remedial Investigation/Feasibility Study Report Dated 09 August 1996
MCAS El Toro OU-1 Interim RI/FS

Reference (P. = Page; C. = Comment; S. = Section/Subsection; T. =Table; App. = Appendix)		Comment	Response
Comment No.	**RI/FS Report Reference**	**from DTSC (Tayseer Mahmoud, Sherrill Beard, and John Christopher)**	**by the Department of the Navy (DON)**
	Attachment G, Groundwater Monitoring, Table G-3	interval) and the July 21, 1994 RI/FS Draft Groundwater Monitoring Program Plan reports the screened interval as 392-410 feet below ground surface (a 18-foot screened interval). Please reconcile this inconsistency and cross-check for any additional errors.	Report (Volume II). Table G-3 will be corrected.
Specific C. 25	Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Figures G-2, G-3, and G-4	Given the present flow gradient of the subbasin, results of the simulated flow gradients, and the simulated contaminate pathlines (shown on figures in Section 6), the location of new proposed monitoring well 18_ADD7 should be reconsidered and moved further south.	DON will consult the regulatory agencies on the siting of any additional wells to be located at the leading edge of the plume (toe of the plume).

Response to Comments of RWQCB (L. Vitale)

RESPONSE TO COMMENTS
FROM THE RWQCB DATED 08 OCTOBER 1996
Regarding the Draft Final MCAS El Toro OU-1 Interim Remedial Investigation/Feasibility Study Report Dated 09 August 1997
MCAS El Toro OU-1 Interim RI/FS

Reference (P = Page; C = Comment; S. = Section/Subsection; App. = Appendix)		Comment	Response
Comment No.	**RI/FS Report Reference**	**of RWQCB (L. Vitale)**	**by the Department of the Navy (DON)**
General		The IAFS report identifies the feasible alternatives that will mitigate the regional groundwater plume emanating from Marine Corps Air Station (MCAS) El Toro. The next phase of the remedial project is to select the preferred alternative from those listed in the IAFS. The preferred alternative will be based on protection of human health and the environment, cost, implementability, community and regulatory acceptance. The IAFS report is acceptable to the extent that it identifies feasible remedial alternatives to mitigate the regional groundwater plume. If the model is the basis for selecting the final remedy, then additional groundwater data must be collected and the model must be refined prior to design and implementation.	No additional groundwater modeling is required. The IAFS presented the feasible remedial alternatives and evaluated them, as required by the CERCLA process, based on two threshold criteria and five balancing criteria. Both empirical groundwater monitoring data and model simulation results were used in the evaluation of the alternatives. DON will follow the proposed groundwater monitoring program specified for the preferred alternative as shown in Attachment G of the IAFS Addendum.
Specific C. 1.0		Statements are made in the Executive Summary and other sections of the report that 34 µg/L is the highest Trichloroethylene (TCE) concentration detected in the principal aquifer. However, TCE in the principal aquifer has been detected at levels near 50 µg/L in well MCAS - 7 on 12/22/95, and above 34 µg/L in various other wells.	The scope of the RI Report is to document activities that took place during the Phase I RI field investigations which occurred between 1992 and 1994. Data reported in the RI Report consisted of two rounds of groundwater monitoring data that were fully validated following the protocols established under USEPA's Contract Laboratory Program (CLP). For completeness, historical and contemporary data of existing wells in the Irvine Subbasin (i.e., water supply wells and other monitoring wells) provided by OCWD were also included in the RI Report. However, the data obtained from the additional existing wells was not subjected to CLP protocols. Although all available data were used in the IAFS, DON believes the evaluation of the alternatives should primarily rely on fully validated data. Based on the first two rounds of groundwater monitoring data, 34 µg/L was the highest TCE concentration detected in the Principal Aquifer (collected during the second sampling round, June to December 1993). The reviewer correctly points out that higher concentrations have been detected in the Principal Aquifer since 1993. However, the higher

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Reference (P = Page; C = Comment; S. = Section/Subsection; App. = Appendix)		Comment	Response
Comment No.	**RI/FS Report Reference**	**of RWQCB (L. Vitale)**	**by the Department of the Navy (DON)**
			detected concentrations were based on monitoring data obtained outside the umbrella of USEPA's CLP. More recent groundwater monitoring data, fully validated following the CLP protocols, is available in the quarterly groundwater monitoring reports prepared by CDM Federal Programs. The most recent quarterly report is the Quarterly Groundwater Monitoring Report, Marine Corps Air Station El Toro, California (CDM Federal Programs Corp., October 1997 for sampling round 6 that occurred during July 1997). DON believes it is important to note that the higher concentrations (47.8 µg/L) would not change the conclusions on the extent of groundwater contamination or evaluation of remedial alternatives.
Specific C. 2.0	Volume IX, P. 5-6	On page 5-6, Volume IX, the last line of the last sentence states, "consideration of actions, if any, needed to protect actual beneficial uses." Please modify to state, ".....to protect beneficial uses as stated in the Water Quality Control Plan, Santa Ana River Basin."	Text will be changed.
Specific C. 3.0	Vol. IX, S. 7.2.2.2, Compliance with ARARs	The last paragraph refers to SWRCB Resolution No. 68-16. The report states that Resolution No. 68-16 does not apply to the El Toro regional groundwater plume because the plume is not a new discharge. Resolution No. 68-16 is intended to protect/maintain high quality waters. We agree that the El Toro regional groundwater plume is not a new discharge, as long as it does not migrate. However, if contaminant migration is occurring (above maximum contaminant levels) then higher quality waters will be negatively impacted by the discharge of contaminants from the plume which violates	As stated in the text in Section 7.2.2.2, DON recognizes, but does not agree with the state's interpretation of the application of Resolution No. 68-16 to the interim actions being considered for the regional groundwater plume. However, as also stated in the text, DON believes that the new alternatives are compatible with the state's interpretation of the resolution.

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Reference (P = Page; C = Comment; S. = Section/Subsection; App. = Appendix)		Comment	Response
Comment No.	**RI/FS Report Reference**	**of RWQCB (L. Vitale)**	**by the Department of the Navy (DON)**
		Resolution No. 68-16.	
		General Comment on the Groundwater Model	
General		The groundwater modeling activities with the IAFS report compare feasible alternatives to remediate or control the regional groundwater plume emanating from MCAS El Toro. Specific parameters used in the model may be debatable, such as the constant head boundary at the downgradient edge of the plume, retardation factors, hydraulic conductivities, sensitivity analysis and calibration. Since modeling is not an exact science, continued refinement is necessary to improve and enhance the accuracy of the model predictions. If the model is used as the basis for selecting the remedial alternative, then model refinement will be required in order to increase confidence in the selected alternative and predicting plume behavior.	As discussed during the 26 September 1996 meeting with DON, the regulatory agencies, and OCWD, the BCT agreed that empirical data would be used in conjunction with the modeling results to assist in the selection of an alternative. The 26 September 1996 meeting minutes are attached with all of the meeting minutes in which groundwater modeling was discussed following the response to agency comments. The implementability of a joint DON/OCWD alternative is based on the outcome of negotiations between OCWD and DON and is also a factor in the selection of an alternative. Also see above response to General Comment.
		Specific Comments on the Groundwater Model	
Specific C. 1.0		We do not agree with the northwestern constant head boundary condition represented in the model. Water level variations up to 60 feet have occurred in wells near the presumed plume boundary (OCWD well data). These variations may affect the flow velocity which may in turn affect the plume migration estimate. Transient boundary head conditions should be represented in the model to provide a more realistic estimate of aquifer/plume behavior.	The use of a constant head boundary condition at the northwestern boundary, specifically the boundary between the Irvine Subbasin and the Orange County Main Basin, was based on a series of modeling meetings/conference call among DON, the regulatory agencies, and OCWD that were held between June 1993 and September 1996. The use of the constant head boundary has been discussed extensively and was approved by the regulatory agencies and OCWD. DON initially raised the concern about the constant boundary conditions used in the original MODFLOW model of the Irvine Subbasin developed by OCWD. DON commented that the OU-1 IAFS alternatives, in

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Comment No.	RI/FS Report Reference	of RWQCB (L. Vitale)	by the Department of the Navy (DON)
			particular alternatives including the Desalter project, may be affected by the northwest boundary conditions and without expanding the model to include the Main Basin, these boundary effects could not be fully understood. In the 30 June 1993 groundwater modeling meeting, DON questioned the validity of assuming a constant head boundary at the arbitrarily assumed boundary between the two groundwater basins. A consensus was reached by the BRAC Cleanup Team (BCT) [e.g. Navy and regulators], including the OCWD, to evaluate the use of an alternate boundary condition such as prescribed fluxes. The prescribed fluxes were initially derived from performing an analytical solution to the Theis equation. The Theis equation was used to estimate the appropriate groundwater flux to be prescribed for the northwestern boundary. It was determined that due to the limited extent of the Irvine Subbasin model across the boundary and the high interdependency with the adjacent Main Basin, suitable transient boundary conditions could not be calculated. Therefore, the expected effects were bracketed by performing each transient simulation using a constant head condition first and then repeating that simulation with a constant flux boundary condition. This approach was used for the draft MCAS El Toro OU-1 Interim Action Feasibility Study [IAFS] dated (01 September 1994). In the January 31, 1995 groundwater modeling conference call, a decision was made by the regulatory agencies, including the RWQCB, to limit the number of model simulations used in the revised draft OU-1 IAFS (dated 15 October 1995) by performing model runs on only one set of boundary conditions, constant head. The team's decision was based primarily on the results of sensitivity analysis runs for the two boundary conditions, constant head and prescribed fluxes. The results indicated insignificant differences in the relative effectiveness of the alternatives.

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			This decision to use only constant head boundary conditions for simulations of remedial alternatives was also used on the IAFS Addendum (06 August 1996) with agency concurrence, so that the additional alternatives evaluation in the IAFS Addendum could be directly compared with model results from the 15 October 1995 IAFS.
Specific C. 2.0		The retardation factor may be too high. The remedial investigation report indicates that total organic carbon is less than 0.04 percent of the total mass of the soil and provides little opportunity for adsorption to take place. Please explain how the retardation factor was calculated, taking into account the low organic carbon content in the soil.	Based on the total organic carbon content measured and types of dissolved compounds found in groundwater, DON calculated a retardation factor of 1 to 1.3. During the January 31, 1995 groundwater modeling conference call (meeting minutes attached) with the regulatory agencies and OCWD, the BCT decided to use a retardation factor of 2 to be conservative with respect to cleanup time to MCL for the sole purpose of comparisons of the OU-1 IAFS alternatives. DON believes it is important to note that although the higher retardation factor does slow the plume movement, sensitivity analyses on retardation demonstrated that the model results were not significantly different with the higher retardation factor of 2. The sensitivity analyses of the retardation factor were provided in the 01 September 1994 IAFS (Appendix A) and the 15 October 1995 IAFS (Appendix A).
Specific C. 3.0		Model calibration was attempted using two rounds of groundwater monitoring samples. The monitoring samples were collected between 1992 and 1993 ("they were all we had, " CH2MHill, IAFS modeling meeting, 9/26/96). It would be advantageous to include OCWD data, from past years, and the recent CDM data. The reported model calibration for potentiometric groundwater elevation exhibited a wide range of predicted to actual groundwater elevations (0 to 30 feet difference). The wide range of predicted to actual groundwater elevations is not	The model was calibrated using OCWD data. It was not calibrated using the more recent CDM data because they were collected in 1994 after the model was constructed in 1993. The earliest available groundwater elevation data for the Shallow Groundwater Unit were collected in the Fall of 1992 as part of the Phase I RI field investigations. Groundwater elevation data for the Principal Aquifer are available for the past few decades, courtesy of OCWD, and were used in the model calibration. Data for 1993 was deemed the most appropriate for the Principal Aquifer because they were complete and found to be representative of the Irvine Subbasin based on a trend analysis of historical groundwater elevation

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		an accurate calibration. Additional data collection should improve the model performance and will be required prior to final remedial design and implementation.	data. DON disagrees with the reviewer's comment that "[t]he wide range of predicted to actual [measured] groundwater elevations is not an accurate calibration." Model calibration is not judged solely by the range of differences between the measured and the simulated ground water elevations. It is more appropriately judged by the statistical meaning of these differences. In the January 31, 1995 groundwater modeling conference call, the team agreed that a calibration target of 15 feet for the Root Mean Squared Error (RMS) of these differences is adequate for an accurate calibration. The model calibration documented in the IAFS resulted in a calculated RMS of less than 15 feet for both the Shallow Groundwater Unit and the Principal Aquifer. Therefore, the model calibration is accurate and the model performance does not require improvements with additional data.
Specific C. 4.0		Hydraulic conductivities may be too low (13 to 35 feet/day). OCWD data indicate hydraulic conductivities up to 67 feet/day (preferential pathways probably exist in the regional plume). The sensitivity analysis in the report should account for the higher observed hydraulic conductivities.	DON agrees that there are higher hydraulic conductivity zones within the Irvine Subbasin. However, in an alluvial fan environment, these more permeable units are generally not continuous over large distances and tend to pinch out laterally. Therefore, a range (13 to 35 feet/day) representing average hydraulic conductivity properties of the Principal Aquifer used in the model is more appropriate than a maximum hydraulic conductivity value. The sensitivity analysis runs account for higher hydraulic conductivities; values between 13 and 53 feet/day were used in the Principal Aquifer. The sensitivity analysis results for Alternative 2B (results presented in the OU-1 IAFS Appendix A [Groundwater Modeling Report]) indicate that the TCE plume remains to the east of Culver Drive for the entire range of hydraulic conductivities.
Specific C. 5.0		Alternative 2B was used for the model solute transport sensitivity analysis. It would be appropriate to apply this analysis to the new alternatives 7A and 7B, the natural	The reviewer is correct in pointing out that solute transport sensitivity analysis was performed on Alternative 2B (OU-1 IAFS Appendix A [Groundwater Modeling Report]). Sensitivity analysis of biodegradation

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		attenuation alternatives. If a natural attenuation alternative is selected, a solute transport analysis would be useful in supporting the selection.	was performed on Alternative 7B (OU-1 IAFS Addendum). Although additional sensitivity analysis of all solute transport parameters on either Alternatives 7A or 7B may be useful, based on the results of the alternatives evaluation, DON believes that greater emphasis should now be placed on the use of empirical data instead.

Response to Comments of EPA (B. Arthur and H. Levine)

RESPONSE TO COMMENTS
FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY DATED 10 OCTOBER 1996
Regarding the Draft Final OU-1 Interim Remedial Investigation/Feasibility Study Report Dated 09 August 1996
MCAS El Toro Interim RI/FS

Reference (P. = Page; C. = Comment; S. = Section/Subsection; T = Table; App. = Appendix; Attach = Attachment)		Comment	Response
Comment No.	**RI/FS Report Reference**	**from EPA (B. Arthur, H. Levine)**	**by the Department of the Navy (DON)**
Comments from Bonnie Arthur/EPA			
		EPA has finished review of the "Draft Final Interim Action Remedial Investigation/Feasibility Study Reports." The documents are acceptable without revision, however, the attached comments (Enclosures A & B) are provided for your incorporation into future Operable Unit (OU) 1 documents. The following major comments should be incorporated into the OU 1 draft final Proposed Plan (PP) and Record of Decision (ROD)	
Major C. 1		EPA can accept a draft final Proposed Plan (PP) and Record of Decision (ROD) for a joint Navy/Orange County Water District (OCWD) project if the parties are able to reach agreement. The Navy is required to comply with the deadlines under the Federal Facilities Agreement (FFA). Additionally, as discussed in prior meetings, the Long-term Groundwater Monitoring Plan must be approved by the regulatory agencies prior to the submittal of the draft ROD.	Acknowledged.
Major C. 2		If Orange County Water District and the Navy/Marine Corps are unable to reach agreement and a joint project thus is not "Implementable" (as defined under the National Contingency Plan FS Nine Evaluation Criteria), EPA would require the installation of the additional monitoring wells at Culver Road (the leading edge of the plume) prior to signing a ROD for any Navy stand alone principal aquifer remediation alternative.	If a DON "stand-alone" alternative is selected, DON will consider installing and sampling one or more monitoring wells near Culver Drive to investigate the leading edge of the plume (or toe of the plume) prior to the approval of the Record of Decision.
Major C. 3		As discussed in EPA's 12/15/95 comments, the Navy should ensure that shallow aquifer extraction/remediation occurs prior	DON concurs that it would be beneficial to begin Shallow Groundwater Unit (SGU) extraction/remediation before Principal

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Comment No.	**RI/FS Report Reference**	**from EPA (B. Arthur, H. Levine)**	**by the Department of the Navy (DON)**
		to any significant principal aquifer extraction.	Aquifer (PA) extraction/remediation. This would avoid the spreading of contaminated shallow groundwater into the Principal Aquifer. For the joint MCAS El Toro Project/Irvine Desalter Project (IDP) alternatives [Alternatives 6A and 8], both the SGU and PA remediation systems would start at the same time because water from the SGU would be conveyed to the IDP treatment system. An interim ROD of the Site 24 (VOC Source Area) vadose zone was singed by the regulators and DON in September 1997. Soil vapor extraction (SVE) and shallow groundwater extraction pilot-testing is in progress to support the remedial actions and to reduce mass in the source area.
1	Draft Final OU 1 Interim RI/FS Report Executive Summary; Section 4.3.1	As mentioned in the report, the TDS plume is migrating (page ES-9). Please clarify that the estimates for TDS plume movement are based on OCWD estimates (applicable also for the IAFS Report).	In the OU-1 Interim RI/FS Report Executive Summary (Volume I), page ES-9, the text refers to the sources of elevated total dissolved solids (TDS), not future migration of TDS. However, in the (OU-1 IAFS Appendices B through J (Volume VII), future migration of TDS is discussed. In the OU-1 RI Report Addendum (Volume VIII), as stated in the comment, the predictions of future TDS plume movements are based on OCWD estimates.
2	Draft Final Interim OU 1, Interim-Action Feasibility; Study Report Addendum; Pages ES-2, 1-9, 1-10	OCWD's sampling results must be presented consistently. On page ES-2; 34 ug/L, the maximum Navy detected level for TCE, is provided as the highest concentration. Pages 1-9 and 1-10 discuss the OCWD data, which include a few higher historical detections for TCE. Any discussion of maximum concentrations should include both OCWD and Navy/Marine Corps data with reference to each.	On page ES-2, paragraph 2, sentence 4 will be revised to read as follows: "The highest TCE concentration detected in the Principal Aquifer **during the Phase I RI** was 34 micrograms per liter..." (bold text is new). On page 1-10, sentence 2, the date range for OCWD data used in the Phase I RI will be changed from "1985 to present" to "1985 to 1994." Data collected subsequent to 1994 are presented in the OU-2A reports prepared by Bechtel and the quarterly groundwater monitoring

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Comment No.	**RI/FS Report Reference**	**from EPA (B. Arthur, H. Levine)**	**by the Department of the Navy (DON)**
			reports prepared by CDM Federal.
Minor 1	Page 1-11	Is Table 1-3 missing? Also, the "area of regional groundwater investigation" is not depicted on Figure 1-1. Please correct this in future reports.	Table 1-3 is missing and will be included in the public comment Draft Final version. The area of regional groundwater investigation is already included on Figure 1-1 as denoted by the green shaded area.
Minor 2	Page 5-1, Section 5.1.1	It is assumed that the discussion under Alternative 7B stating "action in the Principal Aquifer under Alternative 7B would occur only as necessary to protect actual beneficial uses" is also applicable to Alternative 7A.	Alternative 7B, which is a contingency to Alternative 7A, includes the costs of aquiring and operating Wells 18_IRWD78 AND 18_TIC 113 if their use is phased out after 10 years. The "action in the Principal Aquifer..." described in Section 5.1.1 refers to the DON acquisition and operation of these two wells. Section 5.3 (pages 5-5 to 5-8) discusses additional monitoring and potential mitigative actions including wellhead treatment, if necessary, for the additional protection of beneficial uses. These measures are common to all three new alternatives (7A, 7B and 8). Therefore, DON does not propose any revisions to the text.
Minor 3	Page 5-2, Section 5.2.1	Typographical error. Should Figure 6-2 be changed to Figure 5-4?	The figure reference will be changed to Figure 5-5 that shows the 5-µg/L TCE isoconcentration contour in the Principal Aquifer and the locations of the proposed enhanced monitoring array well clusters.
Minor 4	Figure 7-13	Shading missing for the "Intermediate Risk" key.	In the legend for Figure 7-13, the lower risk bar should be shaded light gray, and the intermediate risk bar is correctly shown as white. Changes will be made to clarify the information.
Minor 5	Page 7-37, 4th paragraph	Typographical error. Should Figure 7-3 be stated as Figure 7-2?	The text will be revised to reflect the correct figure reference is Figure 7-2.
Comments from Herb Levine/EPA			
General C. 1		This FS and the Addendum raise some interesting questions	See response to Major Comment 2 from Bonnie Arthur/EPA provided

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Comment No.	**RI/FS Report Reference**	**from EPA (B. Arthur, H. Levine)**	**by the Department of the Navy (DON)**
		regarding addressing remediation of the off-base contaminant plume. Though there are some data gaps this document is sufficient for comparing remedial actions. The existing data gaps are critical and, in my opinion, should be filled prior to signing the ROD, if the Desalter is chosen. Those data gaps are, if natural attenuation is chosen, additional monitoring wells at Culver Road, as well as a long term monitoring plan.	above.
General C. 2		There are some concerns with the ground water model which have not been adequately addressed. The initial condition for contaminant distribution in the principle aquifer is, and the Navy has admitted, an over-estimation by a factor of three to four. The Navy's contention that this is conservative is not true, it is merely an over-simplification and misrepresentation. It is appropriate to use field measured data which represents three dimensional data when constructing a three dimensional model.	DON disagrees with the reviewer's assessment that the methodology used to assign the initial contaminant distributions results in "...an oversimplification and misrepresentation" of the actual conditions". The methodology used is valid and was based on all available data and constraints on the use of the data. The technical approach for the groundwater modeling was discussed with and agreed to by the regulatory agencies (including USEPA) and OCWD before the model was constructed and used for each phase of work. *Meeting minutes which include discussions of modeling assumptions, construction of the model, and presentation of modeling results are attached to these response to comments.* The groundwater model is a three-dimensional (3-D) model composed of 5 layers. The Principal Aquifer (PA) is represented by 3 layers in the western portion of the model (main part of the Irvine Subbasin) and by 1 layer directly beneath MCAS El Toro. The depth-specific occurrence of TCE is well characterized along the subbasin axis where cluster wells or multiple-port (MP) wells were installed. However, at the perimeter of the plume, data are available only from fully screened water supply wells with relatively long screen intervals and the vertical contaminant distribution is not known. Therefore, the maximum measured TCE concentration from each well completed

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			within the PA, regardless of the type of construction, was assigned to all three PA layers as a "conservative" assumption so that the cost and time to complete remediation of the PA were not underestimated. The regulatory agencies, including the EPA, agreed to this approach prior to modeling the alternatives. An alternate approach of assigning average values from each well cluster or MP well was considered by the agencies, but was rejected, on the basis that it would result in an underestimation of the extent of the TCE plume. The assignment of the initial contaminant distribution in the PA is constrained by the availability of depth-specific data in all portions of the Irvine Subbasin. At well cluster or MP well locations where the vertical contaminant distribution is well characterized, the TCE mass in the PA may be overestimated by a factor of up to three **or four**. Overestimation of mass is expected to be much less in the eastern portion of the model where the PA is represented by 1 layer. The overestimation of mass for the entire model has not been rigorously calculated, but is expected to vary throughout the model domain. If the initial mass dissolved in the aquifer is overestimated, the simulated cleanup times to MCL may be overestimated, the mass removed estimates may be high, and the simulated concentrations may be high. It is in this context that statements about the conservativeness of the simulations were made. DON believes that regardless of whether the initial concentration assignments are high or not, the results of the IAFS evaluations are valid. The model is used to compare the effectiveness of each remedial alternative relative to the other alternatives. Since the same initial mass is used for all of the alternatives, the evaluation of the relative effectiveness of the alternatives is not affected.

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General C. 3		A comment was raised previously and discussed with the Navy with regards to delineating risk with plume concentrations. The group had agreed to contour risk at order of magnitude intervals and overlay on the contaminant plume. This was not done. This would be an useful tool when comparing risk posed for alternative 1 and then comparing against other alternatives. It would also be useful for comparing dollar costs for risk reduction.	In order to respond to EPA requests, TCE concentrations were contoured at concentrations that correspond to TCE risk contours of 3×10^{-6}, 10^{-5}, and 10^{-4}. This approach was described at the meeting with the regulators, Navy, and CH2M HILL on 07 May 1996 to present the results of the groundwater modeling for the OU-1 IAFS. No objections were stated, DON proceeded with the approach being acceptable. On the figures presenting the groundwater modeling results for each alternative (Figures 7-1 to 7-4), the 5-µg/L TCE contour represents the 3×10^{-6} TCE risk level, the 15-µg/L contour represents the 10^{-5} TCE risk level, and the 150-µg/L contour represents the 10^{-4} TCE risk level. The dollar costs for risk reduction were calculated. The approach for presenting the reduction of TCE plume risk areas is described in Section 7.3.3.3 (page 7-42). The risk areas representing the lower risk range (3×10^{-6} to 10^{-5}), intermediate risk range (10^{-5} to 10^{-4}), and higher risk range (greater than 10^{-4}) were calculated and used as the basis to compare the reduction of risk ranges for the alternatives. The relative comparisons of TCE risk areas among the alternatives are presented in Table 7-9 and displayed as bar graphs (Figures 7-10 to 7-13). The evaluation of the cost per TCE area reduced was based on an evaluation of the cost of the <u>total</u> TCE area reduced (Table 7-10 and Figure 7-16). Note that there is a direct correlation between TCE area reduction and TCE risk reduction (Table 7-9), and therefore costs associated with the TCE area (or risk) reduction (Table 7-10). DON believes that the approach presented in the IAFS Addendum

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			was responsive to the regulatory agencies' request to display TCE risk contours. TCE is only one of the VOC contaminants of concern (COCs) in the regional groundwater plume. For the OU-1 IAFS, TCE plume maps were used as surrogates of all volatile COCs. Therefore, DON believes it is more appropriate to use TCE plume maps with isoconcentration contours, so that TCE risk contours are not confused with overall groundwater risk contours. Since a risk level is associated with each concentration, "risk contours" and "risk areas" can be inferred from the TCE plume maps
Specific C. 1	S. 1.4, P. 1-11,	Scope of OU-1 Interim Action. The second paragraph does not clearly distinguish between this action and the OU-2A action. The next section (1.5) does, so I recommend rewriting this paragraph.	The text will be modified to clarify the scopes of OU-1 and OU-2A (specifically Site 24, the VOC Source Area).
Specific C. 2	S. 1.5, P. 1-12,	Relationship Between OU-1 and OU-2A. The discussion here identifies the plume separation between the hydrogeologic units. This is not discussed elsewhere but should be discussed here. The Navy should state where these plumes actually are, and why they are separated. Or is this an artifact of sampling?	The division between OU-1, the regional VOC plume investigation, and OU-2A (Site 24), the VOC source area, is not related to any physical separation of the TCE plume between the Shallow Groundwater Unit (SGU) and the Principal Aquifer (PA). Site 24 was defined as the source area of the regional TCE plume during the Phase I RI investigation. The extent of the source area has been defined in greater detail by the Site 24 vadose zone investigation. The "separation of the plumes" between the SGU and the PA is a result of the separate contouring of the SGU and the PA groundwater monitoring data. An insufficient number of monitoring wells are located between the Station boundary and Sand Canyon Avenue to accurately contour the expected overlap of the shallow and deep plumes. A continuous plume extending across both hydrostratigraphic units is expected. A more detailed discussion of the physical

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			plume boundaries is provided in the RI Report (Volume II).
Specific C. 3	S. 6.1.2.2, P. 6-5,	Model Modifications. The practice of using the highest measured value for TCE for the entire saturated thickness when other depth specific data are present is not appropriate nor warranted. The unique feature which makes a three dimensional model more accurate than a two dimensional model is the ability to incorporate depth specific variability in aquifer parameters and contaminant distribution. The contention that the Navy's approach is conservative is misleading. In fact, conservatism is not what is being modeled. What is being modeled is an oversimplification of the subsurface hydrology and contaminant distribution. This in turn produces a plume distribution and movement prediction which is overly simplified and unrealistic. This is evidenced by the plume maps presented for each alternative. They are all two dimensional maps. For the off-base principle aquifer plume it is desirable to compare contaminant distribution in cross section with actual data. The statement that "*This conservative approach helps to compare modeling results...*" is actually wrong and should be deleted. There is no added benefit or help from this approach.	DON disagrees with the reviewer's assessment that the methodology used to assign the initial contaminant distributions "... is not appropriate nor warranted" and that "[w]hat is being modeled is an oversimplification of the subsurface hydrology and contaminant distribution." As discussed above in the response to General Comment 2, the methodology used is valid and was based on all available data and constraints on the use of the data. The approach was discussed with and agreed to by the regulatory agencies, including USEPA, before the model was constructed and used. The word "conservative" will be deleted from the sentence referenced by the reviewer.
Specific C. 4	S. 6.1.2.2, P. 6-7	Model Modifications, Biodegradation. The agency comments asked the Navy to evaluate natural attenuation for the off-base plume of TCE in the principle aquifer. During subsequent BCT meetings this comment was further explained to ask for the Navy to model the off-base plume with the hypothesis that the source is cut off via an action from OU-2A. Therefore, what	Based on the 6 February 1996 meeting between DON and the regulatory agencies in San Francisco, it was DON's understanding that the active source would be incorporated into the model simulations. However, for all of the active alternatives evaluated (i.e. all alternatives except the No-Action alternative), because the shallow groundwater extraction systems contain the shallow contamination

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		was asked for was for the model to evaluate the degradation of the offbase plume without further impact from the source area. During these discussions it was suggested that the Navy consider re-running the no action alternative without any continuing mass loading from the base. It appears that the Navy did not quite do this, but does evaluate something not too different for Alternative 7B (without biodegradation as shown in Figure 6-46). It is curious that this alternative predicts higher concentrations in the off-base principle aquifer than Alternative 1 (see Figure 6-10). Is this due to incomplete capture of the on-base plume? Please explain.	effectively, the Principal Aquifer (PA) is not affected by continuing contamination from the source. In other words, the active source is essentially "cut off" from the PA. Figures 6-10 and 6-46, Principal Aquifer plume maps for Alternative 1 (No Action) and Alternative 7B, respectively, have different model assumptions and therefore can not be compared directly. Figure 6-10 includes active biodegradation and Figure 6-46 includes no biodegradation. Figure 6-10 should be compared with Figure 6-34 (Alternative 7B with biodegradation) instead. A comparison of these last two maps demonstrates that Alternative 7B is more effective (has a smaller TCE plume area after 20 years) than Alternative 1.
Specific C. 5	S. 6.3.4, P. 6-15,	TCE Transport Simulations. Please compare and discuss Figure 6-10, TCE in principle aquifer with no action, with Figure 6-16. Table 6-6 identifies a distinction based on plume size greater than 5 ppb. What is the mass differential? (for the principal aquifer). Please make the distinction between SGU and PA in Table 6-6 for all alternatives.	The differences in total mass removal achieved among the alternatives, with the exception of Alternative 1, can be attributed primarily to the mass removal achieved in the Principal Aquifer (PA). This is due to the fact that the mass removal achieved in the Shallow Groundwater Unit (SGU) was similar among the alternatives primarily because they shared the same shallow groundwater extraction system. This assumes that mass removal is not affected significantly by reinjection in the SGU. Different extraction systems (different number of wells and extraction rates), however, were designed for the alternatives in the PA. Table 6-6 will be modified to include an explanatory footnote. The reviewer is referred to the detailed comparisons of all the alternatives, including Alternative 1 (Figure 6-10) and Alternative 2A (Figure 6-16), presented in Section 7, Analysis of Remedial Alternatives.
Specific C. 6	S. 6.4.4,	TCE Transport Simulations. Moderate shrinking of the TCE	DON disagrees with the reviewer's comment on the TCE plume size.

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	P. 6-18	plume in the PA appears to be a very optimistic view. There does not appear to be significant reduction in size. When the Navy adds the additional data requested in comment 5 mass removal can be compared.	Based on the model simulations, there is a distinct shrinking of the TCE plume in the Principal Aquifer (PA). Table 6-6 presents both the TCE mass removed and the TCE plume areas greater than 5 μg/L (risk greater than $3x10^{-6}$) remaining after 20 years for all the alternatives. The difference in plume size in the PA is greatest between Alternative 1 (No Action) and Alternative 6A. See response to Specific Comment 5 on the mass removal part of the comment.
Specific C. 7	S. 6.7.2, P. 6-24	Groundwater Flow Conditions and Capture Zone Mapping. This agency commented on the previous FS with regards to water level declines in the source area if the IDP was constructed. Of particular concern is the top 40 to 50 ft. of the SGU. This is the portion of the plume which contains the most mass of TCE. Since all of the alternatives are run out for 20 years it is appropriate to mention that the portion of the SGU of interest dewaters significantly in less than 20 years. Table 6-4 compares water level differences for 20 years only. It would be appropriate to prepare a table which has more than one time step. As example, Figure A-3-5 shows simulated drawdown vs. time for 20 years. At time one year water levels drop ten feet in well 22_DBMW47, at the down gradient edge of the hot spot. At time step 2 years water levels have decline to over 15 ft., and at the time step 6 years 30 ft. of drawdown has occurred and at the 10 year time step 40 ft. of drawdown has occurred in this well. This is very significant since most of the mass is in the upper 40 ft. This implies little value of pumping within this zone after 10 years. The comments to the previous	The phenomenon of dewatering of the SGU was noted in the OU-1 IAFS Report (Volume IV) for Alternatives 6A and 8. These two alternatives do not have reinjection wells in the SGU, therefore, they exhibit larger drawdowns when compared to Alternatives 2A, 7A, and 7B which include reinjection wells in the SGU. At EPA's request, additional analysis of the drawdowns in the SGU were completed for the IAFS Addendum and included as graphs in Attachment A-3. The reviewer correctly notes that the projected drawdowns vary significantly throughout the Shallow Groundwater Unit (SGU). However, DON disagrees with the reviewer's comment that there would be little value in pumping the SGU beyond 10 years. DON believes the dewatering of the upper 40 to 50 feet of the SGU would enhance the effectiveness of a soil vapor extraction (SVE) system. Additional groundwater modeling of the TCE source area (Site 24) was included as part of the OU-2A FS. New alternatives for remediation and containment of the TCE source area have been developed that incorporated new site-specific data generated during

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		document and discussions at BCT meetings stressed the importance of acknowledging this phenomenon and including this in the alternatives.	the Phase II RI. As indicated in the response to Major Comment 3, SVE pilot-testing and groundwater extraction pilot testing is currently ongoing. This pilot testing is generating additional data on the subsurface of the TCE source area that will be during remedial design/remedial action (RD/RA).
Specific C. 8	S. 6.8, P. 6-26	Sensitivity Analysis of TCE Biodegradation. This sensitivity analysis is important, however one important step was excluded. The simulated plumes for this sensitivity analysis should be compared to Alternative 1. The best case, 100 year half life, is not presented in Figures 6-39 and 6-40. Figure 6-46 indicates that without biodegradation concentrations in the PA are greater than Alternative 1, which is also simulated without biodegradation. Please provide the missing Figures and compare all sensitivity analyses with Alternative 1.	The No-Action alternative (Alternative 1 in this case) typically is not used as a representative alternative for sensitivity analysis, because it does not include active remedial groundwater components that would influence the groundwater flow regime. In the OU-1 IAFS Addendum, Alternative 7B was selected as a representative alternative for evaluating the impact of biodegradation (expressed as half life) on solute transport; a half-life value of 100 years was used in the model. The text on page 6-27 (third paragraph) has misstated the figure numbers; it should reference Figure 6-33 (not Figure 6-39) and Figure 6-34 (not Figure 6-40). The text will be modified to reflect the correct figure references. The reviewer's comment about figure 6-46 (and Figure 6-10) is not accurate. Alternative 1 was simulated with a 100-year half life and that is why the simulated TCE concentrations for Alternative 1 are less than those shown in Figure 6-46 (Alternative 7B, without biodegradation).
	S. 6.9, P. 6-28, T. 6-9	Cleanup Time to TCE MCL Simulations. The Table 6-9 should breakout the mass and risk difference between the SGU and the PA. The agencies asked for a risk based comparison for each alternative with risk contours shown on plume maps (for the PA). This is necessary for making many comparisons.	DON provided a risk-based comparison of the alternatives as requested by the agencies in Section 7, Analysis of Remedial Alternatives, of the IAFS Addendum. In particular, Tables 7-9 provided a comparison of the alternatives based on TCE plume areas remaining after 20 years by risk category (based on TCE

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		When comparing time for each alternative the risk contours are likely to indicate the relative risk reduction along with time. As presented the discussion of relative difference of alternatives adds little to the ability to choose a remedy based on time. The statement that Alternatives 6A and 8 are distinguished from other alternatives might be irrelevant if risk were considered.	isoconcentration contours). Table 7-10 provided a comparison based on present worth costs to reduce TCE plume areas (based on total risk above $3x10^{-6}$) after 20 years. DON believes a full evaluation of the alternatives can be made, as intended by the agencies, when the information in Table 6-9 (cleanup time to TCE MCL) are used in combination with the information presented in Section 7. For additional clarification of the TCE isoconcentration contours and their corresponding risk levels, see the response to General Comment 3 provided above.
Specific C. 10	S. 6.11, P. 6-34, Item 2	The concept presented here for containment of the SGU is considered conceptual only. This agency does not approve the proposed well placement as presented in this document. This will be addressed in the OU-2A FS.	DON acknowledges that the shallow groundwater extraction system design is conceptual and will be refined, as appropriate, during the Remedial Design phase.
Specific C. 11	S. 6.11, P. 6-34, Item 3	Summary. The contention that 18_TIC113 contains the plume is documented by water levels, but not particles (see Figures 6-8, 6-26, 6-32, 6-38). Please clarify. What is the effect of plume movement without these wells pumping?	The particle tracking results (Figures 6-8, 6-14, 6-20, 6-26, 6-32, and 6-38) show the particles are not being influenced by Well 18_TIC113 because the well is situated cross gradient with respect to the TCE plume in the Principal Aquifer. Most of the particles are captured by Well 18_IRWD78 and the few particles that appear to escape initial capture are ultimately captured by the well (particles are within the capture zones of these wells, which are based on water levels) as depicted in Figures 6-6, 6-12, 6-18, 6-24, 6-30, and 6-36. Pumping of Well 18_TIC 113 does, however, contribute to the large cone of depression centered on Culver. Both Wells 18_TIC113 and 18_IRWD78, located at the toe of the plume, were included as part of the network of existing (background) pumping wells. Therefore, all model simulation runs

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			included the effect of the two wells pumping. Their inclusion was based on current known conditions. *DON believes speculation on the effect of plume movement without these wells pumping is not warranted.* However, as part of Alternative 7B, DON has made provisions to acquire and operate both wells if their use is phased out after 10 years.
Specific C. 12	S. 6.11, P. 6-35, Item 4	Summary. Another concern with the numeric solution is the low value of longitudinal dispersivity used. Anderson and Woessner (1992) state "dispersivity seems to increase with the size of the contaminant plume; i.e., dispersivity seemingly increases as the plume moves down gradient." Also, Fetter (1993) suggests that while the potential range is rather large, the longitudinal dispersivity can be estimated to be about 0.1 of the flow length. Fetter (op. cit.) also states that the few field studies available indicate a ratio of longitudinal to transverse dispersivity ranging from 6 to 20. Please explain why a relatively low longitudinal dispersivity of 50 feet and a lateral dispersivity of zero was used to present large plumes ranging from 2,000 to 10,000 feet.	The model values of the longitudinal and transverse dispersivity coefficients are based on an attempt to calibrate the model using the observed TCE plume at MCAS El Toro and not merely literature values. Sensitivity analysis performed that varied these coefficients up to 200 feet indicated that the higher values would result in solute transport simulations that are not consistent with the observed TCE plume. The initial groundwater modeling performed in September 1994 for the MCAS El Toro TCE plume included simulations to calibrate solute transport parameters, including the longitudinal and transverse dispersivity coefficients. A number of values were used to arrive at a reasonable match between the observed and the modeled TCE plumes. Initially, a value of 680 feet was used for the longitudinal dispersivity coefficient. Review of related literature and discussions with the regulatory agencies during the 31 January 1995 modeling conference call (meeting minutes attached) indicated that this value may be too high. A lower value of 50 feet was selected and agreed upon by the Navy and regulators. Values other than zero for the transverse dispersivity coefficient produced unrealistic results that laterally distributed TCE over a much larger area beyond the observed TCE plume. The longitudinal and the

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			transverse dispersivity coefficients were therefore based on results of the sensitivity analysis and the attempt to calibrate the modeled TCE plume against the observed TCE plume.
Specific C. 13	S. 6.11, P. 6-35 Item 5	Summary. As stated in comment 10 above, this agency considers the design for the SGU as presented here as conceptual only. We anticipate major changes in the design as presented here and will address our concerns with the OU-2A FS.	As stated above in the response to Specific Comment 5, DON acknowledges that the shallow groundwater extraction system design is conceptual and will be refined, as appropriate, in the OU-2A FS and during the Remedial Design phase.
Specific C. 14	S. 6.11, P. 6-35, Item 6	Summary. This agency can not concur since significant figures were not presented (100 yr. Half life) and the no biodegradation term differs from the no action (see comments 4 & 8).	The reviewer's comments are addressed above in the response to Specific Comment 8. DON believes the observations and conclusion made in this summary item are valid as stated.
Specific C. 15	S. 6.11, P. 6-36, Item 7	Summary. The discussion of cleanup times should include relative risk. What is the difference between these cleanup times?	DON has included in the OU-1 IAFS Addendum the risk information the reviewer requests. The TCE plume areas (and their corresponding risk levels) remaining after 20 years for each alternative are discussed in Section 7, Analysis of Remedial Alternatives. Table 7-9 presents the TCE plume areas remaining after 20 years by risk category (with corresponding risk levels and TCE concentrations) in the Shallow Groundwater Unit (SGU) and Principal Aquifer (PA). For each alternative, cleanup times to TCE MCL in the SGU and the PA are presented in Section 6 (Table 6-9) and the risk remaining in the SGU and PA after 20 years are presented in Section 7 (Table 7-9),
Specific C. 16	P. G-1 Attach. G	The primary purpose of the existing Groundwater Monitoring Plan is to determine the nature and extent of contamination.	The reviewer's comment correctly describes the primary objective of the existing Groundwater Monitoring Plan. The text will be modified to incorporate the reviewers comment. However, the sentence referred

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			to by the reviewer is merely conveying the fact that there are different *purposes* between the existing Groundwater Monitoring Plan and the conceptual groundwater monitoring plans presented in Attachment G of the IAFS Addendum.
Specific C. 17	P. G-2, Attach. G	Agree that the objective during a remedial action are different than during a remedial investigation. The primary objective of monitoring during remedial action is to determine if the designed performance and remedial goals are actually met (see Methods for Monitoring Pump-and-Treat Performance, EPA/600/R-94/123, June 1994). Cost-effectiveness is of course always a concern, but is not the only or major concern as presented here. This Attachment should focus on OU-1A, i.e., the contaminant plume in the principle aquifer.	DON concurs with the reviewer's comment on the primary objective of the remedial action monitoring. DON believes the reviewer misstated DON's position on emphasizing cost above all other considerations. It has always been DON's position to achieve the necessary protection of human health and the environment in a cost effective manner. The attachment does focus on OU-1. However, the remedial action monitoring also encompasses a larger set of goals, including the monitoring of groundwater elevations in the Shallow Groundwater Unit (SGU) and the evaluation of potential contaminant migration from the SGU to the Principal Aquifer.
Specific C. 18	P. G-2, Attach. G	Add as a monitoring objective, *Evaluate the performance of the chosen remedial action.*	The goals listed in the text are specific components of evaluating the performance of the chosen remedial action. The text will be modified to emphasize this point.
Specific C. 19	S. G-2, P. G-3, Attach. G	Monitoring Phases. Suggest changing Compliance to Performance. Agree with the need to collect additional data during the Reconnaissance Phase. The data collection frequency during the Reconnaissance Phase is acceptable. Please add Redox and dissolved oxygen to the parameter list.	The term "compliance" is more appropriate because during the Compliance Phase (Section G.2.2), groundwater monitoring will continue to ensure the broader scope of compliance with RAOs has been achieved. One of the key activities during this monitoring phase is to continually evaluate the performance of the selected remedial action. DON acknowledges the reviewer's comments on the value of collecting additional data and agreement on the monitoring frequency. Oxidation-reduction potential (redox or Eh) and dissolved oxygen

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			may be added to the list of parameters.
Specific C. 20	S. G-2, P. G-5, Attach. G	Monitoring Phases. What is the frequency for this phase?	The monitoring frequencies for the Reconnaissance Phase and the Compliance Phase are stated in Section G.2 (pages G-3 to G-5) and reiterated below. The monitoring frequency for the first year (Reconnaissance Phase) is monthly for groundwater elevations and quarterly for groundwater quality samples. The monitoring frequency for subsequent years (Compliance Phase) will be refined based on data collected during the Reconnaissance Phase. For illustration purposes, groundwater elevation measurements and groundwater samples may be collected quarterly during the early stages of the Compliance Phase. Less-frequent monitoring intervals may be possible at selected wells at later stages. For purposes of costing (Section G.4), the annual costs for Compliance Phase monitoring is expected to be less than the annual Reconnaissance Phase monitoring costs on average (one-third for groundwater elevation measurements and one-half for groundwater sampling).
Specific C. 21	S. G-3, P. G-6, Attach. G	Monitoring Well Network. This section can not be reviewed since the Tables and Figures were not included.	The figures and tables for this section were inadvertently omitted from the reviewer's copy of the report. A copy of these tables and figures were sent separately to EPA
Specific C. 22	S. 7.2.3.4 P. 7-21,	Reduction in Toxicity, Mobility, or Volume Through Treatment-Alternative 6A. The reference to and data presented in Table C-1c poses an interesting question. If the influent concentrations from the off-site principle aquifer plume are below drinking water standards why is treatment proposed?	Alternative 6A is a joint (Navy/OCWD) alternative. Treatment to 0.5 µg/L, the detection limit of TCE, was prescribed by OCWD and IRWD. DON's responsibility, as dictated by CERCLA, is to treat to MCLs (5 µg/L for TCE). Treatment beyond MCLs was selected by OCWD and IRWD.

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Specific C. 23	S. 7.2.4.3 P. 7-26	Long-Term Effectiveness and Performance--Alternative 7A. Please add the previously requested risk contours to Figures 7-3 and 7-4. What is the difference in risk reduction, appears negligible, within the PA for each alternative and what is the dollar amount associated with risk reduction?	See response to General Comment 3 provide above.
Specific C. 24	S. 7.4.2 P. 7-58	Conclusions. The presentation of risk reduction based on length of a 5 ppb plume is not acceptable. The Navy was asked, and agreed, to prepare risk contours for the off-base plume in the PA. The presentation here is misleading since the total mass reduced is presented along with the cost estimates with no realistic presentation of risk reduction. Figure 7-11 makes an attempt to compare risk with alternatives after 20 years. What is the difference? Why is plume area important? The risk is within an acceptable range for all alternatives presented including alternative 1. According to the data presented in Table C-1c the influent concentrations to a treatment plant for wells in the PA are below drinking water standards. If the Navy proposes an action within the PA then actual risk and risk reduction must be demonstrated. Figure 7-7 should breakout the difference between the SGU and the PA (as in Figures 7-5 and 7-6).	DON disagrees with the reviewer's comment on plume length. The plume length is one of several measures of the long-term effectiveness and permanence of the alternatives. As discussed above in the response to General Comment 5 and reiterated directly below, the reduction in TCE risk levels is correlated to the reduction in TCE plume areas. One clear measure of the reduction in TCE plume areas is the reduction in TCE plume length. Therefore, DON believes the comparison of risk reduction achieved by the alternatives is appropriately measured by the change in TCE plume length. As discussed above in the response to General Comment 5, several key isoconcentration contours correspond to TCE risk levels (5 μg/L = $3x10^{-6}$ risk, 15 μg/L = 10^{-5} risk and 150 μg/L = 10^{-4} risk). A summary of the risk areas (and therefore risk levels) is presented in Figures 7-12 and 7-13; the costs to reduce TCE plume areas ($/acre) are presented in Figure 7-16. Table C-1c provides TCE concentrations in the SGU "Downgradient: in the Small and Medium TCE Areas, not the PA. DON agrees with the reviewer's comment that for all the alternatives, including the No-Action alternative, the risk in the Principal Aquifer is within the acceptable range for risk management. For this reason, DON has evaluated alternatives that include natural attenuation

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FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY DATED 10 OCTOBER 1996
Regarding the Draft Final OU-1 Interim Remedial Investigation/Feasibility Study Report Dated 09 August 1996
MCAS El Toro Interim RI/FS

Reference (P. = Page; C. = Comment; S. = Section/Subsection; T = Table; App. = Appendix; Attach = Attachment)		Comment	Response
Comment No.	**RI/FS Report Reference**	**from EPA (B. Arthur, H. Levine)**	**by the Department of the Navy (DON)**
			strategies in the Principal Aquifer (Alternatives 7A, 7B, and 8); the reduction in risk is achieved at significant costs. Also see response to Specific Comment 22 provided above. For the difference in mass removal achieved between the Shallow Groundwater Unit and the Principal Aquifer, see response to Specific Comment 5 provided above.

Orange County Water District (R. Herndon)
dated 03 September 1996

RESPONSE TO COMMENTS
FROM ORANGE COUNTY WATER DISTRICT (OCWD) DATED 03 SEPTEMBER 1996
on the Draft Final OU-1 Interim Action Remedial Investigation/Feasibility Study Report Dated 09 August 1996
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Reference		Comment	Response
Page	Paragraph	by Orange County Water District (OCWD)	by the Department of the Navy (DON)
		Note: These "Preliminary OCWD Comments on MCAS El Toro OU-1 Draft Final RI/FS Report" were submitted in the form of a letter from Roy Herndon/OCWD to Bonnie Arthur/USEPA, Tayseer Mahmoud/DTSC, and Larry Vitale/SARWQCB with a copy to Andy Piszkin/SWDIV, Bob McVicker/IRWD, and Seth Daugherty/OCHCA. Attached to OCWD's comments was a draft report titled *Review Of Ground Water Modeling Report & Potential Impacts Of TCE Contamination, Interim Action Feasibility Study* prepared by Geoscience Support Services Incorporated, dated 30 August 1996.	
1	1	Orange County Water District (OCWD) is in the process of reviewing the MCAS El Toro Draft Final Interim Action RI/FS documents, dated August 9, 1996, provided by the Department of Navy (DON). As you know from our various meetings and conversations, including our meeting on August 21, we are very concerned with DON's new "natural attenuation" alternatives analysis and the supporting model, and so have prepared these initial comments, and ask that you incorporate our comments into your responses to DON on its Draft document. We have been unable to schedule a meeting to discuss our concerns with EPA modeler, Herb Levine, but trust that he will have an opportunity to consider our comments during his review of the draft RI/FS. We will submit further comments on the RI/FS when we have had more time to review this lengthy set of documents.	A meeting with OCWD, the regulatory agencies, and the Navy to discuss OCWD's concerns on the groundwater modeling completed for the OU-1 IAFS Addendum was held on 26 September 1996. The minutes for that meeting and other meetings discussing OU-1 groundwater modeling issues. are attached a the end of this section containing the responses to comments. Herb Levine/EPA was present at the 26 September 1996 meeting and reviewed OCWD's comments prior to the submittal of EPA comments on the OU-1 Interim RI/FS Report. OCWD submitted additional review comments dated 11 October 1996. The response to these additional comments follow these response to comments.
2	1	As discussed at our meeting on August 21, DON's evaluation of the three Principal Aquifer natural attenuation alternatives (7A, 7B, and 8) depends on the validity of its groundwater model. The model incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume, as	The OU-1 Interim RI/FS Report has been prepared according to the guidelines set forth under CERCLA. DON strongly disagrees with the comments that "[t]he model incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume...." DON addresses each of the issues in

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		acknowledged by DON. We cannot accept DON's conclusions that the TCE plume will be contained by the existing irrigation wells along Culver Drive, and urge that DON be required to undertake remedial work that will remove this threat to public health and the environment from our groundwater supply.	the individual responses to comments provided below.
2	2	OCWD retained the services of Dr. Dennis Williams, an experienced hydrogeologist and groundwater modeling expert, to independently review DON's hydrogeologic assumptions and model input parameters, and the validity of the conclusions drawn by DON from the model. Enclosed is a copy of Dr. Williams' draft report. We concur with Dr. Williams' comments, and incorporate the attached draft report as part of OCWD's comments on the RI/FS.	DON appreciates the draft report prepared by Dr. Dennis Williams. A final of Dr. Williams report has not been received. The draft report was discussed in specific detail with OCWD, Dr. Williams, DON, and the regulatory agencies at the 26 September 1996 meeting at MCAS El Toro. Dr. Williams noted that he had not reviewed the previous drafts of the OU-1 IAFS reports where much of DON's model foundation and calibration information is addressed in detail. Please refer to the September meeting for specific responses to Dr. Williams' draft report.
2	3	**Comments on RI/FS Addendum (Volume IX) and Related Sections of Other Volumes**	
2	3	1. Page ES-2 and throughout the RI/FS documents: The many references to 34 µg/L as the highest TCE concentration in the Principal Aquifer are erroneous and should be corrected. TCE has been measured above 40 µg/L in wells MCAS-1 and MCAS-7 during 1993-95, including 47.8 µg/L in MCAS-7 on 12/22/95. OCWD provided this data to DON and EPA in Spring 1996.	The scope of the RI Report is to document activities that took place during the Phase I Remedial Investigation (RI) field investigations which occurred between 1992 and 1994. Data reported in the RI Report, and therefore all other documents which refer to the monitoring data, consisted of two rounds of groundwater monitoring data (from existing MCAS El Toro monitoring wells and new groundwater monitoring wells installed during Phase I) that were fully validated following the protocols established under USEPA's Contract Laboratory Program (CLP). For completeness, historical and contemporary data of existing wells in the Irvine Subbasin (i.e., water supply wells and other monitoring wells) provided by OCWD were also included in the RI Report. However, the data obtained from the additional existing wells was not subjected to CLP protocols. Although all available data was used in the IAFS, DON believes the evaluation of the alternatives should primarily rely on fully validated data. Based on the first two rounds of groundwater monitoring data, 34 µg/L was the highest TCE concentration detected in the Principal Aquifer (collected during the

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			second sampling round, June to December 1993). The reviewer correctly points out that higher concentrations have been detected in some wells completed in the Principal Aquifer. However, the higher detected concentrations were based on monitoring data obtained outside the umbrella of USEPA's CLP. More recent groundwater monitoring data, fully validated following the CLP protocols, is available in the quarterly groundwater monitoring reports prepared by CDM Federal Programs. The quarterly groundwater monitoring reports provide updated plume maps of volatile organic chemicals (VOCs) and summaries of data trends. The October 1997 monitoring report shows that the extent of the TCE plume is not substantially different from the distribution observed during the 1992-1993 sampling round for the Phase I RI. TCE concentrations at the MCAS01 and MCAS07 monitoring wells have been relatively constant. It is important to note that the higher concentrations (47.8 µg/L) would not change the conclusions on the extent of groundwater contamination or evaluation of remedial alternatives.
2	4	2. Pages 5-I and 5-2: The repeated statement that the Principal Aquifer VOC contamination will "continue to attenuate as it has in the past, with or without DON or IDP remedial action," is incorrect. We are unaware of any evidence suggesting that the plume has begun to attenuate (except to the extent that spreading of the problem is considered to be "attenuation"). As defined by DON in its model, attenuation involves several mechanisms: advective dispersion (mechanical dilution), biodegradation, and soil adsorption. As applied to the Principal Aquifer, the plume has spread contaminants at levels exceeding MCLs, and that spread continues as demonstrated by well sampling. Biodegradation has not been a significant factor (as shown by low concentrations of the breakdown product DCE). Indeed, reliance on biodegradation as	OCWD has not directly quoted the statement in the IAFS Addendum. DON intended to communicate that natural attenuation mechanisms (dilution, adsorption, biodegradation) are occurring and will occur in the future, but did not intend to indicate that the regional VOC plume was shrinking. Although the TCE concentrations in groundwater from some wells have increased over time, in others TCE concentrations have decreased. TCE concentrations in the majority of the wells have stayed approximately the same. From a regional perspective, contouring of the VOC plume within the Principal Aquifer has not changed significantly since 1993. Therefore, natural attenuation mechanisms appear to be occurring. The first paragraph of page 5-2 will be modified to clarify the statement. Based on literature values and an evaluation of available field data, DON estimated a first-order decay rate constant for TCE (half-life of 100 years). For Alternatives 7A, 7B, and 8, the significance of TCE biodegradation, in combination with other natural

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		part of a lower cost solution is extremely dangerous, given that, over time, dechlorination may result in conversion of TCE to DCE, then to the highly carcinogenic compounds, vinyl chloride or 1,2-DCA (each with an MCL of just 0.5 µg/L). Further, soil adsorption can be ruled out as an effective way to safely attenuate TCE-contaminated soil. Extensive testing of the affected soils has shown them to have a low carbon content, with a retardation factor of 1.3 being a reasonable assumption for modeling purposes.	attenuation processes including sorption, was evaluated by the use of groundwater model simulations. DON feels the groundwater incorporates reasonable model input parameters selected based on field data and extensive discussions with the regulatory agencies and OCWD. Minutes of meetings with the regulatory agencies, OCWD, and the Navy documenting the decisions on model parameters are attached at the end of this response to comments. The potential residual risk associated with TCE's biodegradation daughter products (e.g., 1,2-dichloroethene [1,2-DCE], 1,2-dichloroethane [1,2-DCA], vinyl chloride) is exaggerated and is discussed in greater detail in the response to RI/FS Addendum (Volume IX) Comment 5 provided below.
3	1	Spread of the TCE plume must stop. Remedial Alternatives 2A and 6A are intended to prevent plume spreading.	DON is committed to addressing the regional VOC contamination in groundwater and has prepared the OU-1 Interim RI/FS Report according to the guidelines set forth under CERCLA. The evaluation of Alternatives 2A, 6A, 7A, 7B, and 8 is performed based on the rigorous nine-criteria evaluation process stipulated under the FS process. Please note that plume containment is being considered.
3	2	3. Pages 5-6 and 5-7 (section 5.3.2): The last sentence on page 5-6 reads, "Confirmed exceedance of the MCL leads to...consideration of actions, if any, needed to protect actual beneficial uses." This should be modified to state, "actual and anticipated beneficial uses" to be consistent with the Santa Ana River Basin Plan.	The sentence will be modified to state "actual and anticipated beneficial uses."
3	3	4. Page 6-6, top paragraph: The model's initial conditions should have taken into account the TCE plume between the 0.5 and 5 µg/L contours in the Principal Aquifer. Since the model attempts to simulate future dispersion of the TCE plume by mixing of higher concentrations with lower concentrations, it is important to take into account the existing mass of TCE outside the 5 µg/L isoconcentration contour. Neglecting this mass in the model will	The initial conditions of the CFEST model did account for TCE concentrations between 0.5 and 5 µg/L; the concentrations were linearly interpolated and assigned to the applicable nodes. Figures 6-1 and 6-2 (IAFS Addendum [Vol. IX]) present the baseline data (June 1993 to December 1993) for the Shallow Groundwater Unit and the Principal Aquifer, respectively. The figures show the 0.5 µg/L isoconcentration contour line as a dashed line. However, only concentrations above the MCL (5 µg/L) were shown on the figures presenting the simulated TCE

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		detract from the aquifer's simulated assimilative capacity to dilute the TCE plume and could result in a significantly underestimated plume migration.	results.
3	4	5. Pages 6-7 and throughout the RI/FS: DON factored biodegradation of TCE into its model as a component of natural attenuation. If biodegradation is a significant component of attenuation then DON must describe and analyze whether or not that process is beneficial. TCE may, over time, be converted to one or more forms of DCE which then may degrade to vinyl chloride or 1,2-DCA. This process does nothing to remove toxic contaminants from the groundwater. To the contrary, biodegradation has the potential to worsen an already unacceptable condition by leaving groundwater contaminated with cis-1,2-DCE (6 ug/L MCL) and vinyl chloride (0.5 ug/L MCL). Rather than portraying biodegradation as a positive "naturally occurring destructive process," DON should emphasize that TCE can degrade into compounds that are equally or more carcinogenic than TCE itself. There was no discussion on the potential long-term health risks, should the large mass of TCE in the Principal Aquifer be allowed to biodegrade to a large mass of vinyl chloride. DON should have taken a more conservative modeling approach by either eliminating biodegradation altogether (evidence of actual degradation of TCE in the Irvine subbasin is minimal), or quantifying and preparing a plan to treat the resultant increases in TCE's very hazardous breakdown compounds.	DON factored in TCE biodegradation to more accurately portray all the mechanisms of fate and transport. The magnitude of each of the mechanisms, including biodegradation, was quantified based on available data and discussions with the regulatory agencies. DON believes the modeled conditions are appropriate. The following discussions provide supporting evidence. Significance of the Quantity of Biodegraded Mass of TCE The groundwater model includes conservative assumptions of the initial TCE mass that is dissolved in groundwater and attributed to the source term at Site 24. As stated on page 7-43 of the IAFS Addendum, the risk associated with the biodegradation daughter products of TCE is insignificant compared to the impact of the conservative estimate of TCE mass in the aquifer. What is not included on page 7-43 (although the information is included elsewhere in the text) is the explicit quantification of this qualitative statement. The discussion in the following paragraphs provides a comparison of the impacts of the overestimate of the initial TCE mass against the potential underestimate of risk of the daughter products of TCE, followed by a discussion of the risk of the biodegradation daughter products. Results of the second round of groundwater monitoring (June 1993-December 1993, Figures 6-1 and 6-2 of the IAFS Addendum [Vol. IX]) were used as the initial conditions for the groundwater model. Based on the plume maps, the initial dissolved TCE mass is estimated to be approximately 19,500 pounds (see Section 6.0 of the IAFS Addendum). Based on procedures agreed upon by the regulatory agencies, at locations where cluster wells or multiple-port wells are installed, the maximum TCE concentration detected at each location was used to create the plume maps. For instance, at multiple-port well MCAS01, although concentrations of 2.0, 22, and 34 μg/L were detected in the 3 screens in the Principal Aquifer, the highest value (34 μg/L) was used to contour the initial condition isoconcentration map (refer to page 6-5 of the IAFS Addendum). If an average concentration had been used at this well, the concentration would be 19.3 μg/L. Using the maximum

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			value (34 µg/L) results in a concentration that is more than 70 percent higher than the average concentration (19.3 µg/L). At other locations, the difference is even greater. The active source term, representing the continuing vadose zone source of VOC contamination used in the model, is also conservative. Based on estimates provided in the draft OU-2A (Site 24, VOC Source Area) Feasibility Study, 500 pounds of TCE are added into the system over 20 years (Section 6.0). However, DON is actively pursuing the cleanup of the VOC Source Area. Therefore, it is likely the source will be remediated within about half the simulation time (within 10 years). As stated on page 6-28 of the IAFS Addendum, the mass removed as a result of biodegradation over 20 years is less than 10 percent of the total mass of 20,000 pounds introduced into the groundwater system. For Alternatives 7A and 8, 1,790 pounds (9 percent) and 1,490 pounds (7 percent) of TCE mass, respectively, would be removed as a result of biodegradation over 20 years. In summary, the built-in conservative overestimate of the initial TCE mass dissolved in groundwater and attributed to the continuing source more than compensate for the potential underestimate of risk of biodegraded TCE. <u>Risk of Biodegradation Daughter Products</u> As discussed in the OU-1 RI/FS Interim Report, the most likely biodegradation daughter products of TCE are 1,2-DCE, vinyl chloride, as well as other products that do not have published risks (see Figure 5-5 of OU-1 RI Report [Vol. II]). The cancer risk range evaluated in the IAFS Addendum ranged from 10^{-6} to 10^{-4}. The following table provides USEPA's preliminary remediation goals (PRGs) for the most likely biodegradation daughter products.

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USEPA PRGs for TCE Degradation Products

Compound	Cancer PRG (µg/L)			Non-Cancer PRG (µg/L)
	10^{-6}	10^{-5}	10^{-4}	
TCE	1.6	16	160	none
cis-1,2-DCE	none	none	none	61
trans-1,2-DCE	none	none	none	120
1,1-DCE	0.046	0.46	4.6	none
1,1-DCA	none	none	none	810
1,2-DCA	0.12	1.2	12	none
vinyl Chloride	0.02	0.2	2	none
ethylene	none	none	none	none
chloroethane	none	none	none	none
ethanol	none	none	none	none
carbon dioxide	none	none	none	none
water	none	none	none	none

The health risk associated with the potential daughter products of TCE biodegradation is exaggerated in OCWD's comment. In the Principal Aquifer, the presence of 1,2-DCE is confined to a narrow band in the middle of the plume. 1,2-DCE does not have a cancer risk, but has a non-cancer risk PRG of 61 µg/L for the cis isomerand 120 µg/L for the trans isomer. Based on the first two rounds of groundwater monitoring, the highest detected concentration of 1,2-DCE (total) in the Principal Aquifer was 12.7 µg/L which is less than the non-cancer risk PRG values. The biotransformation of TCE, a carcinogen, to 1,2-DCE, a non-carcinogen, would reduce risk in the Irvine Subbasin.

Three other potential daughter products of TCE biodegradation (vinyl chloride, 1,1-DCE, and 1,1-DCA) have higher cancer risks (lower PRG values) than TCE,

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			but they either have not been detected or their presence is sporadic. No vinyl chloride has been detected in any of the samples collected in groundwater at the MCAS El Toro (Station). 1,1-DCE has been detected only in the Shallow Groundwater Unit within the Station boundaries; no 1,1-DCE has been detected in the Principal Aquifer on- or off-Station. Only traces of 1,2-DCA (maximum concentration of 1 µg/L) have been detected once in the Principal Aquifer. The other potential daughter products, ethylene, chloroethane, ethanol, carbon dioxide, and water do not have any cancer or non-cancer risks. Based on actual data and published EPA risk concentrations, DON believes the residual risk posed by the daughter products of TCE is insignificant. Therefore, DON believes its modeling approach is appropriate and a plan to treat the purported "hazardous breakdown compounds" as suggested by the reviewer is unnecessary.
4	2	6. Page 6-28 (section 6.9): DON states, "the retardation factor [applied in its model] is set higher than is believed correct" in an attempt to better estimate total cleanup time. This was done at the cost of sacrificing the model's validity in estimating TCE plume movement in the Principal Aquifer. Because DON relies on the model's prediction of plume containment by Culver Drive irrigation wells in the natural attenuation alternatives, the use of a purposefully inflated retardation factor of 2 raises serious questions as to the validity of the model as a basis for concluding that plume containment will occur.	Based on the total organic carbon content measured and types of dissolved compounds found in groundwater, DON calculated a retardation factor of 1 to 1.3. During the 31 January 1995 groundwater modeling conference call with the regulatory agencies and OCWD (meeting minutes attached at the end of the response to comments), the team agreed to use a retardation factor of 2 to be conservative with respect to cleanup time to maximum contaminant level (MCL) for the sole purpose of comparisons of the OU-1 IAFS alternatives. Although the higher retardation factor would be expected to slow the VOC plume movement, sensitivity analyses on retardation demonstrated that the model results were not significantly different with the higher retardation factor of 2. The sensitivity analysis for the retardation factor is presented in Section 7.2.2 of the IAFS Appendix A (Volume VI)
4	3	7. Page 6-33 (section 6.1 1): There is no basis for DON's statement that "modeling results appear reasonable when compared with available data...." DON fails to say what data was	OCWD correctly states that TCE concentrations in groundwater from the North Lake well (18_NLAKE) has been increasing since 1988 as is shown in the time-series plot provided in Dr. Williams' draft report. The TCE concentration predicted

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		found that indicate "reasonable" modeling results. TCE concentrations have been increasing in wells at the lead edge of the plume. For example, as presented in Dr. Williams' draft report, several years of data from our North Lake well situated 2½ miles from the air station show a steady increase in TCE concentration. Groundwater contour maps from measured water levels also indicate flow paths moving beyond Culver Drive. Actual field conditions, as shown by hard data, are quite different from DON's modeling prediction of a relatively stable plume.	by the IAFS Addendum groundwater model shows a close agreement of projected TCE concentrations to that observed at the North Lake well. A copy of a graph showing the TCE concentrations predicted by the model is attached to the 26 September 1996 meeting minutes (at the end of the response to comments). The agreement with observed concentrations indicates that the model simulations are consistent with observed TCE concentrations. Although TCE concentrations are increasing at the North Lake well, based on quarterly groundwater monitoring completed for the Navy by CDM Federal, the overall plume appears relatively stable. The North Lake well is located at the perimeter of the 5 µg/L TCE contour in the Principal Aquifer. Pumping at this well appears to be intercepting the adjacent TCE plume as shown by the particle tracking simulations for the No Action alternative (Alternative 1) shown on Figure 6-8 of the IAFS Addendum. Although the model predicts that some particles escape beyond well IRWD-78 during the portion of the year when the well does not pump, the simulated groundwater elevations (Figure 6-12) demonstrate that an overall capture zone occurs at Culver Drive.
5	1	8. Page 6-34, paragraph 3: The solute transport model results "showing the 5 µg/L TCE isoconcentration contour remaining to the east of the Culver Drive wells" are inaccurate. As described in Dr. Williams' report, the mistake is the result of flawed assumptions and ill-chosen input parameters used in the model, including the following:	DON disagrees with each of the bulletized comments and will address each comment separately below.
5	1ST Bullet	• The model uses unreasonably low hydraulic conductivities, e.g., only 13 ft/day for the Principal Aquifer west of Culver Drive. This understates the higher aquifer permeabilities measured from Principal Aquifer well tests (35 to 60 ft/day), and ignores the fact	Hydraulic conductivity values used in DON's CFEST groundwater model are based on available test data and model calibrations of simulated to observed water levels. Based on a review of the referenced Principal Aquifer well tests, the hydraulic conductivity values averaged approximately 15 feet/day. This is the

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		that the preferential path of pollutants will be through the more permeable zones. The model layering is not detailed enough to take into account the actual permeabilities of individual sandy zones within the Principal Aquifer, resulting in use of average permeability values that include both aquifers and aquitards. This, in turn, reduces the modeled plume velocity proportionately.	same average hydraulic conductivity used by OCWD's original MODFLOW model of the Irvine Subbasin. DON agrees that preferential pathways likely exist in the more permeable zones in an alluvial setting such as that underlying MCAS El Toro. However, it is highly unrealistic to assume, as did OCWD, that a continuous lens of sands and gravels with a high hydraulic conductivity of 60 feet/day extends for about five miles from MCAS El Toro to Newport Boulevard. Because the continuity of the coarse-grained lenses is limited, a more accurate estimate of average VOC plume movement is provided by the use of a representative average hydraulic value for the Prinicipal Aquifer. The higher velocities of 3 to 4 feet/day in the Principal Aquifer suggested by OCWD are not supported by the observed data. Comparison of the 1993 TCE plume data with 1996 groundwater quality data suggests average linear velocities are less than 1 feet/day, which is consistent with DON's model. DON recommended the conversion of OCWD's 2-dimensional model to a 3-dimensional model on 30 June 1993 meeting in order to develop a better tool for the relative comparison of IAFS alternatives. DON's groundwater model of the Irvine Subbasin was constructed using 5 layers of which 3 layers represent the Principal Aquifer. Additional layering of the Principal Aquifer is not supported by the existing data. The hydraulic conductivity values assigned to the Principal Aquifer range from 13 to 35 feet/day. The original model of the Irvine Subbasin constructed by OCWD using MODFLOW conceptualized the entire subbasin as a single layer [a 2-dimensional model], with a hydraulic conductivity value of 15 feet/day. Thus the average hydraulic conductivity value used by DON for the area west of Culver Drive is consistent with that used previously by OCWD. The sensitivity analysis performed on DON's model using Alternative 2B increased

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			hydraulic conductivity values up to 53 feet/day (the same general order of magnitude as 60 feet/day). For the full range of hydraulic conductivity values, the results of the sensitivity analysis indicate that the TCE plume remains east of Culver Drive. Based on these observations, DON believes OCWD's estimates of plume migration are exaggerated.

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5	2nd Bullet	• The model uses a western constant-head model boundary condition based on 1993 water levels, the year when Main Groundwater Basin water levels were near a record high. Application of this unusually high water level data allowed the gradient to be reversed (and the TCE plume contained) in the model with minimal production from the Principal Aquifer;	Two separate issues raised by the comment will be addressed below: use of the constant-head model boundary condition and use of 1993 water levels. The use of a constant head boundary condition at the boundary between the Irvine Subbasin and the Orange County Main Basin, was based on a series of groundwater modeling meetings/conference calls attended by DON, the regulatory agencies, and OCWD that were held between June 1993 and September 1996. *Copies of the meeting minutes are attached at the end of the response to comments.* The use of the constant head boundary was discussed extensively and was approved by the regulatory agencies and OCWD. DON initially raised the concern about the constant boundary conditions used in the original MODFLOW model of the Irvine Subbasin developed by OCWD. DON commented that the OU-1 IAFS alternatives, in particular alternatives including the Irvine Desalter Project, may be affected by the northwestern boundary conditions and without expanding the model to include the Main Basin, these boundary effects could not be fully understood. In the 30 June 1993 groundwater modeling meeting, DON questioned the validity of assuming a constant head boundary at the arbitrarily assumed boundary between the two groundwater basins. A consensus was reached by the Navy, regulatory agencies, and OCWD to evaluate the use of an alternate boundary condition such as prescribed fluxes. The prescribed fluxes were initially derived from performing an analytical solution to the Theis equation. The Theis equation was used to estimate the appropriate groundwater flux to be prescribed for the boundary. It was determined that due to the limited extent of the Irvine Subbasin model across the boundary and the high interdependency with the adjacent Main Basin, suitable transient boundary conditions could not be calculated. Therefore, the expected effects were bracketed by performing each transient simulation using a constant head condition first and then repeating that simulation with a constant

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			flux boundary condition. This approach was used for the draft MCAS El Toro OU-1 Interim Action Feasibility Study [IAFS] dated (01 September 1994). In the January 31, 1995 groundwater modeling conference call, a decision was made by the regulatory agencies, including the RWQCB, to limit the number of model simulations used in the revised draft OU-1 IAFS (dated 15 October 1995) by performing model runs on only one set of boundary conditions, constant head. The team's decision was based primarily on the results of sensitivity analysis runs for the two boundary conditions, constant head and prescribed fluxes. The results indicated insignificant differences in the relative effectiveness of the alternatives. This decision to use only constant head boundary conditions for simulations of remedial alternatives was also used on the IAFS Addendum (06 August 1996) with agency concurrence, so that the additional alternatives evaluation in the IAFS Addendum could be directly compared with model results from the 15 October 1995 IAFS. 1993 water levels were selected and agreed upon by the regulatory agencies and OCWD for calibration, because it was the most complete set of data available for both the Shallow Groundwater Unit and the Principal Aquifer when DON's model was first constructed. No water level data were available prior to 1992 for the Shallow Groundwater Unit. Available hydrographs for wells located near the Irvine Subbasin boundary, both within the Main Basin and the subbasin, were reviewed to note long-term trends (not just seasonal variations) in water levels. In general, contrary to the comment that 1993 water levels in the Main Basin were near a record high, there is no overall increasing or decreasing trend in average water levels observed for the period between 1981 and 1993. Well TIC-41 is a good example of the observed stable trend. OCWD has sampled the well consistently for 60 years. Well TIC-72 shows a slight increasing trend that may indicate the need for transient simulation.

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			However, the water levels are expected to fluctuate because groundwater production wells in the subbasin are active and it experiences seasonal variations in rainfall.
5	3rd Bullet	• The model uses outdated data and insufficient pumping for well TIC-106 west of Culver Drive. TIC-106 has been pumping approximately 1,000 acre-feet/year since 1993, not 52 acre-feet/year as assumed in the model. At its actual rate, the well would be likely to pull the TCE plume further west if the active remediation measures such as Alternatives 2A or 6A are not implemented. In addition, well TIC-47 (for its model DON assumed it is pumping 270 acre-feet/year within the plume) is permanently inactive;	DON's model incorporated pumping data of existing wells. The data were obtained from OCWD, and were the same input files used by OCWD in their groundwater model. Based on data received from OCWD, the pumping rate for Well TIC-106 was 52 acre-feet per year (acfy), not 1,000 acfy. Based on information received from OCWD, at the time DON's model was constructed in 1994, TIC-47 was actively pumping. In order for the comparison of the alternatives first presented in the OU-1 IAFS (Alternatives 2A and 6A) and the additional alternatives presented in the OU-1 IAFS Addendum (Alternatives 7A, 7B, and 8) to be evaluated and compared with the same model assumptions, the assumed pumpage of basin production wells was not changed between the OU-1 IAFS and the OU-1 IAFS Addendum. The alternatives evaluation presented in the OU-1 IAFS is valid still because the same model conditions are applied to all the alternatives. The model results are used to compare the *relative* effectiveness of the alternatives. In the 13 April 1995 groundwater modeling meeting (minutes attached), it was reported that well TIC_47 was being turned off. OCWD stated at that time that shutting off that well would have little effect of the modeling results.
5	4th Bullet	• The model uses an unreasonably high retardation factor that DON acknowledges will underestimate the rate of plume movement.	Based on the total organic carbon content measured and the types of dissolved compounds found in groundwater, DON calculated a retardation factor of 1 to 1.3. During the 31January 1995 groundwater modeling conference call with the regulatory agencies and OCWD, the team agreed to use a retardation factor of 2 to be conservative with respect to the cleanup time to MCL for the purpose of comparisons of the OU-1 IAFS alternatives (meeting minutes attached at end of response to comments). Although the higher retardation factor does slow the plume movement,

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			sensitivity analyses on retardation demonstrated that the model results were not significantly different with the higher retardation factor of 2.

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5	5th Bullet	• The model assumes biodegradation of TCE, which is shown to reduce Principal Aquifer TCE concentrations by approximately 10-15 µg/L over 20 years, but ignores the potential resultant, more hazardous daughter compounds.	See response to RI/FS Addendum (Volume IX) Comment 5 provided above.
6	1	9. Page 7-12, last paragraph: None of the RWQCBs accept DON's unilateral interpretation of SWRCB Resolution 68-16. We also strongly disagree with DON's attempt to sidestep California law and policy, and will comment on this further under separate cover.	DON understands that OCWD and the State disagree with the DON and USEPA interpretation. EPA supports the Navy's interpretation of this issue. DON agrees that Resolution 68-16 is applicable to the reinjection of treated groundwater. The remedial alternatives that include reinjection will meet the requirements of Resolution 68-16.
6	2	10. Page 7-38, section 7.3.1.2 (pertaining to the Principal Aquifer): The paragraph beginning "In all the alternatives, extracted groundwater is treated...," is misleading. Only Alternatives 2A and 6A involve treatment of groundwater from the Principal Aquifer. In addition, Alternative 7A should be deleted from the statement in the following paragraph, as it does not include reinjection of water. The paragraph is also misleading in that it states that Alternatives 7A [sic] and 7B "avoid the possibility of exposure via domestic use by reinjecting the VOC-treated groundwater." This is true with regard to the shallow aquifer, but not with regard to the Principal Aquifer, where exposure via domestic use can only be prevented by not producing water from this valuable groundwater source.	The meaning of the text on page 7-38, paragraph 3 was that all groundwater pumped as part of a planned alternative (beyond that of background basin pumping) would be treated for VOC removal. In addition to Alternatives 2A and 6A, Alternative 7B and 8 include pumping and treatment of groundwater from the Principal Aquifer. The reviewer's comment is correct that Alternative 7A does include reinjection of VOC-treated groundwater from the Prinicipal Aquifer. Changes will be made in the text to clarify these points.
6	3	11. Page 7-45, section 7.3.3.4: DON's statement that "The groundwater extraction remedial actions considered for the alternatives are permanent" should be modified to exclude those extraction remedial actions consisting of "background pumping." There is no guarantee that this pumping will continue in the future nor is there a guarantee that pumping will continue in a location	The sentence quoted by OCWD intended to convey the concept that groundwater extraction and treatment permanently removes mass from the aquifer. OCWD's concerns that "background pumping" currently providing capture or mass removal may potentially not continue in the future are valid. DON completed an evaluation of

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		that will be conducive to containing the plume. Higher quality groundwater exists in the Irvine subbasin west of Culver Drive where IRWD is considering construction of wells to meet future water demands.	the potential impacts of the VOC plume on current or future beneficial uses of groundwater in the Irvine Subbasin (Attachment B of the IAFS Addendum). The evaluation concluded that current and future use of the Irvine Subbasin are not likely to be impacted by potential TCE migration. The background pumping wells of primary importance are those on Culver Drive. To address the potential that the Culver Drive wells may cease to pump in the future due to well deterioration or a reduction in irrigation demand, DON identified and evaluated Alternative 7B that would install two new wells at the toe of the plume, treat the water, and reinject the treated water upgradient of the Prinicipal Aquifer TCE plume. An evaluation of the factors affecting the useful life of the Culver Drive wells was completed in Attachment F-2 of the IAFS Addendum. In order to respond to the regulatory agencies concerns about potential uncertainties in the groundwater modeling and future background pumping, DON completed conceptual designs and cost estimates of wellhead treatment systems (IAFS Addendum, Attachment D-2). This analysis estimated future funding that potentially might be needed if the VOC plume did migrate. Additional groundwater monitoring was proposed for the alternatives incorporating natural attenuation in order to provide time for consideration of actions required to protect beneficial uses of the Principal Aquifer.
6	4	**Specific Comments on Appendix A—Groundwater Modeling (Volume VI)**	
6	4	1. Page A5-3, last paragraph: DON acknowledges that the model was unable to "demonstrate a good match between the observed and simulated TCE distributions." Given this, DON's conclusion that the > 5 µg/L TCE concentration plume will not migrate is unsubstantiated.	The subject of solute transport calibration is much more complicated than groundwater flow calibration, and the usefulness of DON's conclusions does not depend entirely on whether a good match between the observed and simulated TCE distributions can be demonstrated. The initial conditions of groundwater flow and TCE concentrations presented in the Draft Final OU-1 IAFS (Volumes IV and VI of the OU-1 Interim RI/FS Report) were based on extensive discussions with the regulatory agencies.

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			Solute transport calibration is significantly more difficult than groundwater flow calibration because of the uncertainties associated with the release history of TCE contamination and the historical groundwater flow conditions in the Irvine Subbasin. Initially, an attempt was made to reproduce the current distribution of TCE assuming that a single source of TCE in the southwestern portion of the Station was introduced to the subbasin about 50 years ago when the Station was first established. The results of this calibration run are presented in the 01 September 1994 Draft OU-1 IAFS Report, which was reviewed by OCWD. In general, the model reproduced the observed migration of TCE from the Shallow Groundwater Unit into the Principal Aquifer. Simulated and observed TCE concentration ranges were similar. The flow calibration of the groundwater model was improved by utilizing available data on the extent of the VOC plume. Based on discussions with the regulatory agency modeling experts, simulated groundwater flow conditions were revised to more accurately reproduce the current VOC plume extent.
7	1	2. Section 7.0 (Sensitivity Analysis): Sensitivity analysis does not substitute for transient calibration of a model. Sensitivity analysis should be used to identify which hydraulic and solute transport parameters should be adjusted for later calibration. DON used the pumping scenario of Alternative 2B for its sensitivity analysis of all alternatives, including 7A and 7B, even though Alternative 2B is not being considered and includes aggressive pumping of the Principal Aquifer, which is not a part of Alternatives 7A and 7B. It is probable that the pumping scenario of Alternative 2B is aggressive enough that even within the range of parameter selection, the results indicated plume containment. However, this scenario has little to do with Alternatives 7A and 7B, which include no active pumping from within the Principal Aquifer TCE plume. A	Based on the full parameter sensitivity analysis for Alternative 2B. the results of groundwater simulations, and the groundwater flow and solute transport conditions of TCE in the Principal Aquifer, it is DON's belief that a full scale sensitivity analysis for Alternative 7A and 7B would not have changed the relative performance of alternatives. If additional groundwater modeling is required during remedial design/remedial action (RD/RA), additional sensitivity analyses could be completed at that time. As the regulatory agencies have stated in their comments, if a natural attenuation alternative is selected, a greater emphasis will be placed on recent groundwater monitoring data than modeling results.

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		more representative analysis should have been performed to evaluate the model's sensitivity under Alternatives 7A and 7B using the full range of potential model input parameters because they are least able to adequately capture the TCE in the Principal Aquifer due to relying solely on background pumping. Results of such an analysis would likely show lack of containment of the TCE plume.	
7	2	3. Page A7-4: DON states "the groundwater flow condition at the northwestern boundary is one of the major uncertainties at the Irvine Subbasin model." The false assumption of the constant head condition at the western model boundary overestimated the amount of inflow to the Irvine subbasin from the Main Groundwater Basin, as acknowledged by DON, which states "the actual amount of inflow from the Main Basin available to replenish water... will be less than that simulated by the model under a constant-head boundary condition." The overestimation of inflow from the Main Basin will erroneously impede the rate of TCE plume movement in the model.	See response to Comment 8, page 5, second bullet, provided above. The results of sensitivity analyses (Section 7 of Appendix A, Groundwater Modeling Report [Volume VI]) indicated that simulation results do not vary significantly whether prescribed flux or constant head boundary conditions were used. DON disagrees that the use of a constant head boundary would "...impede the rate of TCE plume movement." On the contrary, the use of prescribed flux boundary conditions would result in a smaller (shorter) TCE plume in the Shallow Groundwater Unit (Section 7 of Appendix A, Groundwater Modeling Report, and September 1994 Draft OU-1 IAFS). This decrease of the TCE plume length is attributed to the lowering of groundwater levels under a prescribed flux boundary throughout the Irvine Subbasin and a subsequent decrease in the saturated thickness of the Shallow Groundwater Unit resulting in the enhanced removal of contaminant mass via extraction wells. Therefore, the use of constant head boundary conditions would be more conservative with respect to hydraulic extraction of contaminant mass in the Shallow Groundwater Unit. In the Principal Aquifer, the length of the TCE plume under a prescribed flux boundary would be similar to that under a constant head boundary (Section 7 of Appendix A, Groundwater Modeling Report).
7	3	4. Page A7-5: DON notes that the simulated water level elevations in the Principal Aquifer along the western boundary are as much as 34 feet higher when a prescribed flux condition was used instead of a constant head condition. A constant flux	See response to OCWD Comment 8 (page 5, second bullet) and the previous comment. The use of prescribed flux boundary conditions would result in a smaller (shorter) TCE plume in the Shallow Groundwater Unit.

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		condition specifies a constant rate of groundwater movement into or out of a model but allows the water level elevations to rise or fall. This, in turn, would allow a steeper gradient to form in the subbasin model, which may drive the TCE further west unless sufficient pumping were added to offset the steeper gradient. Although DON states that, under Alternative 2B simulations, the prescribed flux boundary condition still showed containment of the TCE plume, the prescribed flux rates modeled were not defined, and none of the natural attenuation alternatives were modeled using this boundary condition.	
8	1	5. Page A7-6: DON again used only Alternative 2B for the sensitivity analysis of its solute transport modeling. As stated previously, this alternative is inappropriate for comparison with Alternatives 7A and 7B.	See response to OCWD Comment 2 (page 7) provided above.
8	2	6. Page A7-6: DON did not run sensitivity analyses of the solute transport model using documented ranges of hydraulic conductivity in the Principal Aquifer. Instead, it adjusted the hydraulic conductivity of Layer 1 (Shallow Groundwater Unit), which has relatively little effect on migration of the TCE in the Principal Aquifer.	See Response to OCWD Comment 8 (Page 5, 1st bullet). The sensitivity analysis performed on DON's model varied hydraulic conductivity values up to 53 feet/day for the Principal Aquifer.
8	3	7. Page A8-8: DON states, "The accuracy of the simulation of the advance of the plume to its current extent indicates that the estimated η_ε [effective porosity], R [retardation factor], and α [dispersivity] distributions are sufficiently accurate to compare remedial actions that remove water and contaminants from the center of the plume" (emphasis added). Because Alternatives 7A and 7B do not extract water from the center of the TCE plume, DON's statement appears to corroborate OCWD's and Dr. Williams'	It was DON's intention to state that the accuracy of the simulation of the plume using the selected solute transport parameters is sufficiently accurate to compare all remedial alternatives. The text will be modified to clarify this issue.

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		conclusion that the solute transport model has not been shown to be reliable for predictive analysis of TCE plume migration/capture.	
8	4	8. Page A8-9: DON's recommended model refinements should have been performed to accurately evaluate the effects (both positive and negative) of natural attenuation. Without these refinements, the model results presented have a high degree of uncertainty. Therefore, they leave DON's findings of the natural attenuation alternatives without a sound technical basis.	DON has recommended refinements to the model in order that detailed design can be better performed. As part of the CERCLA process, feasibility studies are followed by the remedial design phase in which design details of the selected remedy are resolved. DON's CFEST model serves well as a tool for the comparative analysis of the effectiveness of the remedial alternatives analyzed in the OU-1 IAFS Addendum.
8		**Conclusions and Recommendations**	
8	5	OCWD has been managing Orange County's groundwater for over 50 years. Based on our experience and scientific review, and independent expert review of DON's groundwater model documentation and resultant evaluations presented in the IAFS report addendum, OCWD concludes that DON's flawed analytical methodology and assumptions have not demonstrated that natural attenuation can be used as a primary means of reducing TCE concentrations in the Principal Aquifer. Absent reliable supporting data, Alternatives 7A, 7B, and 8 must be dropped from further consideration.	DON respectively disagrees with the reviewer's conclusions and recommendations. Alternatives 7A, 7B, and 8 were evaluated as part of the OU-1 IAFS Addendum at the urging of the regulatory agencies because they are lower-cost alternatives of the two most effective alternatives (Alternatives 2A and 6A) identified in the IAFS. Because USEPA, DTSC, and the RWQCB were concerned over the very high cost of groundwater extraction and treatment to reduce comparably *low* concentrations of TCE in the Principal Aquifer; they suggested the critical evaluation of a natural attenuation approach for the Principal Aquifer. The detailed comparative analysis of the remedial alternatives along with the provisions of increased groundwater monitoring for the alternatives incorporating natural attenuation and the evaluation and costing of contingency measures provide a margin of safety that permit the serious consideration of Alternatives 7A, 7B, and 8.
9	1	We would like to schedule a follow-up discussion of these comments in mid-September with you and Herb Levine, others with EPA, and the Santa Ana Regional Water Quality Control Board, Department of Toxic Substances Control, and DON.	A meeting to discuss OCWD's concerns was held on 26 September 1996. The minutes of that meeting are attached at the end of the response to comments.

Orange County Water District (B. Mills)
dated 11 October 1996

RESPONSE TO COMMENTS
FROM ORANGE COUNTY WATER DISTRICT (OCWD) DATED 11 OCTOBER 1996
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			Note: These comments were submitted in the form of a letter dated 11 October 1996 from William Mills/OCWD to David Hodges/USEPA, Tayseer Mahmoud/DTSC, and Larry Vitale/SARWQCB with a copy to the Honorable Christopher Cox, the Honorable Robert Dornan, Robert McVicker/IRWD, Seth Daugherty/OCHCA, and Andrew Piszkin/SWDIV. The entire letter is reproduced in this response to comments. For ease of reference, the text has been divided by paragraph or subject and reference numbers have been added.	
1	1	Parag. 1	Orange County Water District ("OCWD") is commenting on the MCAS El Toro Draft Final Operable Unit 1 Interim RI/FS Report, dated August 9, 1996 ("Draft Report"). We ask that our comments be added to the administrative record in this action, and that our comments be incorporated into each of your agency's comments on the Draft Report to the Department of Navy ("DON"). We also will submit a copy of our comments to the Restoration Advisory Board with the request that DON provide us with a written response, as provided in the Advisory Board's procedures.	
2	1	Parag. 2, I. INTRO-DUCTION	As you know from our meeting with you in August *(1996)* and our preliminary comment letter of September 3, 1996, OCWD is deeply concerned about the continuing spread of TCE and other chemicals from MCAS El Toro. We do not believe that DON's so-called "natural attenuation" alternatives (7A, 7B and 8) would meet remedial objectives. Well monitoring data shows a widespread area of impact, demonstrating the need to actively remediate the Principal Aquifer. This is not the time or place to experiment with natural attenuation. Other, better, cost-effective remedies using accepted technologies are available.	The natural attenuation alternatives were developed and evaluated at the request of and in close coordination with the regulatory agencies. Natural attenuation has been shown to be a technically defensible and cost-effective approach to the remediation of numerous sites with groundwater volatile organic compound (VOC) contamination. DON disagrees with OCWD's belief that the three alternatives that employ natural attenuation strategies in the Principal Aquifer (Alternatives 7A, 7B, and 8) would not meet remedial objectives. As described in more detail in Comment No. 7, the three "natural attenuation alternatives" meet all three remedial action objectives (RAOs).
3	2	Parag. 2	OCWD remains committed to participating with DON to implement Alternative 6A, which is both protective of the	Negotiations between DON and OCWD on a joint groundwater project are ongoing.

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			environment and cost-effective. We urge each of you to unequivocally advise DON that 6A is the preferred alternative. We are actively negotiating with DON on an agreement to fairly share the costs of the combined VOC treatment and Irvine Desalter Project ("IDP") facilities described in Alternative 6A. Earlier this week, I sent a letter to DON proposing that OCWD and DON each agree to take on a fair share of the actual costs of the common elements of the IDP, based on relative contribution of water to the IDP system. It is time for DON to commit to implementing Alternative 6A and vigorously seek approval of that single, preferred alternative.	
4	2	Parag. 3	OCWD's proposal would result in a clear, useable aquifer, and real savings to DON. Using DON's cost estimates in the Draft Report, DON's share of the costs to construct and operate Alternative 6A would be $31 million, based on the present value of an assumed 20-year project. This compares to DON's estimate of $48.1 million for Alternative 2A, $34.4 million for Alternative 6A (at 50% for common elements), $29 million for Alternative 7A, $39.8 million for Alternative 7B, and $27.6 million for Alternative 8 (at 50% for common elements), also assuming a 20-year project life.	This comment has been superseded by a more recent OCWD settlement offer which supports a smaller DON share of a joint groundwater project.
5	2	II. SUMMARY OF OCWD's COMMENTS ON THE DRAFT REPORT	These comments build upon comments on the Draft Report from Roy Herndon, the manager of our Hydrogeology Department, transmitted in his September 3, 1996 letter to each of you. Mr. Herndon addressed the natural attenuation alternatives which DON described in the Addendum to the Draft Report, and the model used to support those alternatives. In addition, he forwarded a draft report prepared by Dr. Dennis Williams, one of the leading experts in modeling the hydrogeology of northern Orange County. Dr. Williams demonstrated that the hydrogeologic assumptions and input parameters used in DON's model were inconsistent with actual conditions in the aquifer, and the conclusions drawn from that model are severely flawed.	DON strongly disagrees with the comment that the assumptions and input parameters used in the model were "inconsistent with actual conditions in the aquifer, and the conclusions drawn from the model are severely flawed." Responses to comments dated 03 September 1996 by Roy Herndon/OCWD and Dennis Williams on the Draft Final OU-1 IAFS are provided as a separate document. The responses demonstrate that the hydrogeologic assumptions and input parameters were discussed and agreed upon with the regulatory agencies and OCWD prior to implementation and are consistent with actual aquifer conditions. In addition, the meeting minutes for the 26 September 1996 meeting attended by Roy Herndon/OCWD, Dennis Williams, DON, and the regulatory agencies to discuss the 03 September 1996 comments provided in Roy Herndon and

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			.	Dennis Williams' draft report are attached. The regulatory agencies concluded at that meeting that the MCAS El Toro groundwater model is an acceptable tool to compare the alternatives in the IAFS.
6	3	Parag. 1	These comments are focused on four critical flaws in the Draft Report: (i) the alternatives analysis fails because it is based upon a model that incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume; (ii) the natural attenuation alternatives are not consistent with the National Contingency Plan ("Plan"); (iii) critical state and federal applicable and relevant requirements ("ARARs") have not been identified and applied; and (iv) the costs of the natural attenuation alternatives are understated and their cost-benefits in comparison to Alternatives 2A and 6A are misrepresented	The OU-1 Interim RI/FS Report has been prepared in accordance with CERCLA and the NCP. DON strongly disagrees with the comments that critical flaws exist in the nine-volume report. Each of the four issues raised by OCWD is fully addressed within these responses to comments.
7	3	Parag. 2, 1st bullet	OCWD's comments include those contained herein and those in Mr. Herndon's letter and Dr. Williams' report. In brief, these comments demonstrate: • The natural attenuation alternatives do not meet remedial objectives, which include preventing the spread of contaminants in the Principal Aquifer.	DON disagrees with the comment. The three alternatives that employ natural attenuation strategies in the Principal Aquifer (Alternatives 7A, 7B, and 8) meet all three remedial action objectives (RAOs). The review comment loosely described the second RAO as "...preventing the spread of contaminants in the Principal Aquifer." As provided in Section 3.1 of the OU-1 IAFS Addendum (Volume IX), the second RAO states: "Contain migration of VOCs above cleanup levels in the Principal Aquifer within the AOC (Area of Concern)." The three "natural attenuation" alternatives meet this RAO.
8	3	Parag. 2, 2nd bullet	• DON's model underestimates plume movement, in part because: - It uses unreasonably low hydraulic conductivities;	DON disagrees with the comment. For completeness, the full OCWD comment (from Roy Herndon/OCWD dated 03 September 1996) on hydraulic conductivity values is reproduced below. *"The model uses unreasonably low hydraulic conductivities, e.g., only 13 ft/day for the Principal Aquifer west of Culver Drive. This understates the higher aquifer permeabilities measured from Principal Aquifer well tests (35 to 60 ft/day), and ignores the fact that the preferential path of pollutants will be through the more permeable zones. The model layering is not detailed enough to take into account the actual permeabilities of individual sandy zones within the Principal Aquifer, resulting in use of average permeability values that include both aquifers and aquitards. This in turn reduces the modeled plume velocity*

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				proportionately." Hydraulic conductivity values used in DON's CFEST groundwater model accounted for available well test data and were based on attempted calibrations of actual versus simulated TCE plume data. Based on a review of the referenced Principal Aquifer well tests, the hydraulic conductivity values only averaged about 15 feet/day. DON agrees that preferential pathways likely exist in the more permeable zones in an alluvial environment such as that underlying MCAS El Toro. However, it is highly unrealistic to assume, as did OCWD, that a continuous lens of sands and gravels with a high hydraulic conductivity of 60 feet/day extends for about five miles from MCAS El Toro to Newport Boulevard. Due to the discontinuous nature of the sand lenses, the average velocity of dissolved contaminants is more accurately assessed by use of the average hydraulic conductivity values. Furthermore, the higher velocities of 3 to 4 feet/day in the Principal Aquifer suggested by OCWD are not supported by the observed data. Comparison of the 1993 TCE plume data with 1996 groundwater quality data suggests average linear velocities are less than 1 feet/day, which is consistent with DON's model. DON's groundwater model of the Irvine Subbasin was constructed using 5 layers of which 3 layers represent the Principal Aquifer. Additional layering of the Principal Aquifer is not supported by the existing data. The hydraulic conductivity values assigned to the Principal Aquifer range from 13 to 35 feet/day. The original model of the Irvine Subbasin constructed by OCWD using MODFLOW conceptualized the entire subbasin as a single layer [a 2-dimensional model], with a hydraulic conductivity value of 15 feet/day.) Thus the average hydraulic conductivity value used by DON for the Principal Aquifer is consistent with that used previously by OCWD. The sensitivity analysis performed on DON's model using Alternative 2B increased hydraulic conductivity values up to 53 feet/day (the same general order of magnitude as 60 feet/day). For the full range of hydraulic conductivity values modeled, the results of the sensitivity analysis indicate that the TCE plume remains east of Culver Drive. Based on these observations, DON

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				believes OCWD's estimates of plume migration are exaggerated.
9	3	Parag. 2, 2nd bullet	- It uses a western, constant-head, model boundary condition based on 1993 water levels, a year when the Main Groundwater Basin water levels were near a record high;	Two separate issues raised by the comment will be addressed below: use of the constant-head model boundary condition and use of 1993 water levels. The use of a constant head boundary condition at the boundary between the Irvine Subbasin and the Orange County Main Basin, was based on a series of groundwater modeling meetings/conference calls attended by DON, the regulatory agencies, and OCWD that were held between June 1993 and September 1996. *Copies of the meeting minutes are attached at the end of the response to comments.* The use of the constant head boundary was discussed extensively and was approved by the regulatory agencies and OCWD. DON initially raised the concern about the constant boundary conditions used in the original MODFLOW model of the Irvine Subbasin developed by OCWD. DON commented that the OU-1 IAFS alternatives, in particular alternatives including the Irvine Desalter Project, may be affected by the northwestern boundary conditions and without expanding the model to include the Main Basin, these boundary effects could not be fully understood. In the 30 June 1993 groundwater modeling meeting, DON questioned the validity of assuming a constant head boundary at the arbitrarily assumed boundary between the two groundwater basins. A consensus was reached by the Navy, regulatory agencies, and OCWD, to evaluate the use of an alternate boundary condition such as prescribed fluxes. The prescribed fluxes were initially derived from performing an analytical solution to the Theis equation. The Theis equation was used to estimate the appropriate groundwater flux to be prescribed for the boundary. It was determined that due to the limited extent of the Irvine Subbasin model across the boundary and the high interdependency with the adjacent Main Basin, suitable transient boundary conditions could not be calculated. Therefore, the expected effects were bracketed by performing each transient simulation using a constant head condition first and then repeating that simulation with a constant flux boundary condition. This approach was used for the draft MCAS El Toro OU-1 Interim

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				Action Feasibility Study [IAFS] dated 01 September 1994. In the January 31, 1995 groundwater modeling conference call, a decision was made by the regulatory agencies, including the RWQCB, to limit the number of model simulations used in the revised draft OU-1 IAFS (dated 15 October 1995) by performing model runs on only one set of boundary conditions, constant head. The team's decision was based primarily on the results of sensitivity analysis runs for the two boundary conditions, constant head and prescribed fluxes. The results indicated insignificant differences in the relative effectiveness of the alternatives. This decision to use only constant head boundary conditions for simulations of remedial alternatives was also used on the IAFS Addendum (06 August 1996) with agency concurrence, so that the additional alternatives evaluation in the IAFS Addendum could be directly compared with model results from the 15 October 1995 IAFS. 1993 water levels were selected and agreed upon by the regulatory agencies and OCWD. November 1992 water levels were selected for calibration because it was the most complete set of data available for both the Shallow Groundwater Unit and the Principal Aquifer when DON's model was first constructed. Available hydrographs for wells located near the Irvine Subbasin boundary, both within the Main Basin and the subbasin, were reviewed to note long-term trends (not just seasonal variations) in water levels. In general, contrary to the comment that 1993 water levels in the Main Basin were near a record high, there is no overall increasing or decreasing trend in average water levels observed for the period between 1981 and 1993. Well TIC-41 is a good example of the observed stable trend. OCWD has sampled the well consistently for 60 years. Well TIC-72 shows a slight increasing trend that may indicate the need for transient simulation. However, the water levels are expected to fluctuate because groundwater production wells in the subbasin are active and it experiences seasonal variations in rainfall.
10	3	Parag. 2,	- It assumes that well TIC-106 west of Culver Drive pumps at a rate of 52 acre-feet per year, when its actual rate is	DON's model incorporated pumping data of existing wells operated by others. According to data received from OCWD during development of the

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		2nd bullet	approximately 1,000 acre-feet per year;	groundwater model, the pumping rate for Well TIC-106 was 52 acre-feet per year (acfy) and not 1,000 acfy.
11	3	Parag. 2, 2nd bullet	- It assumes that well TIC-47 was actively pumping when in fact it is permanently inactive; and	Based on information received from OCWD, at the time DON's model was constructed in 1994, TIC-47 was actively pumping. In order for the comparison of the alternatives first presented in the OU-1 IAFS (Alternatives 2A and 6A) and the additional alternatives presented in the OU-1 IAFS Addendum (Alternatives 7A, 7B, and 8) to be evaluated and compared with the same model assumptions, the assumed pumpage of basin production wells was not changed between the OU-1 IAFS and the OU-1 IAFS Addendum. It is important to note that an assumption of the model is that conditions in the Irvine Subbasin do not change over the 20-year period of analysis of the OU-1 IAFS. However, changes such as the installation of new wells and decommissioning of existing wells are likely to occur in the subbasin over time. The alternatives evaluation presented in the OU-1 IAFS is valid still because the same model conditions are applied to all the alternatives. The model results are used to compare the *relative* effectiveness of the alternatives. In the 13 April 1995 groundwater modeling meeting (minutes attached), it was reported that well TIC_47 was being turned off. OCWD stated at that time that shutting off that well would have little effect of the modeling results.
12	3	Parag. 2, 2nd bullet	- It uses an unreasonably high retardation factor that DON acknowledges underestimates the rate of plume movement.	Based on the total organic carbon content measured and the types of dissolved compounds found in groundwater, DON calculated a retardation factor of 1 to 1.3. During the 31 January 1995 groundwater modeling conference call with the regulatory agencies and OCWD, the team agreed to use a retardation factor of 2 to be conservative with respect to the cleanup time to the maximum contaminant level (MCL) for the purpose of comparisons of the OU-1 IAFS alternatives. Although the higher retardation factor does slow the plume movement, sensitivity analyses on retardation demonstrated that the model results were not significantly different with the higher retardation factor of 2.
13	4	1st bullet	• The aquifer being damaged by this plume is a critically important groundwater resource, supplying approximately 70% of local drinking water needs.	No drinking water production wells are located in the area of VOC contamination. In general, high total dissolved solids (TDS) groundwater occurs within the VOC plume area that precluded the use of this water as a

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				drinking water source without treatment. Groundwater modeling results indicate that the VOC plume is not expected to migrate beyond Culver Drive in any of the proposed remedial alternatives. Therefore the portion of the Irvine Subbasin that does contain drinking water wells is protected.
14	4	2nd bullet	• Well monitoring data and calibrated modeling demonstrate the need to actively remediate the Principal Aquifer. In just five years, another 53,000 acre-feet of high quality groundwater may be contaminated with TCE above 5 ug/L if aggressive cleanup is not initiated.	The estimate that an additional 53,000 acre-feet of groundwater may be contaminated with TCE above 5 ug/L within the next 5 years if aggressive cleanup is not initiated was prepared by Dennis Williams/Geoscience Support Services in his draft report attached to the 03 September 1996 comments received from Roy Herndon/OCWD. This estimate was based on a very simplified analytical model with flawed assumptions. The analytical estimate used worse-case TCE concentrations and ignored capture of the TCE plume by existing irrigation wells at Culver Drive. In the meeting with OCWD, regulatory agencies, and DON representatives held on 26 September 1996 to discuss OCWD's concerns on the groundwater modeling for the OU-1 IAFS Addendum, Herb Levine/EPA hydrogeologist stated that he disagreed with the technical approach used by Dennis Williams [meeting minutes are attached to these response to comments]. H. Levine stated that D. William's approach utilized only the highest detected TCE concentrations at the North Lake well, and therefore, projected a worst-case scenario.
15	4	3rd bullet	• Alternatives 2A and 6A achieve OU-1 remedial objectives at a reasonable cost using proven and readily available technology.	As dictated by the CERCLA process, each of the alternatives are evaluated against two threshold and five balancing criteria, of which "reasonable cost" and "proven and readily available technology" satisfy a subset of the evaluation criteria. The OU-1 IAFS Addendum compares the two most effective alternatives from the Draft OU-1 IAFS [15 October 1995] (Alternatives 2A and 6A) with three lower-cost alternatives that rely on natural attenuation in the Principal Aquifer (Alternatives 7A, 7B, and 8). Alternatives 7A and 7B are the natural attenuation versions of Alternative 2A. Alternative 8 is the natural attenuation version of Alternative 6A. The five alternatives are also compared against No Action.
16	4	4th bullet	• OCWD remains committed to participating with DON to fund the common elements of Alternative 6A..	At the time of this response, DON is similarly committed to pursuing a joint project with OCWD that meets the remedial objectives.

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17	4	5th bullet	• DON cannot unilaterally disregard the state's Antidegradation Policy (State Board Resolution No. 68-16) as a state ARAR. The policy applies to ongoing discharges such as those at MCAS El Toro, is more stringent than any federal ARAR identified by DON, and as a matter of law must be applied.	DON has not disregarded the Anti-degradation policy. DON understands that OCWD and the State disagree with the DON and USEPA interpretation. USEPA supports the DON interpretation of this issue. DON agrees that Resolution No. 68-16 is applicable to the injection of treated groundwater. The remedial alternatives that include injection will meet the requirements of Resolution No. 68-16.
18	4	6th bullet	• DON must apply State Board Resolution No. 92-49 as a state ARAR, because it also contains provisions that are more stringent than federal ARARs.	As stated in Section B2.2.2.1 (Appendix B to the Draft Final OU-1 Interim-Action Feasibility Study [09 August 1996]), DON has evaluated the requirements of Resolution No. 92-49, and determined that they do not constitute ARARs for the OU-1 Interim Action. Resolution No. 92-49 relies upon the provisions of 23 CCR 2550.4 in addressing alternative groundwater cleanup levels less stringent than background. Those provisions are identical to 22 CCR 66264.94, which implements Federal RCRA requirements. Therefore, Resolution No. 92-49 is not more stringent than Federal requirements, and is not a State ARAR. However, 22 CCR 66264.94 will likely be interpreted to be applied in a manner that is consistent with Resolution No. 92-49.
19	4	7th bullet	• In evaluating VOC cleanup levels DON failed to consider levels ranging between background values (which DON erroneously dismissed as infeasible) and MCLs (which DON determined are appropriate for this action). DON is required to evaluate remedial levels between those two end points under 22 Cal. Code Regs. § 66264.940(e) and other ARARs.	As required by the CERCLA process, ARARs and risk-based concentration levels were evaluated, in addition to background concentrations, in setting remedial goals and objectives. This is consistent with the requirements of 22 CCR 66264.94 (e). Cleanup levels were proposed and approved by the regulatory agencies in previous feasibility study drafts. Groundwater modeling has used the 5 µg/l TCE isoconcentration contour as a basis of comparison. TCE reduction below these levels would be achieved by continued operation of the remedial action or by natural attenuation mechanisms.
20	4	8th bullet	•DON mischaracterizes Alternatives 7A, 7B and 8 in calling them the "lower cost alternatives." Alternative 6A meets project objectives and allows for the beneficial use of the Principal Aquifer during the course of cleanup at less cost than Alternative 7B, and at a cost of only $2 million more than Alternative 7A. Furthermore, Alternative 2A has been found to	DON disagrees with the comment. As discussed above, the OU-1 IAFS Addendum compares the two most effective alternatives from the IAFS (Alternatives 2A and 6A) with three lower-cost alternatives that rely on natural attenuation in the Principal Aquifer (Alternatives 7A, 7B, and 8). Alternatives 7A and 7B are the lower cost versions of Alternative 2A. Alternative 8 is the lower cost version of Alternative 6A.

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			be more effective than any of the natural attenuation alternatives and DON has determined it to be a cost-effective remedy.	Alternatives 7A and 7B cost approximately $22 million and $8 million, respectively, less than Alternative 2A, based on 20-year present worth costs. Alternative 8 costs approximately $7 million less than Alternative 6A, also based on 20-year present worth costs. The cost-benefit analysis indicates that the higher cost alternatives (2A and 6A) are much less cost effective in plume reduction and TCE mass removal than the lower cost alternatives (7A, 7B, and 8). In addition, the higher cost of Alternatives 2A and 6A is spent almost entirely on removal of lower risk areas of the Principal Aquifer portion of the TCE plume.
21	5	III. MCAS EL TORO ACTIVITIES HAVE CONTAMIN-ATED AN IRREPLACE-ABLE GROUND-WATER RESOURCE	Decades of military activity at MCAS El Toro has had an enormous, toxic impact on the groundwater of Orange County. The extent of the contamination originating at MCAS El Toro was first observed in 1985, when OCWD discovered that a plume of TCE which originated from MCAS El Toro had impacted two irrigation wells near the Base. DON reacted slowly to this discovery, to the point that Governor Pete Wilson, while he was a United States Senator, undertook a fact-finding mission to the Base in July, 1988. As a result of his visit, Governor Wilson criticized the military for refusing to investigate off-Base contamination. Governor Wilson stated: "When you have the situation where the liability is pretty clear, there is no reason for this delay." In February 1990, EPA placed MCAS El Toro on the National Priorities List. Nonetheless, the military continued to be reluctant to accept responsibility for the offsite contamination. After many years of study, consultants retained by DON confirmed that the contamination originating at MCAS El Toro has, in fact, migrated offsite, and now extends several miles downgradient of the Base. DON's consultants further report that the plume contains numerous chemicals of concern,	DON is committed to implementing interim actions to remedy VOCs in OU-1 (regional groundwater contamination) and Site 24 (VOC Source Area). Elevated concentrations of total dissolved solids (TDS), nitrate, and other inorganics in groundwater downgradient of MCAS El Toro have been shown to be due to existing background conditions and agricultural land use, not from past practices at the Station (Draft Final OU-1 RI/IAFS Report, Vol. VIII.). **No** drinking water or irrigation wells have been or are expected to be adversely impacted by the existence of VOCs in the groundwater. Local irrigation production is being adversely impacted by the existence of high TDS concentrations in the groundwater. The high TDS is the result of natural sources and regional agriculture practices, not the result of past MCAS El Toro operations.

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			including TCE.	
22	5	3	The aquifer which is being damaged by this plume is a critically important groundwater resource. This aquifer supplies approximately 70% of local drinking water needs. As David N. Kennedy, then Director of the California State Department of Water Resources, stated in 1989: "The wells which are threatened by this plume are not replaceable in any thinkable way."	OCWD's statement that "This drinking water aquifer supplies 70% of the local drinking water needs" refers to pumpage of groundwater from both the Irvine Subbasin and from the Main Basin. Currently, only two water supply wells are known to operate within the Irvine Subbasin, and they are located at the western boundary of the Irvine Subbasin, over 1 ½ miles west of the VOC plume and in locations that do not appear to be directly downgradient. The OU-1 VOC plume occurs in the eastern half of the Irvine Subbasin and is not present in the Main Basin. No drinking water wells are affected by the VOC contamination and under current pumping conditions no planned future drinking water wells are expected to be impacted by the VOC plume due to containment of the VOC plume by irrigation wells on Culver Drive. Groundwater within the area of the VOC plume is not currently useable without treatment due to the presence of elevated TDS. A groundwater monitoring program for all of the IAFS alternatives has been proposed to monitor potential movement of the VOC plume into areas that may be utilized as a future source of drinking water.
23	5	4	Migration of these toxic chemicals has continued for several decades, in the absence of remediation. While EPA, the State, and the impacted community all have been patient, it is absolutely clear that this plume contains contaminants at levels presenting unacceptable risk, and will continue to harm our resources for many decades if nothing is done. This problem must be remediated by DON now.	OCWD's study has shown that for the present use of groundwater for irrigation, groundwater pumped from the offsite plume does not present unacceptable risk (OCWD. March 1989, *Results of an Investigation of TCE Removal During Sprinkler and Drip Irrigation in the Irvine Area*). Interpretation of water level data and groundwater modeling concludes that the VOC plume is contained by existing groundwater pumping from wells on Culver Drive. Therefore the plume is not expected to migrate beyond its current extent.
24	6	IV. OCWD'S FURTHER COMMENTS ON DON'S DRAFT	A. The Draft Report Does Not Support Findings that NCP Evaluation Criteria are Met by the Natural Attenuation Alternatives. DON has not demonstrated that the natural attenuation alternatives satisfy the nine evaluation criteria for alternatives	DON disagrees with the comment and firmly believes the natural attenuation alternatives (Alternatives 7A, 7B, and 8) meet the two threshold criteria as set forth in the NCP. Several issues were discussed in the comment. They are addressed separately below. As discussed above in the responses to the comments in Section II, the

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		REPORT	set forth in the National Contingency Plan ("NCP"). (See 40 C.F.R. § 300.430(e)(f)) DON discusses the criteria in Volume IX, Section 7 of the Draft Report. 1. Threshold criteria. To be eligible for selection, each alternative proposed as a result of the RI/FS must meet two "threshold criteria," "overall protection of human health and environment" and "compliance with ARARs." (40 C.F.R. § 300.430 (f)(1)(I)(A).) DON's consultant reported that the natural attenuation alternatives meet the NCP standard for overall protection of human health and the environment because the alternatives contain the TCE plume west of Culver Drive. (Draft Report, Vol. IX, p. 7-57.) However, as we have commented, DON's uncalibrated model does not demonstrate that the TCE plume will be contained. Even using a simple water-balance approach, it defies logic that DON's model indicates that two existing Culver Drive wells pumping approximately 2,000 acre-feet/year can reverse the gradient in the Irvine Sub-basin, which receives over 10,000 acre-feet/year of natural recharge. Without credible modeling data, DON cannot satisfy the threshold criteria that the overall protection of human health and environment criterion will be met with the natural attenuation alternatives. Therefore, the proposed natural attenuation remedies must be rejected as inconsistent with the NCP.	statement that DON's model is "uncalibrated" is incorrect. OCWD's statement that the model is uncalibrated was excerpted from the 30 August 1996 draft report from Dennis Williams/Geoscience Support Services Incorporated. At the 26 September 1996 meeting to discuss OCWD's concerns with the groundwater modeling (meeting minutes attached), D. Williams stated that he had not read the previous drafts of the feasibility study that described the prior model calibration activities. DON's model was constructed based on all available data, at the time it was first constructed, and constraints on the use of the data. The model was initially calibrated against hydraulic head data, then additional calibrations were completed in an attempt to match the existing extent of the VOC plume. Model assumptions and inputs were presented to the regulatory agencies and OCWD for approval in a series of modeling meetings and conference calls that were held between June 1993 and September 1996 (meeting minutes attached). DON's model was developed on the basis of consensus. As demonstrated by available groundwater quality data and DON's model (see Section 6 of the draft final OU-1 IAFS Addendum [Volume IX]), Alternatives 7A, 7B, and 8 are effective in containing the plume such that the leading edge of the 5-µg/L TCE plume is projected to be at a location east of Culver Drive after 20 years. The water-balance evaluation completed by OCWD's consultant, Geoscience Support Services, Inc., in OCWD's preliminary review comments (dated 03 September 3 1996) on the MCAS El Toro OU-1 Draft Final OU-1 RI/FS Report was oversimplified and technically flawed. Containment of the TCE plume does not require a reversal of the direction of hydraulic gradient for the entire Irvine Subbasin. Only a relatively small cross-section of the Irvine Subbasin needs to be captured in order to capture the VOC plume. As presented in Section 6 of the OU-1 IAFS Addendum, both the capture zone analysis and the particle tracking results completed as part of the groundwater modeling indicate effective containment of the VOC plume near Culver Drive. The Principal Aquifer extraction volume for Alternatives 2A and 6A are nearly identical to currently baseline extraction along Culver Drive. Therefore, if

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				Alternative 6A provides capture as supported by the model and acknowledged by OCWD, then alternatives 7A and 8 will also provide capture. At the 26 September 1996 groundwater modeling meeting to discuss OCWD's concerns with the model, the regulatory agencies rejected OCWD's contention that the model is not credible. DON has demonstrated that the groundwater modeling is credible, therefore the natural attenuation alternatives would satisfy the threshold criterion that the overall protection of human health and environment will be met.
25	6	Parag. 3	OCWD is not alone in expressing concern about the ability of the natural attenuation alternatives to protect human health and the environment. In its comments to DON on the Draft Report, the City of Irvine concludes that the natural attenuation alternatives "further compromise the safety and protection of human health." (P. Marsh to J. Joyce, September 16, 1996.) We understand that several other local public entities will submit similar comments if the natural attenuation alternatives are pursued. DON's failure to demonstrate that the natural attenuation alternatives meet the second threshold criteria, compliance with ARARs, is discussed in detail in Subsection B below.	DON will address all significant comments regarding the Remedial Investigation report, Feasibility Study report, and Proposed Plan submitted during the formal public comment period scheduled later in 1998.
26	7	Parag. 2	2. Balancing criteria. DON must apply five "balancing criteria" to the proposed alternatives, including an assessment of the "long-term effectiveness and permanence of the remedy." In performing this assessment, DON must evaluate the "degree of uncertainty that each alternative will prove successful," and the "magnitude of the residual risk" associated with the alternative. (40 C.F.R. § 340.430(e)(9)(iii)(C).) It did not make these evaluations.	The OU-1 IAFS and OU-1 IAFS Addendum have adequately applied the five balancing criteria to each of the alternatives. See below.

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27	7	Parag. 3	The uncertainties associated with a complex groundwater remediation project would be minimized by using proven remediation techniques, but inevitably would be amplified by using untested techniques. Alternatives 2A and 6A rely on proven techniques, minimizing uncertainty. Alternatives 7A, 7B and 8 rely on natural attenuation of VOCs on a very large scale, which is untested, and on a model that incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume. Because the techniques proposed in Alternatives 7A, 7B and 8 are untested, and because the success of the alternatives depend upon the accuracy of the model, there is substantial uncertainty whether the natural attenuation alternatives will prove successful. Nonetheless, DON ignored these issues, and failed to address the degree of uncertainty that the natural attenuation alternatives will prove successful, as required under the NCP. (See Addendum, pp. 7-25 to 7-34, pp. 7-39 - 7-45; 40 C.F.R. § 340.430(e)(9)(iii)(C).)	DON disagrees that it has ignored the issue of uncertainty posed by the natural attenuation alternatives. However, DON concurs that as with any complex groundwater remediation project, uncertainties exist. Results of a sensitivity analysis of the TCE biodegradation half life are presented in Section 6 of the OU-1 IAFS Addendum (Volume IX). Alternative 7B is used as a representative remedial alternative and the "base case" half life is 100 years. This parameter was varied from 50 years to 200 years; the alternative was also modeled with no biodegradation. The sensitivity analysis results show that the solute transport portion of DON's model is sensitive to the TCE biodegradation half-life parameter. However, within the range of the half-life values modeled, the mass removed by biodegradation is less than 20 percent of the no biodegradation simulation. The "base-case" TCE half life of 100 years provides a reasonable margin of error on the uncertainties associated with the selected value used in the model. Inn addition, for the three natural attenuation alternatives, DON has also specified monitoring at the leading edge of the plume (see Section 5.3 of the OU-1 IAFS Addendum). This would allow for consideration of potential mitigative actions, including wellhead treatment, necessary to protect current and future beneficial uses of Principal Aquifer groundwater in the Irvine Subbasin.
27	7	Parag. 4	DON also failed to evaluate the magnitude of the residual risk associated with the natural attenuation alternatives, which is the second test required by the NCP to assess the long-term effectiveness and permanence of a remedy. (See Addendum, pp. 7-25 - 7-34, 7-39 - 7-45.) In particular, DON failed to address the fate of TCE in the Principal Aquifer and the residual risk associated with the breakdown products of TCE, including vinyl chloride, which is even more toxic than TCE. (See letter of September 3, 1996 from R. Herndon, pp. 3-4.) Biodegradation of TCE is a significant factor in DON's model, accounting for from approximately 25% to 30% of VOC reduction in areas of higher VOC concentrations. The health risk from the potential resultant mass of vinyl chloride and	Based on actual groundwater data collected, and published USEPA risk concentration levels, the health risk associated with the potential daughter products of TCE biodegradation is exaggerated in the reviewer's comment. In the following discussion, DON will show that the reviewer's claims of DON's negligence in complying with the NCP is wholly unfounded. As discussed in the OU-1 Interim RI/FS Report, the most likely biodegradation daughter products of TCE are 1,2-DCE, vinyl chloride, as well as other products that do not have published risks (see Figure 5-5 of OU-1 RI Report [Volume II]). The cancer risk range evaluated in the IAFS Addendum ranged from 10^{-6} to 10^{-4}excess cancer incidence. The following table provides USEPA's preliminary remediation goals (PRGs) for groundwater (tap water) for the most likely biodegradation daughter products.

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			other toxic breakdown components has been ignored in the Draft Report. This violates the NCP, which requires residual risks to be addressed for each alternative under consideration. (See 40 C.F.R. § 340.430(e)(9)(iii)(C).) Given DON's failure to assess the degree of uncertainty of success of and magnitude of residual risk associated with the natural attenuation alternatives, it is not surprising that its support for the long-term effectiveness and permanence of such alternatives is, at best, equivocal. In a paragraph addressing long-term effectiveness considerations, DON states: "For the alternatives that rely on natural attenuation of contaminants . . . TCE is either biodegraded, adsorbed, or diluted." (Draft Report, Vol. IX, p. 7-45.) DON makes no comment on whether biodegradation, adsorption or dilution is effective and permanent. Compare this to DON's statement, in the same paragraph, demonstrating the effectiveness and permanence of active remediation measures: "The groundwater extraction remedial actions considered for the alternatives are permanent. Groundwater extraction permanently removes mass from the aquifer, and the VOC-removal treatment technologies permanently remove and destroy the contaminants." (Emphasis added.) The quoted paragraph is as close as DON gets to applying the balancing criterion of long-term effectiveness and	**USEPA PRGs for TCE Degradation Products** Cancer PRG (µg/L) / Non-Cancer PRG (µg/L) Compound | 10^{-6} | 10^{-5} | 10^{-4} | Non-Cancer PRG (µg/L) TCE | 1.6 | 16 | 160 | none cis-1,2-DCE | none | none | none | 61 trans-1,2-DCE | none | none | none | 120 1,1-DCE | 0.046 | 0.46 | 4.6 | none 1,1-DCA | none | none | none | 810 1,2-DCA | 0.12 | 1.2 | 12 | none vinyl Chloride | 0.02 | 0.2 | 2 | none ethylene | none | none | none | none chloroethane | none | none | none | none ethanol | none | none | none | none carbon dioxide | none | none | none | none water | none | none | none | none In the Principal Aquifer, the presence of 1,2-DCE is confined to the middle of the plume. However, 1,2-DCE does not have a cancer risk, but has a non-cancer risk PRG of 61 µg/L (cis isomer) or 120 µg/L (trans isomer). Based on the first two rounds of groundwater monitoring, the highest detected concentration of 1,2-DCE (total) in the Principal Aquifer was 12.7 µg/L which is less than the non-cancer risk PRG values. The biotransformation of TCE, a carcinogen, to 1,2-DCE, a non-carcinogen, would actually reduce risk in the Irvine Subbasin. Three other potential daughter products of TCE biodegradation (vinyl chloride, 1,1-DCE, and 1,2-DCA) have higher cancer risks (lower PRG values) than TCE, but they either have not been detected or their presence is sporadic. No vinyl chloride has been detected in *any* of the samples collected in groundwater at the Station. 1,1-DCE has been detected only in the Shallow Groundwater

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			permanence. DON does not apply the degree of uncertainty and magnitude of the residual risk tests or otherwise describe, consider, or balance the uncertainties and residual risks associated with the natural attenuation alternatives. Having failed to apply the long-term effectiveness and permanence criterion, DON cannot find the natural attenuation alternatives to satisfy the NCP.	Unit within Station boundaries; no 1,1-DCE has been detected in the Principal Aquifer on- or off-Station. Only traces of 1,2-DCA (maximum concentration of 1 µg/L) have been detected once in the Principal Aquifer. The other potential daughter products, ethylene, chloroethane, ethanol, carbon dioxide, and water do not have any cancer or non-cancer risks. Based on actual data and published EPA risk concentrations, the residual risk posed by the daughter products of TCE is insignificant in magnitude when evaluating both the long-term effectiveness and permanence of the natural attenuation alternatives. Therefore, the natural attenuation alternatives can be effective alternatives.
28	9	Parag. 1	3. Modifying criteria. DON ultimately will be required to satisfy two "modifying criteria": state acceptance and community acceptance. The state must determine whether the natural attenuation alternatives meet state ARARs and otherwise are acceptable. In addition, the alternatives will need to achieve community acceptance. The Orange County residents, farmers, and businesses that rely on the aquifer contaminated by DON's activities have objected--and will continue to object--to the natural attenuation alternatives, and will ask the same questions about Alternatives 7A, 7B and 8 that we, as the state-chartered agency responsible for this resource, ask: 1) Why should DON be allowed to leave contamination in place, and not compensate the community for the degradation and loss of this resource? 2) Are the same standards being applied to other VOC-contaminated aquifers in the state, and if so on what legal authority?	The two modifying criteria identified are not assessed until after formal public comment on the Proposed Plan. Monitored Natural Attenuation is a viable remedial approach supported by the USEPA, in general, for large low level VOC contaminated groundwater plumes. The regulatory agencies suggested DON evaluate the use of natural attenuation for OU-1, a large dilute VOC groundwater plume. Natural attenuation is an ongoing action that continues to reduce the already low risk associated with VOCs in the regional groundwater. **No** drinking water or irrigation wells have been or are expected to be adversely impacted by the existence of VOCs in the groundwater. Local irrigation production is been adversely impacted by the existence of high TDS concentrations in the groundwater. The high TDS is the result of natural sources and regional agriculture practices, not the result of past MCAS El Toro operations. The same standards are being applied to other VOC-contaminated aquifers in California under CERCLA.. DON continues to be committed to negotiating in good faith with OCWD. DON believes that a joint project could benefit both parties if cost sharing and liability issues can be resolved. In November 1994, OCWD proposed DON pay $96 million to OCWD for DON's participation in an active aquifer remediation and

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			3) Why did DON commit to participating in the active remediation of the aquifer by sharing fairly in the cost of the IDP and then consider not following through? Would even more groundwater be contaminated as a result of its delay and ultimately backing out of that commitment? 4) Does not the state's proposed Containment Zone Policy limit the use of natural attenuation in drinking water aquifers to situations where there is no other reasonably available remedy, where overlying landowners agree with the approach, and where it can be shown that contamination will not spread? These questions have straightforward answers: 1) DON should not be allowed to leave contaminated groundwater in place, and if it does, DON must provide compensation for such loss; 2) A "natural attenuation" remedy has not been selected elsewhere in the state for a valuable aquifer that has been contaminated with VOC by an identified and solvent responsible party; 3) DON would be backing out of its long-term commitment to OCWD to participate in the IDP and would, by its delay and inaction, contaminate additional high quality groundwater; and 4) The State Water Board's recently adopted amendments to Resolution No. 92-49 (the "Containment Zone Policy") would guarantee all of the protections listed in the question, and more, before a regional board could allow natural attenuation to be attempted.	water supply project. DON considered the offer unreasonable and continues to work towards a fair share agreement on a joint project with OCWD. The Containment Zone Policy is inapplicable; any selected remedy proposed will meet drinking water standards, MCLs, in the groundwater.

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29	10	Parag. 3	B. DON Failed to Apply Critical State Applicable or Relevant and Appropriate Requirements ("ARARS"). DON discusses federal and state ARARs and their application in Volume IV, Appendix B, in its analysis of remedial alternatives in Volumes II (Section 7) and IX (Sec In the 13 April 1995 groundwater modeling meeting (minutes attached), it was reported that well TIC_47 was being turned off. OCWD stated at that time that shutting off that well would have little effect of the modeling results. tion 7), and elsewhere in the Draft Report. DON identified the substantive provisions of the following requirements as the most stringent of the potential federal and state groundwater ARARs for the OU-1 interim action: • Santa Ana River Basin Water Quality Control Plan Water Quality Objectives, Beneficial Uses and Waste Discharge Limitations; • Federal MCLs and Non-Zero MCLGs for Organic Compounds; • State Primary MCLs for Organic Compounds in DTSC's Title 22 Regulations; and • RCRA Groundwater Protection Standards in 22 Cal. Code Regs. § 66264.94(a)(1), (a)(3), (c), (d), and (e). (Draft Report, Vol. IV, Appendix B, p. B2-2.) DON did not identify or apply three important state ARARs. It concluded that the State Water Board's Antidegradation Policy contained in Resolution No. 68-16, and the State Water Board's "Policies and Procedures for Investigation and	The discussion of federal and state ARARs in the OU-1 Interim RI/FS Report is extensive, reflects discussions with state and federal regulators, and includes responses to their comments on previous drafts of this document. In the few areas where DON's interpretation of the intent and application of state regulations differs from the interpretation of one or more state agencies, that difference is noted and discussed at length. OCWD is correct in noting that DON, and, in fact, DOD has taken consistent positions on interpretation of Resolution No. 68-16 and Resolution No. 92-49 at other military facilities in the State of California, ;such as Marine Corps Base Camp Pendleton. The Department of the Navy's response to the State of California position on these policies is set forth in the OU-1 Administrative Record.

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			Cleanup and Abatement under Section 13304 of the Water Code" contained in Resolution No. 92-49 are not state ARARs. (See Draft Report, Vol. IV, Table B2-2 and p. 2-19.) In addition, DON concluded that section 66264.94 of DTSC's Title 22 regulations, containing the RCRA Groundwater Protection Standards, are federal (not state) ARARs. (See Table B2-2 and p. 2-19.) In so doing, DON has reached a conclusion that is contrary to law, and it unilaterally and improperly disregarded California's interpretation of its policies and regulations with regard to all three state ARARs. We note that DON has taken these erroneous positions at other locations, apparently without facing legal challenge. For example, DON unilaterally rejected the applicability of the three disputed state ARARs in the RI/FS and Record of Decision for the Camp Pendleton groundwater cleanup project. California did not accept that DON action, and as discussed below, we agree with the State's position in the Camp Pendleton project that DON must apply State Board Resolutions Nos. 68-16 and 92-49 and 22 Cal. Code Regs. section 66264.94 as state ARARs.	
30	11	Parag. 2	1. DON must apply the State Water Board's Antidegradation Policy as a state ARAR. The State Water Board's Antidegradation Policy was adopted in October 1968. Resolution No. 68-16 provides: "1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such	OCWD has correctly quoted text from the document that discusses DON's position and interpretation of Resolution No. 68-16, as well as DON's response to the differing interpretation on the part of the state. See response to Comment Reference No. 17 (OCWD page 4, 5th bullet).

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			water and will not result in water quality less than that prescribed in the policies. 2. Any activity which produces or may produce a waste or increased volume or concentration of waste in which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained." This crucial groundwater protection policy is directly applicable to the Marine Corps' ongoing discharge of waste to the Shallow Groundwater Unit, to the ongoing discharge of waste from that unit to the Principal Aquifer, and to the continuing migration of TCE into the high quality waters of the Principal Aquifer. Resolution No. 68-16 consistently has been interpreted by the state and regional water boards as applying to the determination of groundwater cleanup levels. This position is expressed in a February 17, 1994 memorandum from William Attwater, Chief Counsel to the State Water Board ("Attwater Memorandum"). The memorandum explains that Resolution No. 68-16 applies to the determination of in-situ ground water cleanup levels because: "it applies to 'discharges' of waste, including unauthorized discharges, that occurred after adoption of the policy in 1968 [and it] also applies to such determinations because the	

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			presence of pollution in soil or ground water constitutes a 'discharge' of waste since polluted ground water migrates to areas of higher quality ground water." (Attwater Memorandum at p. 2.) The memorandum also explains that Resolution No. 68-16 "satisfies the [Clean Water Act] requirement that the State have a policy which, at a minimum, is consistent with the federal antidegradation policy." DON acknowledges that Resolution No. 68-16 has been interpreted by the State Water Board to "include a prohibition on the continued migration of existing ground water contaminant plumes at levels that exceed background for the Aquifer" (Appendix B p. B2-3), but entirely disregards that interpretation: "[DON] has considered [the State Water Board's] position, and determined that further migration of already-contaminated ground water is not a discharge governed by the language in SWRCB. More specifically the language of SWRCB indicates that it is prospective in intent, applying to new discharges in order to maintain existing high quality waters. It is not intended to apply to restoration of waters that have already degraded." (Draft Report, Vol. VII, App. B, p. B2-3). DON's position is insupportable. At best, DON might argue that Resolution No. 68-16 does not apply to discharges of contaminants from base operations that occurred prior to the Resolution's adoption on October 28, 1968. However, any discharges after that date are covered by the policy. These	

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			include discharges to the soil that have migrated to the Shallow Groundwater Unit and to the spread of contaminants within the Shallow Groundwater Unit, into the Principal Aquifer, and within the Principal Aquifer. Such movement constitutes current, continuing releases. The releases began before 1968 and continue to date, and they will continue unless active measures are taken to stop the migration. If DON's position is not challenged by the State now, it may become difficult for the State to enforce its interpretation of Resolution No. 68-16 in the future. Dischargers may take the position that the State is estopped from enforcing its historic interpretation of the Antidegradation Policy after acquiescing to DON's erroneous interpretation. Although it may not have appeared necessary to challenge DON during the Camp Pendleton RI/FS and ROD, it is necessary to do so now. To acquiesce to DON would be a mistake for this remedial action and would jeopardize the State's ability to apply its historic interpretation of Resolution No. 68-16 to other current and future groundwater cleanup actions. Under Resolution No. 68-16, as it has been explained and enforced in California, DON must address the existing groundwater contamination from its past activities, and ensure that additional high quality waters are not contaminated. It must meet requirements that will result in the best practicable treatment or control of the discharge and ensure that the highest water quality consistent with maximum benefit to the people of the state will be maintained.	
31	13	Parag. 4	2. Resolution No. 92-49 is a State ARAR. DON unilaterally and erroneously determined that State Water Board Resolution No. 92-49 is not an ARAR "because its pertinent requirements are not more stringent than the federal	OCWD has quoted text from the document that discusses DON's position and interpretation of Resolution No. 92-49, as well as DON's acknowledgment of a differing interpretation on the part of the state. DON disagrees that this position

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			ARAR provisions of Title 22 CCR 66264.94." (See Draft Report, Vol. VII, App. B, p. B2-20.) DON's flawed reasoning appears to be as follows: (i) Section III.G of the Resolution requires regional boards to apply section 2550.4 of California's Title 23 regulations in approving cleanup levels less stringent than background; (ii) section 2550.4 is identical to section 66264.94 of California's Title 22 regulations with regard to groundwater concentration limits; (iii) section 66264.94 is a federal ARAR; and (iv) because Resolution No. 92-49 incorporates and relies upon section 2550.4, which is not more stringent than section 66264.9, Resolution No. 92-49 is not more stringent than the corresponding federal requirements and is therefore not applicable. (See id., p. B2-20.) DON adopted the same position on Resolution No. 92-49 in the Camp Pendleton RI/FS and ROD, and the State explained the flaws in DON's position at that time. The State pointed out that Resolution No. 92-49 requires compliance not only with Section III.G as it references 23 Cal. Code Regs. § 2550.4, but also with the additional requirements of Section III.G, among other provisions of Resolution No. 92-49. We agree with the State, and stress that the "additional requirements" of Resolution No. 92-49 referred to by the State are substantial, and are not contained in any federal ARAR. We further note that DON's argument is predicated on its characterization of sections 2550.4 and 66264.94 as "identical" with regard to provisions that address groundwater concentration limits. Although the two sections are, in this regard, similar, they are not identical. The State Water Board's Title 23 regulation (§ 2550.4) is more stringent than DTSC's Title 22 regulation (§ 66264.94) with regard to groundwater concentration limits. Section 2550.4 requires	is unilateral and erroneous. In fact, as discussed above, the position was developed following extensive research and legal analysis by a coordinated team of federal agencies with facilities in the State of California. The development of the position was an attempt to achieve a uniform and equitable approach to remediations occurring in California on federal facilities. See response to Comment Reference No. 18 (OCWD page 4, 6th bullet). DON disagrees with OCWD's statement regarding Section III.G. Section 2550.4 is the most stringent requirement referenced in Section 2550.4 (cleanup to background or the lowest concentration technically or economically achievable) and, hence, is equal in stringency to Title 22 CCR Section 66264.94. DON interprets the phrase water quality in Title 22 CCR Section 66264.94 to include "beneficial uses" and has elsewhere identified basin plan beneficial uses as ARARs as acknowledged by OCWD. DON understands the Containment Zone Policy to apply to decisions made to allow contamination to remain in groundwater at levels exceeding basin plan water quality objectives. DON's natural attenuation alternatives would achieve basin plan objectives so the Containment Zone Policy is inapplicable. For discussions regarding the technical and economic infeasibility of cleanup below MCLs to background, please refer to the Infeasibility of Remediating to Background report, Appendix "H" in Volume VII in the draft final IAFS.

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			that before a concentration limit greater than background is established, the state and regional water boards must consider "potential adverse effects on ground water quality and beneficial uses." (23 Cal. Code Regs. § 2550.4(d) (emphasis added)). The corresponding provision of section 66264.94 provides that DTSC must consider "potential adverse effects on ground water quality," but makes no reference to the need to consider beneficial uses. (22 Cal. Code Regs. § 66264.94(d).) The obligation to consider potential adverse effect on beneficial uses causes section 2550.4 to be more stringent than section 66264.94. Resolution No. 92-49 is more stringent than section 66264.94 or any federal ARAR, and must be applied by DON as a state ARAR in this remedial action. This is evident because, in addition to the reasons provided above, the State Water Board has determined that Resolution No. 92-49 does not allow passive remediation of contaminated aquifers such as proposed in Alternative 7A, 7B or 8. Because Resolution No. 92-49 would not allow such passive remediation alternatives to be approved, it is inherently more stringent than any federal ARAR that would allow such a remedy. The State Water Board only very recently (on October 2) amended Resolution No. 92-49 to allow regional boards, under limited circumstances, to establish containment zones where active remediation is not required. If DON wishes to pursue passive remediation alternatives, it must follow the procedures in Resolution No. 92-49, as amended by the so-called "Containment Zone Policy." These procedures are designed to protect human health and safeguard the rights and interests of water owners and purveyors. To obtain approval for its passive remediation alternatives, DON would be required to apply to the Regional Board for designation of a	

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			containment zone, meet stringent procedural requirements, and provide evidence to support mandatory Regional Board findings including that groundwater treatment is economically or technologically infeasible, that contaminants will not spread, and, with limited exceptions, that written permission had been obtained from all fee owners of the land containing the zone. DON could not support any of these findings.	
32	15	Parag. 2	3. DTSC's corrective action program standards in section 66264.94 are state, not federal, ARARs. DON identifies portions of 22 Cal. Code Regs. section 66264.94 as a federal ARAR, even though the DTSC regulation appears to be more stringent than the RCRA regulation with which it complies (see 40 C.F.R. section 264.94), and DTSC previously has advised DON that section 66264.94 is a state ARAR. This distinction is significant, in part, because DON erroneously rejects State Board Resolution No. 92-49 as an ARAR because it is "not more stringent" than a federal ARAR (referring to Section 66274.94). DON's argument collapses if section 66264.94 is a state ARAR or if it is more stringent than any federal ARAR (which it is, as explained in subsection 2 above). DON previously addressed the issue of whether section 66264.94 is a state or federal ARAR in its preparation of the Camp Pendleton RI/FS and ROD. In the October 2, 1995 ROD, DON acknowledged that "the State of California disagrees with DON's assertion that § 66264.94 is a Federal ARAR." (Pendleton ROD, p. D-4.) DTSC was right. Section 66264.94 is more stringent than the federal standard with which it complies (i.e., 40 C.F.R. § 264.94). For example, among other provisions for which there is no equivalent in section 264.94, section 66264.49© requires that a finding be made that it would be "technologically or economically	DON's position and rationale is clearly stated in the document, as noted by OCWD. State regulations that are more stringent than the federal RCRA minimum are incorporated into Federal RCRA authorization and become enforceable Federal law. See 40 CFR Section 271.1(I) and 57 Federal Regulation.

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			infeasible to achieve the background value" for a constituent of concern. (See 22 Cal. Code Regs. § 66264.94(c).)	

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33	16	Parag. 1	C. DON has not Demonstrated that MCLs are the Appropriate Cleanup Standard. DON does not provide support for its conclusion that it is neither technologically nor economically feasible to achieve background levels of VOCs. After discussing background levels as feasible cleanup levels, DON states that, "as provided in 22 CCR 66294.94(c), concentration limits based on MCLs, non-zero MCLGs and health-based criteria have been set as the remedial goals for this interim action." (Draft Report, Vol. IV, App. B, pp. B2-2, B-9.) We have two main concerns with DON's conclusion. First, DON has not demonstrated that it is technologically or economically infeasible to achieve background levels of VOCs applying the State's Antidegradation Policy (Resolution No. 68-16) or Resolution No. 92-49. Second, even if an appropriate finding were made that it is technologically or economically infeasible to achieve the background value for a constituent of concern, section 66294.94© does not provide that the only alternative concentration limits shall be MCLs, non-zero MCLGs, or any other fixed criteria. Instead section 66294.94© provides that the concentration limits "shall not exceed" other applicable statutes or regulations, such as MCLs, and shall not exceed "the lowest concentration that the owner or operator demonstrates and the department finds is technologically and economically achievable." (22 Cal. Code Regs. § 66264.94(e) (emphasis added)). DON leaps from dismissing background levels as appropriate cleanup levels, without justification, to adopting MCLs as cleanup levels, without considering concentration limits falling between these values as is required by section 66264.94. DON must identify the lowest cleanup level that is	A full discussion of the analysis of technical and economic infeasibility of cleanup to below MCLs to background concentrations of VOCs is contained in Appendix H to the OU-1 Interim-Action Feasibility Study (Vol. VII). Apparently OCWD did not review that Appendix. Figure H-3 in Appendix H presents a Comparison of Reduction in Risk Verses Cost of Treatment; there is significant increased economic infeasibility relative to minimal risk reductions. The remedial goals and objectives for this interim action were developed to provide protection of human health and the environment. MCLs were selected as remedial action objectives; they are protective of human health and are consistent with basin plan water quality objectives. The second condition under 22 CCR 66264.94(e) is appropriate for an ex-situ treatment system or other remediation where achievement of a remedial action objective is limited by a treatment technology. This approach has been used by EPA in setting treatment standards under the land disposal restriction, for example.

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			technologically and economically achievable for each constituent of concern. (See 22 Cal. Code Regs. § 66264.94(e)(2).) There is no indication in the Draft Report that DON made any attempt to satisfy this legal obligation, or that Alternatives 7A, 7B or 8 would be capable of achieving such lower levels.	
34	17	Parag. 1	D. Specific Comments on Volume IX (the "Addendum") Evaluating Alternatives 7A, 7B and 8. The Addendum was prepared to evaluate the natural attenuation alternatives (7A, 7B and 8). The new alternatives are compared to the two most effective alternatives identified in the IAFS (Alternatives 2A and 6A), and to the No Action Alternative (Alternative 1), using an updated groundwater model. (See Addendum, p. ES-1.) Our main concerns with DON's analysis and conclusions with regard to Alternatives 7A, 7B and 8 in the Addendum are discussed below.	Response not required.
25	17	Parag. 2	1. Modeling deficiencies. Mr. Herndon and Dr. Williams have provided detailed comments which address the deficiencies of the CFEST model (as run) for purposes of evaluating the new alternatives. We incorporate those comments by reference, so as to not repeat them here. In view of the problems raised in those comments, DON may not use or rely on the results of its modeling effort. Doing so would run afoul of federal jurisprudence, such as a recent opinion involving TCE contamination of groundwater, in which the district court held: "For any scientific evidence to be sufficiently reliable, it must be possible to validate the method by comparing its estimates to real world data." (Carroll v. Litton Systems, Inc., 1990	The Navy has provided detailed responses refuting OCWD's allegations that the MCAS El Toro CFEST groundwater model uses invalid assumptions and is uncalibrated. Those responses are provided to previous comments in this document and in the responses to OCWD's 03 September 1996 comments. DON adequately validated and calibrated OCWD's modified model with OCWD concurrence. TCE concentrations at the North Lake well were simulated with the CFEST model and do in fact agree closely with those observed at the well. A graph of the simulated TCE concentrations were distributed at the 26 September 1996 meeting to discuss OCWD's comments on the IAFS groundwater modeling and is included in the meeting minutes (attached).

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			U.S. Dist. LEXIS 16833, *123 (W.D.N.C.).) The Litton court relied on a Sixth Circuit opinion, holding that EPA acted arbitrarily in using a model to set emission limits "without adequately validating, monitoring, or testing its reliability or trustworthiness in forecasting pollution." Ohio v. United States Environmental Protection Agency, 784 F.2d 224, 226 (6th Cir. 1986). The Litton court also relied on another district court opinion holding that groundwater models must be calibrated against sufficient real world data, United States v. Hooker Chemical & Plastics Corp., 607 F. Supp. 1052, 1061 (W.D.N.Y. 1985). DON's groundwater model forms the basis for all of the significant evaluations and comparisons of alternatives in the Draft Report; from evaluation of whether remedial objectives can be met with the natural attenuation alternatives, to determination of the cost effectiveness of the various alternatives based on criteria such as plume length reduction and mass of TCE removed after 20 years. Because the model as run is not reliable--due to the fact that it uses invalid assumptions, is uncalibrated, and for other reasons--the evaluations and comparisons based on the model are unsupported. In this case, DON asks the United States, California, and the residents of Orange County to rely on a model programmed with demonstrably inaccurate and incomplete data, and which does not accurately predict demonstrated events such as increasing TCE concentrations in the downstream North Lake Well (see Dr. William's Report, at page 6).	
36	18	Parag. 2	2. Failure to overcome statutory preference for permanent measures. DON has not prepared a record in support of the passive,	The IAFS and supporting administrative record support the conclusion that a successful natural attenuation approach to groundwater remediation is just as permanent as an active pump and treat system. The processes that reduce contaminant concentrations in a natural attenuation approach (adsorption,

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FROM ORANGE COUNTY WATER DISTRICT (OCWD) DATED 11 OCTOBER 1996
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No.	Comment Reference: Page	Comment Reference: Section	Comment by OCWD (William Mills)	Response by the Department of the Navy (DON)
			natural attenuation alternatives that could overcome Congress' specific preference in the Superfund Amendments and Reauthorization Act for permanent remedies involving active treatment. (See 42 U.S.C. § 9621(b)(1).)	dilution, volatilization, and degradation) also play a significant role in an active extraction system. If these combined factors result in a stable or shrinking groundwater plume, then the remedial action is in fact permanent. The IAFS Addendum evaluated additional alternatives that incorporate natural attenuation in the Principal Aquifer in combination with active VOC removal in the source area. The analysis demonstrated that the natural attenuation component can provide approximately the same benefit (level of VOC mass removal, reduction of plume size, and reduction of risk) as active treatment, at lower cost, at approximately the same level of protectiveness, and at an improved cost/benefit ratio.
37	18	Parag. 3	3. Faulty cost-effectiveness analysis. We disagree with DON's characterization of Alternatives 7A, 7B and 8 as the "lower cost alternatives" and with its distortion of the comparative costs of Alternatives 2A and 6A and Alternatives 7A, 7B and 8. Setting aside for now our concern that the natural attenuation alternatives simply will not achieve remedial objectives, DON's cost analysis for the new alternatives does not support its conclusions. First, it is misleading to characterize the natural attenuation alternatives as "lower cost" than Alternatives 2A and 6A, either on an overall cost or on a cost-benefit basis. Alternative 8 may have the lowest overall cost but must be rejected because OCWD will not participate with DON on the terms proposed in the Addendum. OCWD categorically will not allow DON to avoid its cleanup responsibilities by using the IDP for disposal of water from the Shallow Groundwater Unit while ignoring remediation of the Principal Aquifer. Alternative 7A may be somewhat less costly than Alternative 6A, but its projected cost is based on the unsupported assumption that two existing wells will continue to be operated by the Irvine Ranch Water District ("IRWD")	DON disagrees with OCWD's comment that the cost-effectiveness analysis was faulty. Each point relative to the cost-effectiveness analysis is addressed separately below. As discussed in responses to previous comments, all of the IAFS Addendum alternatives (including the natural attenuation alternatives) are projected to meet remedial action objectives (RAOs). It is reasonable and correct to state that the natural attenuation alternatives are "lower cost" than Alternatives 2A and 6A. As stated correctly by OCWD, the alternatives are compared to each other within two separate groups: those alternatives which would be implemented by MCAS El Toro (Alternatives 2A, 7A, and 7B) and those alternatives that would be jointly implemented by MCAS El Toro and OCWD (Alternatives 6A and 8). The approach has been mandated by uncertainties in the DON/OCWD negotiations for cost sharing in the Irvine Desalter Project (IDP). At the time the IAFS Addendum analysis was completed, OCWD's negotiation position was that DON should pay for desalination of extracted groundwater (in addition to VOC removal to which DON agrees is their responsibility as part of the CERCLA action). Without resolution of this and other key issues, it appeared likely that negotiations would not conclude in a timely manner, and that it would be in the best interest of DON and the environment to proceed with an alternative that would be implemented by MCAS El Toro alone. If the total cost of each alternative included desalination, then the cost of Alternatives 6A and 8 would be much

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	Comment Reference		Comment	Response
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			and The Irvine Company ("TIC") for decades longer than their expected useful life. (See Addendum, p. 5-3.) Because future operation of the wells is outside DON's control, there is considerable uncertainty whether Alternative 7A could be achieved at the projected cost. If IRWD or TIC decide to remove their wells from service, DON would be required to acquire and operate replacement wells at a significant cost, as presented in Alternative 7B. DON reports that Alternative 7B, which does not assume the continuing operation of the IRWD and TIC wells, costs $8 million more than Alternative 6A. Second, DON did not find Alternatives 7A, 7B and 8 to be more cost-effective than Alternatives 2A and 6A. (See Addendum, p. 7-56.) Instead, it found Alternative 7A to be more cost-effective than Alternative 2A and Alternative 8 to be more cost-effective than Alternative 6A. DON made selective comparisons of Alternatives 2A and 7B, but did not reach a conclusion as to which, if either, is more cost-effective. Furthermore, DON made no comparisons of Alternative 6A to Alternatives 7A or 7B. Had DON performed the same type of cost-benefit analysis in the Addendum as it did in the IAFS, we would have seen overall cost benefit comparisons of each of the alternatives: No Action, 2A, 6A, 7A, 7B, and 8. Had such comparisons been performed, each of the alternatives would have been found to be cost-effective, with, we believe, Alternatives 6A and 8 being the most cost-effective and Alternatives 2A and 7B being the least cost-effective. In addition to our concerns over DON's inaccurate cost comparisons, we are concerned that DON omitted two significant factors in calculating costs and in performing its cost-benefit analysis. First, DON should have factored in a	higher than that presented in the IAFS Addendum. Until this issue and other issues key to the DON/OCWD negotiations are resolved, it is not possible to compare all alternatives to each other on an equal basis. One issue that is currently unresolved is the portion of dual purpose IDP components that would be paid by DON. If DON pays a 50% share of dual purpose components, then the present worth cost of Alternatives 7A and 8 is significantly less than that of Alternative 6A. OCWD correctly states that Alternative 7B was included to address the uncertainty within Alternative 7A that two existing wells operated by IRWD and TIC will continue to operate in the future. The reason that the present worth cost for Alternative 7B ($48.2 million) is so much higher than Alternative 7A ($34.0 million) is that DON conservatively assumed that the demand for irrigation may be reduced and groundwater pumped from the two planned replacement wells would be treated for VOC removal and then injected upgradient of the Prinicipal Aquifer VOC plume. Given the increasing TDS content of groundwater in the eastern portion of the Irvine Subbasin, it is likely that irrigation water demand for the lower TDS groundwater from the Culver Drive wells may continue for decades. In this case, the costs of injection could be avoided, and the present value cost of Alternative 7B would be significantly reduced. The extraction wells and the pumping rates incorporated into Alternative 8 were developed with input from OCWD. Alternative 8 combines MCAS El Toro Project shallow groundwater extraction with six planned IDP extraction wells. This alternative relies on background production wells and natural attenuation in the Prinicipal Aquifer downgradient of the IDP wells. This alternative is the closest to the alternative that incorporates the original IDP (Alternative 3) Alternatives 6A and 8 do have the lowest cost per pound of TCE mass removed from the groundwater after 20 years of operation; however, the total present worth cost of Alternatives 7A and 8 are still significantly less than that for Alternative 6A assuming a 50% share of dual purpose components of the IDP for Alternatives

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			cost for the contingency plan measures common to the three new alternatives. Each of the natural attenuation measures involve unspecified, but substantial, additional costs in the likely event of failure of the remedies to protect the beneficial uses of the Principal Aquifer. Those potential costs improperly have been ignored. (See Draft Report, Vol. I, p. ES-49.) Second, DON should have considered the benefit provided by Alternative 6A of allowing for use of the groundwater during cleanup, and the cost of eliminating the ability to use at least 200,000 acre-feet of groundwater for a minimum of 60 years under Alternatives 7A, 7B, or 8. (See Addendum, p. 7-40, and Dr. Williams' report at p. 5.)	6A and 8. Given the fact that all the alternatives are projected to meet RAOs, the total cost of each alternative takes precedent in the comparative analysis of alternatives. The money that DON pays for remediation of the OU-1 VOC plume is funded from U.S. federal tax revenues, therefore, it is necessary to demonstrate that the least costly alternative, consistent with RAOs and protection of the environment, is identified. DON believes that based on the analysis completed in the IAFS Addendum, the alternatives that incorporate natural attenuation (Alternatives 7A, 7B, and 8) will meet the RAOs without the need for the contingency plan measures (increased groundwater monitoring, pumping, or wellhead treatment) described in Section 5.3 of Vol. IX. The contingency plan was developed to protect the beneficial uses of the Principal Aquifer in the Irvine Subbasin if the VOC plume did migrate beyond Culver Drive. These costs are not anticipated based on the IAFS Addendum analysis, therefore, inclusion of the costs in the comparative analysis of IAFS Addendum alternatives was listed as a contingency and not as part of the total present worth cost of each alternative. DON did not include a cost for the benefit of Alternative 6A allowing for municipal use of groundwater during cleanup, because DON is limited by law to funding only the remediation required as a result of past releases of VOCs from MCAS El Toro. Even though a benefit may accrue to the City of Irvine for an additional groundwater supply, DON can not legally subsidize a local municipal water supply project with federal funds for a remediation that could be accomplished at lower cost by another alternative. DON can only legally pay for measures directly related to their CERCLA liability (i.e. remediation of the VOC groundwater plume). In fact, groundwater within the Irvine Subbasin is currently not used for a drinking water supply due to the lower cost and higher quality of alternative water sources. In the absence of a desalination plant as proposed for the IDP, the groundwater would not be of sufficient quality to be used as a drinking water supply. If OCWD decides to proceed with the IDP based on its own merit, DON is interested in pursuing a joint project with OCWD contingent upon the successful negotiation of equitable cost allocation and liability issues.

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	Comment Reference		Comment	Response
No.	Page	Section	by OCWD (William Mills)	by the Department of the Navy (DON)
38	20	Parag. 1	4. Application of ARARs to Alternatives 7A, 7B and 8. DON did not support its conclusion that Alternatives 7A, 7B and 8 "are expected to comply with ARARS." (See Addendum, p. 7-39.) First, as discussed above, DON has failed to apply critical state ARARs. In addition, as discussed in Mr. Herndon's and Dr. Williams' comments, Alternatives 7A, 7B, and 8 would not prevent further contamination of the Principal Aquifer. These alternatives rely on source reduction in the Shallow Groundwater Unit to address contamination in the Principal Aquifer. As stated on page 13 of Dr. Williams' report, "[a]s TCE migrates westerly, very low concentrations are detected in the shallow aquifer, and high concentrations are found in the deeper aquifer." Any remedy that does not stop the spread of contaminants into and within the Principal Aquifer fails to meet remediation goals and applicable ARARs. (See Draft Report, Vol. IX, p. 7-39.)	DON has responded to OCWD's comment that Alternatives 7A, 7B, and 8 do not comply with ARARs earlier in this response to comments. The complete discussion of ARARs for OU-1 is found in Appendix B to the OU-1 Interim-Action Feasibility Study (Vol. VII). Discussions of ARARs specific to Alternatives 7A, 7B, and 8 are found in the IAFS Addendum, with references to Appendix B. Alternatives 7A, 7B, and 8 do rely on source reduction within the Shallow Groundwater Unit to remove VOC mass and reduce future contamination in the Principal Aquifer, as do all of the alternatives evaluated in the IAFS Addendum, with the exception of the Alternative No. 1 (No Action). This approach is technically based and has been strongly encouraged by the regulatory agencies. Alternatives 7A and 7B they rely upon natural attenuation mechanisms and existing background pumping within the Principal Aquifer to reduce VOC concentrations. Alternative 8 utilizes 4,440 gallons per minute (gpm) pumping from the Principal Aquifer from five OCWD extraction wells adjacent to MCAS El Toro. This Principal Aquifer pumpage rate is the same as that for Alternative 6A and more than that included for Alternative 2A (2,000 gpm).
39	20	Parag. 2	In DTSC's letter to me of February 28, 1996, the agency explained that although it, EPA and the Regional Board would examine alternatives in the event Alternative 6A did not materialize, the agencies encourage DON and OCWD to successfully conclude negotiations on the IDP "so the preferred alternative can be implemented." We have made Alternative 6A available to DON at a reasonable cost, and we urge the agencies to confirm that it remains the preferred alternative. If DON refuses to participate in the IDP at a reasonable cost, then it must be required to undertake Alternative 2A. The natural attenuation alternatives have not been shown to meet	DON appreciates OCWD's comments and is committed to negotiations with OCWD. DON believes that a joint project could benefit both parties if cost sharing and liability issues can be resolved. If DON/OCWD negotiations cannot be successfully concluded, Alternative 2A would be the most costly of the MCAS El Toro Project alternatives. Alternatives 7A and 7B would be less costly and more cost-effective than Alternative 2A while still meeting the RAOs and could be appropriate alternatives to be presented in the OU-1 Proposed Plan.

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			remedial objectives, would not meet state and federal ARARS, and would not conform with other NCP standards, including public acceptance.	

ATTACHMENT A

COMMENTS ON THE DRAFT FINAL OU-1 INTERIM RI/FS REPORT (09 AUGUST 1996) FROM THE RWQCB, Cal/EPA - DTSC, USEPA, OCWD, and City of Irvine

Cal/EPA

Department of Toxic Substances Control

245 West Broadway, Suite 425 Long Beach, CA 90802-4444

October 11, 1996

Pete Wilson Governor

James M. Strock Secretary for Environmental Protection

DUPLICATE

Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P. O. Box 95001
Santa Ana, California 92709-5001

DRAFT FINAL REPORT APPROVAL: INTERIM REMEDIAL INVESTIGATION/ FEASIBILITY STUDY (RI/FS) FOR SITE 18, OPERABLE UNIT 1 (OU-1), MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Joyce:

The California Environmental Protection Agency (Cal/EPA) has completed the review of the above subject documents dated August 9, 1996, prepared by CH2M HILL, Inc. The document consists of the RI report, the Human Health Risk Assessment, the Interim Action Feasibility Study (IAFS), the RI Report Addendum, and the IAFS Addendum. The reports present the results of the regional (offsite) groundwater contamination and the feasibility study conducted to identify and evaluate potential remedial action alternatives for volatile organic compounds (VOC)-contaminated groundwater at Site 18.

The documents are generally acceptable provided that the enclosed Department of Toxic Substances Control and Regional Water Quality Control Board specific comments dated October 8, 1996 are incorporated into the final RI/FS documents. The general comments should be incorporated into future OU-1 documents. The following major comments should be incorporated into the OU-1 draft final Proposed Plan and Record of Decision (ROD):

1. A review of the IAFS (October 15, 1995), the IAFS Addendum, and available historical groundwater data have shown that there are groundwater data gaps, especially at the western boundary of the contaminant plume.

2. If an alternative is chosen which includes a joint Navy/Orange County Water District (OCWD) project, a long-term groundwater monitoring plan must be approved by the regulatory agencies before submittal of the draft ROD. Such an alternative would be based on a timely agreement between the Navy and OCWD, the Navy is required to comply with deadlines established under the Federal Facilities Agreement.

3. If an alternative is chosen which includes a Navy stand alone alternative for the principal aquifer, a long-term monitoring plan, including additional monitoring wells installed at the toe of the plume, with aquifer tests performed and the data evaluated with regard to capture zone analysis must be submitted to the regulatory agencies for approval prior to submittal of the draft ROD.

If you have any questions regarding the comments, please call Mr. Tayseer Mahmoud at (310) 590-4891.

Sincerely,

John E. Scandura, Chief
Office of Military Facilities
Southern California Operations

Enclosures

cc: Ms. Bonnie Arthur
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Final Remedial Investigation Feasibility Study Report For Site 18, OU-1
Marine Corps Air Station El Toro
Dated August 9, 1996

The lists of comments below were prepared by Mr. Tayseer Mahmoud, Remedial Project Manager, and Ms. Sherrill Beard, Engineering Geologist from the Department of Toxic Substances Control. The comments are directed to MCAS El Toro and their consultants. Some of our comments reflect Orange County Water District comments and the Geoscience IAFS review. Please incorporate the specific comments into the final RI/FS documents. The general comments should be incorporated into future OU-1 documents.

General Comments:

1. A review of the IAFS (October 15, 1995), the IAFS Addendum, and available historical groundwater data have shown that there are groundwater data gaps, especially at the western boundary of the contaminant plume. If an alternative is chosen which includes a joint Navy/OCWD project, a long-term groundwater monitoring plan must be approved by the regulatory agencies before submittal of the draft Record of Decision (ROD).

   If an alternative is chosen which includes a Navy stand alone alternative for the principal aquifer, a long-term monitoring plan, including additional monitoring wells installed at the toe of the plume, with aquifer tests performed and the data evaluated with regard to capture zone analysis must be submitted to the regulatory agencies for approval prior to submittal of the draft ROD.

2. Based on the previous review of the IAFS (dated December 13, 1995) and the subject documents it should be restated that one of the remediation goals for the contamination detected in the shallow aquifer should be containment. Specifically, to prevent further migration downward into the principal aquifer.

3. The groundwater model presented in Volume VI or an expanded version of the groundwater and solute transport models used for OU-2A (Site 24, VOC Source Area) should be refined during the design phase. We suggest that the nodal spacing for the groundwater model reflect a finer grid and the assigned hydrogeologic parameters, such as hydraulic conductivity and retardation, more accurately reflect the actual groundwater regime.

Specific Comments:

1. **Volume 1, Executive Summary, Section 4.3.1 Evaluation of Alternatives in the IAFS Addendum, Contingency Plan, page ES-49**

   Refer the reader of this Executive Summary where to turn to for additional information regarding the contingency plan.

2. **Volume 1, Executive Summary, Section 4.3.2 Evaluation of Alternatives in the IAFS Addendum**

   Reference to Table ES-5 is a typographical error. The correct reference is ES-6.

3. **Volume II, Draft Final Remedial Investigation, Attachment 1, Response To Comments**

   Please provide the date of comments in your responses. Also, provide copies of the agencies comments for the public to see the actual comments. This comment also applies to Volume IV, Attachment A.

4. **Volume IV, Draft Final IAFS Report, Section 2.0 RAOs and ARARs, Table 2-2**

   Some chemicals in this table did not have risk base concentrations (RBCs). The following information on three chemicals might be useful:

   a. **Dichlorodifluoromethane**: This compound is also known as Freon 12. As of August 1996, USEPA Region IX gives residential Preliminary Remediation Goals (PRG) of 94 mg/kg in soil and 390 µg/L in water. These are based on an oral reference dose (RfD_o) of 0.2 mg/kg-day and an inhalation reference dose (RfD_i) of 0.057 mg/kg-day.

   b. **2-Butanone**: This compound is also known as methyl ethyl ketone. As of August 1996, USEPA Region IX gives residential PRGs of 7,100 mg/kg in soil and 1,900 µg/L in water. These are based on an RfD_o of 0.6 mg/kg-day and an RfD_i of 0.6 mg/kg-day.

   c. **2-Hexanone**: This compound is also known as methyl-n-butyl ketone. No PRGs or reference doses are published for this chemical. However, *n*-hexane is metabolized in mammals first to 2-hexanone then to the neurotoxic 2, 5-hexanedi-one. Therefore, *n*-hexane is an adequate surrogate compound. As of August 1996, USEPA Region

IX gives residential PRGs for *n*-hexane of 110 mg/kg in soil and 350 μg/L in water. The PRG in soil is the saturating concentration, while the PRG for tap water is based on an RfD_0 of 0.06 mg/kg-day and an RfD_1 of 0.057 mg/kg-day.

5. **Volume VII, Draft Final IAFS Report, Appendix B, Evaluation of ARARS, Table B2-3**

See comment #3 above regarding RBCs.

6. **Volume IX, Draft Final IAFS Addendum, Section 1.3.1 Site History**

Reference to off-Station TCE highest concentration of 34 μg/L is not accurate. OCWD data reflects higher numbers up to 47.8 μg/L. Please make the corrections throughout the document.

7. **Volume IX, Draft Final IAFS Addendum, Section 1.3.3, Nature and Extent of VOC Contamination**

Table 1-3 is referenced on page 1-11 but not provided in the document.

8. **Volume IX, Draft Final IAFS Addendum, Section 2.0, Summary of Remedial Alternatives Evaluation**

Reference to IAFS in this section should be changed to draft IAFS.

9. **Volume IX, Draft Final IAFS Addendum, Section 3.2, Applicable or Relevant and Appropriate Requirements, page 3-2**

The last paragraph regarding additional ARARs for the new alternatives should be revised. On September 17, 1996, MCAS El Toro requested the State to provide any additional ARARs. Please note that the State provided ARARs for Site 24 which has similar alternatives as Site 18.

10. **Volume IX, Draft Final IAFS Addendum, Section 5.2.1, Alternative 7A, page 5-2**

Alternative 7A assumes that wells 18_TIC113 and 8_IRWD78 will continue to be operational throughout the duration of the required monitoring period, therefore, cost for the implementation does not include the extra expenditure if these wells need to by replaced, recondition, and/or purchased.

11. **Volume IX, Draft Final IAFS Addendum, Section 5.2.2, Alternative 7B, page 5-3**

The Navy should shorten the screen length for the proposed new monitoring wells and increase monitoring locations and depths by either constructing multiple port monitoring wells or install more than the proposed number of conventionally constructed monitoring wells.

12. **Volume IX, Draft Final IAFS Addendum, Section 5.3.2.1, One Half the MCL, page 5-7**

The term "relevant MCL" should be further defined with regard to state and federal MCL regulatory concentrations.

13. **Volume IX, Draft Final IAFS Addendum, Section 6, Figures 6-1, 6-3, 6-5, 6-7, 6-9, etc.,**

Figures showing the placement of the shallow groundwater extraction wells; Shallow groundwater extraction well placement should be close enough to the source to both maximize mass contaminant removal and maintain hydraulic containment. Please consider this recommendation while evaluating the design of the shallow groundwater extraction well network.

14 **Volume IX, Draft Final IAFS Addendum, page 6-8, Figures 6-8, 6-14, 6-20, 6-26, 6-32, and 6-38**

The pumpage rates and pumping schedules (Table 6-2) are similar for both irrigation wells 18_TIC113 and 18_IRWD078 yet the figures illustrating particle tracking indicated most simulated path lines migrating toward 18_IRWD078 and 18_NLAKE. This is most likely due to the prevailing hydraulic gradient, however, it may be helpful to overlay the simulated groundwater elevations over the particle tracking figures illustrating the effect or non-effects of pumpage from specific wells (i.e., 18_TIC113).

15. **Volume IX, Draft Final IAFS Addendum, Section 6.9, Cleanup Time to TCE MCL Simulation, page 6-29, 3rd paragraph**

According to Table 6-9, the simulated cleanup time to TCE MCL in the Principal Aquifer for Alternatives 2A, 7A, and 7B, ranges from 43 to 60 years. Also, for Alternatives 6A, and 8 are 49 and 70 years, respectively. Please correct the 3rd paragraph.

16. Volume IX, Draft Final IAFS Addendum, Section 7.2.4.2, Compliance with ARARs - Alternative 7A

This section needs to discuss compliance with ARARs for the principal aquifer or refer to the discussion if provided in another section of the report. This comment also applies to Section 7.2.5.2, Alternative 7B, and Section 7.2.6.2, Alternative 8.

17. Volume IX, Draft Final IAFS Addendum, Attachment E, Cost Estimates

Cost estimates for all alternatives which include injection into both the shallow aquifer and/or the deep principal aquifer should include operational costs that will be needed to maintain a successful injection well, such as maintenance to control mineral scaling in the injections wells and the air stripping treatment unit.

18. Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, page G-1

Please include the reference to the Groundwater Monitoring Plan (28 April 1995) in the Reference section of Volume IX.

19. Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, page G-2, bullet 2

Based on the available information to date, air sparging should not be considered as a remedial technology.

20. Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Table G-1

The CFEST groundwater model has served well as a comparative tool for the evaluation of the different alternatives presented in the FS, however, future groundwater modeling for the purposes outlined in Table G-l should not be limited only to the CFEST model.

21. Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Section G.2 and G.2.1, page G-3

The additional monitoring wells proposed as part of the long term monitoring network throughout the IAFS Addendum should be installed before the reconnaissance phase. One of the primary objectives stated as part of the reconnaissance phase is to identify data gaps need to be addressed to assess whether the proposed monitoring well network meets groundwater

monitoring objectives. The IAFS and the IAFS Addendum have already shown that data gaps exist. Therefore, the proposed additional monitoring wells should be installed and included as part of the reconnaissance phase. If, after the reconnaissance phase, the groundwater data shows further data gaps, then additional wells should be installed if determined necessary by the BCT.

22. **Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Section G.2.1, Reconnaissance Phase, page G-4**

Groundwater from all newly constructed monitoring wells should be analyzed not only for the proposed VOCs and TDS, but also for general chemistry during the reconnaissance phase and then evaluated and reduced to VOCs and TDS, if appropriate. The new monitoring wells will be installed at locations that are considered "data gaps" therefore it is necessary to collect and analyze the requested data to adequately evaluate the water-quality of the aquifer at the additional monitoring well locations.

Other field measurements to be collected besides electrical conductivity (EC), pH, and temperature, are dissolved oxygen (DO) concentration, turbidity, and oxidation-reduction potential (Eh). These additional aquifer geochemical parameters are necessary to evaluate the water-quality, integrity of the groundwater sample, and to evaluate the contribution of biodegradation to the attenuation of the contaminant plume. While DTSC understands that at present biodegradation of the contaminate plume may be a minor portion of the attenuation of the plume, monitoring DO, Eh and general chemistry will provide data to gage future biodegradation rates.

23. **Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Section G.2.2, Compliance Phase, page G-5**

Groundwater elevation measurements should be collected a minimum of twice a year throughout the duration of the compliance phase to monitor summer/winter groundwater fluctuations.

24. **Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Table G-3**

This table and the September 30, 1994 Groundwater Quality Data Report describes the well screen interval for 18_MCAS08 as 205-410 feet below ground surface (a 205-foot screened interval) and the July 21, 1994 RI/FS Draft Groundwater Monitoring Program Plan reports the screened interval as 392-410 feet below ground surface (a 18-foot screened interval). Please reconcile this inconsistency and cross-check for any additional errors.

25. Volume IX, Draft Final IAFS Addendum, Attachment G, Groundwater Monitoring, Figures G-2, G-3, and G-4

Given the present flow gradient of the subbasin, results of the simulated flow gradients, and the simulated contaminate pathlines (shown on figures in Section 6), the location of new proposed monitoring well 18_ADD7 should be reconsidered and moved further south.

State of California

Memorandum

To: Mr. Tayseer Mahmoud
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, CA 90802-4444

Date: October 8, 1996

From: CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - SANTA ANA REGION
3737 MAIN STREET, SUITE 500, RIVERSIDE, CALIFORNIA 92501-3339
Telephone: CALNET 632-4130 Public (909) 782-4130

Subject: DRAFT FINAL OPERABLE UNIT 1 INTERIM - ACTION FEASIBILITY STUDY REPORT (IAFS)

We have reviewed the subject report dated August 9, 1996 and received by us on August 12, 1996. In addition, we have reviewed comments from the Orange County Water District (OCWD) report Review of Ground Water Modeling Report and Potential Impacts of TCE Contamination (Geoscience Support Services Inc.). We have the following comments, some of which, reflect the OCWD comments and the Geoscience IAFS review.

GENERAL COMMENT

The IAFS report identifies the feasible alternatives that will mitigate the regional groundwater plume emanating from Marine Corps Air Station (MCAS) El Toro. The next phase of the remedial project is to select the preferred alternative from those listed in the IAFS. The preferred alternative will be based on protection of human health and the environment, cost, implementability, community and regulatory acceptance. The IAFS report is acceptable to the extent that it identifies feasible remedial alternatives to mitigate the regional groundwater plume. If the model is the basis for selecting the final remedy, then additional groundwater data must be collected and the model must be refined prior to design and implementation.

Specific Comments:

1.0 Statements are made in the Executive Summary and other sections of the report that 34 µg/L is the highest Trichloroethylene (TCE) concentration detected in the principal aquifer. However, TCE in the principal aquifer has been detected at levels near 50 µg/L in well MCAS - 7 on 12/22/95, and above 34 µg/L in various other wells.

2.0 On page 5-6, Volume IX, the last line of the last sentence states, "consideration of actions, if any, needed to protect actual beneficial uses." Please modify to state, "..... to protect beneficial uses as stated in the Water Quality Control Plan, Santa Ana River Basin."

3.0 Vol. IX, 7.2.2.2, Compliance With ARARs

The last paragraph refers to SWRCB Resolution No. 68-16. The report states that Resolution No. 68-16 does not apply to the El Toro regional grounderwater plume because the plume is not a new discharge.

Resolution No. 68-16 is intended to protect /maintain high quality waters. We agree that the El Toro regional groundwater plume is not a new discharge, as long as it does not migrate. However, if contaminant migration is occurring (above maximum contaminant levels) then higher quality waters will be negatively impacted by the discharge of contaminants from the plume which violates Resolution No. 68-16.

General Comment on the Groundwater Model

The groundwater modeling activities associated with the IAFS report compare feasible alternatives to remediate or control the regional groundwater plume emanating from MCAS El Toro. Specific parameters used in the model may be debatable, such as the constant head boundary at the downgradient edge of the plume, retardation factors, hydraulic conductivities, sensitivity analysis and calibration. Since modeling is not an exact science, continued refinement is necessary to improve and enhance the accuracy of the model predictions. If the model is used as the basis for selecting the remedial alternative, then model refinement will be required in order to increase confidence in the selected alternative and predicting plume behavior.

Specific Comments on the Groundwater Model

1.0 We do not agree with the northwestern constant head boundary condition represented in the model. Water level variations up to 60 feet have occurred in wells near the presumed plume boundary (OCWD well data). These variations may affect the flow velocity which may in turn affect the plume migration estimate. Transient boundary head conditions should be represented in the model to provide a more realistic estimate of aquifer/plume behavior.

2.0 The retardation factor may be too high. The remedial investigation report indicates that total organic carbon is less than 0.04 percent of the total mass of the soil and provides little opportunity for adsorption to take place. Please explain how the retardation factor was calculated, taking into account the low organic carbon content in the soil.

3.0 Model calibration was attempted using two rounds of groundwater monitoring samples. The monitoring samples were collected between 1992 and 1993 ("they were all we had," CH2MHill, IFS modeling meeting, 9/26/96). It would be advantageous to include OCWD data, from past years, and the recent CDM data. The reported model calibration for potentiometric groundwater elevation exhibited a wide range of predicted to actual groundwater elevations (0 to 30 feet difference). The wide range of predicted to actual groundwater elevations is not an accurate calibration. Additional data collection should improve the model performance and will be required prior to final remedial design and implementation.

4.0 Hydraulic conductivities may be too low (13 to 35 feet/day). OCWD data indicate hydraulic conductivities up to 67 feet/day (preferential pathways probably exist in the regional plume) . The sensitivity analysis in the report should account for the higher observed hydraulic conductivities.

5.0 Alternative 2B was used for the model solute transport sensitivity analysis. It would be appropriate to apply this analysis to the new alternatives 7A and 7B, the natural attenuation alternatives. If a natural attenuation alternative is selected, a solute transport analysis would be useful in supporting the selection.

If you have any questions, please call me at (909) 782-4998.

Lawrence Vitale

Lawrence Vitale
DoD Section

cc: Mr. Roy Herndon, Orange County Water District, P.O. Box 8300, Fountain Valley, CA 92728

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 10, 1996

DUPLICATE

Joseph Joyce
BRAC Environmental Coordinator
Environment and Safety (Code 1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001

Dear Mr. Joyce:

EPA has finished review of the "Draft Final Interim Action Remedial Investigation/Feasibility Study Reports." The documents are acceptable without revision, however, the attached comments (Enclosures A & B) are provided for your incorporation into future Operable Unit (OU) 1 documents. The following major comments should be incorporated into the OU 1 draft final Proposed Plan (PP) and Record of Decision (ROD):

1) EPA can accept a draft final PP and ROD for a joint Navy/Orange County Water District (OCWD) project if the parties are able to reach agreement. The Navy is required to comply with the deadlines established under the Federal Facilities Agreement (FFA). Additionally, as discussed in prior meetings, the Longterm Groundwater Monitoring Plan must be approved by the regulatory agencies prior to the submittal of the draft ROD.

2) If the OCWD and the Navy/Marine Corps are unable to reach agreement and thus a joint project is not "Implementable" (as defined under the National Contingency Plan FS Nine Evaluation Criteria), EPA would require the installation of the additional monitoring wells at Culver Road (the leading edge of the plume) prior to signing a ROD for any Navy stand alone principal aquifer remediation alternative.

During the preparation of these comments, EPA also reviewed comments submitted from OCWD, including the report "Review of Ground Water Modeling Report and Potential Impacts of TCE Contamination," prepared by Geoscience Support Services Inc. If you have any questions regarding these comments, I can be reached at 415/744-2368.

Sincerely,

Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

cc: Tayseer Mahmoud, DTSC
Larry Vitale, RWQCB
Andy Piszkin, Southwest Div.

ENCLOSURE A

EPA COMMENTS ON THE DRAFT FINAL OU 1
INTERIM ACTION FEASIBILITY STUDY (IAFS)

MAJOR COMMENTS

1) EPA can accept a draft final Proposed Plan (PP) and Record of Decision (ROD) for a joint Navy/Orange County Water District (OCWD) project if the parties are able to reach agreement. The Navy is required to comply with the deadlines under the Federal Facilities Agreement (FFA). Additionally, as discussed in prior meetings, the Longterm Groundwater Monitoring Plan must be approved by the regulatory agencies prior to the submittal of the draft ROD.

2) If Orange County Water District and the Navy/Marine Corps are unable to reach agreement and a joint project thus is not "Implementable" (as defined under the National Contingency Plan FS Nine Evaluation Criteria), EPA would require the installation of the additional monitoring wells at Culver Road (the leading edge of the plume) prior to signing a ROD for any Navy stand alone principal aquifer remediation alternative.

3) As discussed in EPA's 12/15/96 comments, the Navy should ensure that shallow aquifer extraction/remediation occurs prior to any significant principal aquifer extraction.

Comments to be Incorporated into Future OU 1 Reports

Draft Final OU 1 Interim RI/FS Report Executive Summary

1) Section 4.3.1; As mentioned in the report, the TDS plume is migrating (page ES-9). Please clarify that the estimates for TDS plume movement are based on OCWD estimates (applicable also for the IAFS Report).

Draft Final Interim OU 1, Interim-Action Feasibility Study Report Addendum

2) Pages ES-2, 1-9, 1-10; OCWD's sampling results must be presented consistently. On page ES-2, 34 ug/L, the maximum Navy detected level for TCE, is provided as the highest concentration. Pages 1-9 and 1-10 discuss the OCWD data, which include a few higher historical detections for TCE. Any discussion of maximum concentrations should include both OCWD and Navy/Marine Corps data with reference to each.

MINOR COMMENTS

1) Page 1-11; Is Table 1-3 missing? Also, the "area of regional groundwater investigation" is not depicted on Figure 1-

1. Please correct this in future reports.

2) Page 5-1, Section 5.1.1; It is assumed that the discussion under Alternative 7B stating "action in the Principal Aquifer under Alternative 7B would occur only as necessary to protect actual beneficial uses" is also applicable to Alternative 7A.

3) Page 5-2, Section 5.2.1; Typographical error. Should Figure 6-2 be changed to Figure 5-4?

4) Figure 7-13; Shading missing for the "Intermediate Risk" key.

5) Page 7-37, 4th paragraph; Typographical error. Should Figure 7-3 be stated as Figure 7-2?

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 10, 1996

MEMORANDUM

Subject: Review Comments on Draft Final Operable Unit 1 Interim Action Feasibility Study Report Addendum

From: Herbert Levine, Hydrogeologist
Technical Support Section, FFCO

To: Bonnie Arthur, RPM
Navy Section, FFCO

General Comments

This FS and the Addendum raise some interesting questions regarding addressing remediation of the off-base contaminant plume. Though there are some data gaps this document is sufficient for comparing remedial actions. The existing data gaps are critical and, in my opinion, should be filled prior to signing the ROD, if the Desalter is chosen. Those data gaps are, if natural attenuation is chosen, additional monitoring wells at Culver Road, as well as a long term monitoring plan.

There are some concerns with the ground water model which have not been adequately addressed. The initial condition for contaminant distribution in the principle aquifer is, and the Navy has admitted, an over-estimation by a factor of three to four. The Navy's contention that this is conservative is not true, it is merely an over-simplification and misrepresentation. It is appropriate to use field measured data which represents three dimensional data when constructing a three dimensional model.

A comment was raised previously and discussed with the Navy with regards to delineating risk with plume concentrations. The group had agreed to contour risk at order of magnitude intervals and overlay on the contaminant plume. This was not done. This would be an useful tool when comparing risk posed for alternative 1 and then comparing against other alternatives. It would also be useful for comparing dollar costs for risk reduction.

Specific Comments

1. Section 1.4 Scope OF-1 Interim Action, page 1-11. The second paragraph does not clearly distinguish between this action and the OU-2A action. The next section (1.5) does, so I recommend rewriting this paragraph.

2. Section 1.5 Relationship Between OU-1 and OU-2A, page 1-12. The discussion here identifies

the plume separation between the hydrogeologic units. This is not discussed elsewhere but should be discussed here. The Navy should state where these plumes actually are, and why they are separated. Or is this an artifact of sampling?

3. Section 6.1.2.2 Model Modifications, page 6-5. The practice of using the highest measured value for TCE for the entire saturated thickness when other depth specific data are present is not appropriate nor warranted. The unique feature which makes a three dimensional model more accurate than a two dimensional model is the ability to incorporate depth specific variability in aquifer parameters and contaminant distribution. The contention that the Navy's approach is conservative is misleading. In fact, conservatism is not what is being modeled. What is being modeled is an oversimplification of the subsurface hydrology and contaminant distribution. This in turn produces a plume distribution and movement prediction which is overly simplified and unrealistic. This is evidenced by the plume maps presented for each alternative. They are all two dimensional maps. For the off-base principle aquifer plume it is desirable to compare contaminant distribution in cross section with actual data. The statement that "*This conservative approach helps to compare modeling results....*" is actually wrong and should be deleted. There is no added benefit or help from this approach.

4. Section 6.1.2.2 Model Modifications, Biodegradation, page 6-7. The agency comments asked the Navy to evaluate natural attenuation for the off-base plume of TCE in the principle aquifer. During subsequent BCT meetings this comment was further explained to ask for the Navy to model the off-base plume with the hypothesis that the source is cut off via an action from OU-2A. Therefore, what was asked for was for the model to evaluate the degradation of the off base plume without further impact from the source area. During these discussions it was suggested that the Navy consider re-running the no action alternative without any continuing mass loading from the base. It appears that the Navy did not quite do this, but does evaluate something not too different for Alternative 7B (without biodegradation as shown in Figure 6-46). It is curious that this alternative predicts higher concentrations in the off-base principle aquifer than Alternative 1 (see Figure 6-10). Is this due to incomplete capture of the on base plume? Please explain.

5. Section 6.3.4 TCE Transport Simulations, page 6-15. Please compare and discuss Figure 6-10, TCE in principle aquifer with no action, with Figure 6-16. Table 6-6 identifies a distinction based on plume size greater than 5 ppb. What is the mass differential?(for the principal aquifer). Please make the distinction between SGU and PA in Table 6-6 for all alternatives.

6. Section 6.4.4 TCE Transport Simulations, page 6-18. Moderate shrinking of the TCE plume in the PA appears to be a very optimistic view. There does not appear to be significant reduction in size. When the Navy adds the additional data requested in comment 5 mass removal can be compared.

7. Section 6.7.2 Groundwater Flow Conditions and Capture Zone Mapping, page 6-24. This agency commented on the previous FS with regards to water level declines in the source area if the IDP was constructed. Of particular concern is the top 40 to 50 ft. of the SGU. This is the portion of the plume which contains the most mass of TCE. Since all of the alternatives are run out for 20 years it is appropriate to mention that the portion of the SGU of interest dewaters significantly in less than 20 years. Table 6-4 compares water level differences for 20 years only.

It would be appropriate to prepare a table which has more that one time step. As example, Figure A-3-5 shows simulated drawdown vs. time for 20 years. At time one year water levels drop ten feet in well 22_DBMW47, at the down gradient edge of the hot spot. At time step 2 years water levels have decline to over 15 ft., and at time step 6 years 30 ft. of drawdown has occurred and at the 10 year time step 40 ft. of drawdown has occurred in this well. This is very significant since most of the mass is in the upper 40 ft. This implies little value of pumping within this zone after 10 years. The comments to the previous document and discussions at BCT meetings stressed the importance of acknowledging this phenomenon and including this in the alternatives.

8. Section 6.8 Sensitivity Analysis if TCE Biodegradation, page 6-26. This sensitivity analysis is important, however one important step was excluded. The simulated plumes for this sensitivity analysis should be compared to Alternative 1. The best case, 100 year half life, is not presented in Figures 6-39 and 6-40. Figure 6-46 indicates that without biodegradation concentrations in the PA are greater than Alternative 1, which is also simulated without biodegradation. Please provide the missing Figures and compare all sensitivity analyses with Alternative 1.

9. Section 6.9 Cleanup Time to TCE MCL Simulations, page 6-28 and Table 6-9. The Table 6-9 should breakout the mass and risk difference between the SGU and the PA. The agencies asked for a risk based comparison for each alternative with risk contours shown on plume maps (for the PA). This is necessary for making many comparisons. When comparing time for each alternative the risk contours are likely to indicate the relative risk reduction along with time. As presented the discussion of relative difference of alternatives adds little to the ability to chose a remedy based on time. The statement that Alternatives 6A and 8 are distinguished from other alternatives might be irrelevant if risk were considered.

10. Section 6.11 Summary, page 6-34, item 2. The concept presented here for containment of the SGU is considered conceptual only. This agency does not approve the proposed well placement as presented in this document. This will be addressed in the OU-2A FS.

11. Section 6.11 Summary, page 6-34, item 3. The contention that 18_TIC113 contains the plume is documented by water levels, but not particles (see Figures 6-8, 6-26, 6-32, 6-38). Please clarify. What is the effect of plume movement without these wells pumping?

12. Section 6.11 Summary, page 6-35, item 4. Another concern with the numeric solution is the low value of longitudinal dispersivity used. Anderson and Woessner (1992) state "dispersivity seems to increase with the size of the contaminant plume; i.e., dispersivity seemingly increases as the plume moves down gradient." Also, Fetter (1993) suggests that while the potential range is rather large, the longitudinal dispersivity can be estimated to be about 0.1 of the flow length. Fetter (op.cit.) also states that the few field studies available indicate a ratio of longitudinal to transverse dispersivity ranging from 6 to 20. Please explain why a relatively low longitudinal dispersivity of 50 feet and a lateral dispersivity of zero was used to represent large plumes ranging from 2,000 to 10,000 feet.

13. Section 6.11 Summary, page 6-35, item 5. As stated in comment 10 above, this agency considers the design for the SGU as presented here as conceptual only. We anticipate major changes in the design as presented here and will address our concerns with the OU-2A FS.

14. Section 6.11 Summary, page 6-35, item 6. This agency can not concur since significant

figures were not presented (100 yr. Half life) and the no biodegradation term differs from the no action(see comments 4 & 8).

15. Section 6.11 Summary, page 6-36, item 7. The discussion of cleanup times should include relative risk. What is the difference between these cleanup times?

16. Attachment G, page G-1. The primary purpose of the existing Groundwater Monitoring Plan is to determine the nature and extent of contamination.

17. Attachment G, page G-2. Agree that the objective during a remedial action are different than during a remedial investigation. The primary objective of monitoring during remedial action is to determine if the designed performance and remedial goals are actually met (see Methods for Monitoring Pump-and-Treat Performance, EPA/600/R-94/123, June 1994). Cost-effectiveness is of course always a concern, but is not the only or major concern as presented here. This Attachment should focus on OU-1A, i.e., the contaminant plume in the principle aquifer.

18. Attachment G, page G-2. Add as a monitoring objective, *Evaluate the performance of the chosen remedial action.*

19. Attachment G, Section G-2 Monitoring Phases, page G-3. Suggest changing Compliance to Performance. Agree with the need to collect additional data during the Reconnaissance Phase. The data collection frequency during the Reconnaissance Phase is acceptable. Please add Redox and dissolved oxygen to the parameter list.

20. Attachment G, Section G-2 Monitoring Phases, page G-5. What is the frequency for this phase?

21. Attachment G, Section G-3 Monitoring Well Network, page G-6. This section can not be reviewed since the Tables and Figures were not included.

22. Section 7.2.3.4 Reduction in Toxicity, Mobility, or Volume Trough Treatment- Alternative 6A, page 7-21. The reference to and data presented in Table C-1c poses an interesting question. If the influent concentrations from the off-site principle aquifer plume are below drinking water standards why is treatment proposed?

23. Section 7.2.4.3 Long-Term Effectiveness and Permanace--Alternative 7A, page 7-26. Please add the previously requested risk contours to Figures 7-3 and 7-4. What is the difference in risk reduction, appears negligible, within the PA for each alternative and what is the dollar amount associated with risk reduction?

24. Section 7.4.2 Conclusions, page 7-58. The presentation of risk reduction based on length of a 5 ppb plume is not acceptable. The Navy was asked, and agreed, to prepare risk contours for the off-base plume in the PA. The presentation here is misleading since the total mass reduced is presented along with the cost estimates with no realistic presentation of risk reduction. Figure 7-11 makes an attempt to compare risk with alternatives after 20 years. What is the difference? Why is plume area important? The risk is within an acceptable range for all alternatives presented including alternative 1. According to the data presented in Table C-1c the influent concentrations

to a treatment plant for wells in the PA are below drinking water standards. If the Navy proposes an action within the PA then actual risk and risk reduction must be demonstrated. Figure 7-7 should breakout the difference between the SGU and the PA (as in Figures 7-5 and 7-6).

ORANGE COUNTY WATER DISTRICT

VIA FEDERAL EXPRESS

September 3, 1996

Ms. Bonnie Arthur
U.S. Environmental Protection Agency
75 Hawthorne Street (H-9-2)
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Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
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Long Beach, CA 90802-4444

Mr. Larry Vitale
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Subject: Preliminary OCWD Comments on MCAS El Toro OU-1 Draft Final RI/FS Report

Dear Ms. Arthur and Mssrs. Mahmoud and Vitale:

Orange County Water District (OCWD) is in the process of reviewing the MCAS El Toro Draft Final Interim Action RI/FS documents, dated August 9, 1996, provided by the Department of Navy (DON). As you know from our various meetings and conversations, including our meeting on August 21, we are very concerned with DON's new "natural attenuation" alternatives analysis and the supporting model, and so have prepared these initial comments, and ask that you incorporate our comments into your responses to DON on its Draft document. We have been unable to schedule a meeting to discuss our concerns with EPA modeler, Herb

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Levine, but trust that he will have an opportunity to consider our comments during his review of the draft RI/FS. We will submit further comments on the RI/FS when we have had more time to review this lengthy set of documents.

As discussed at our meeting on August 21, DON's evaluation of the three Principal Aquifer natural attenuation alternatives (7A, 7B, and 8) depends on the validity of its groundwater model. The model incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume, as acknowledged by DON. We cannot accept DON's conclusions that the TCE plume will be contained by the existing irrigation wells along Culver Drive, and urge that DON be required to undertake remedial work that will remove this threat to public health and the environment from our groundwater supply.

OCWD retained the services of Dr. Dennis Williams, an experienced hydrogeologist and groundwater modeling expert, to independently review DON's hydrogeologic assumptions and model input parameters, and the validity of the conclusions drawn by DON from the model. Enclosed is a copy of Dr. Williams' draft report. We concur with Dr. Williams's comments, and incorporate the attached draft report as part of OCWD's comments on the RI/FS.

Comments on RI/FS Addendum (Volume IX) and Related Sections of Other Volumes

1. Page ES-2 and throughout the RI/FS documents: The many references to 34 ug/L as the highest TCE concentration in the Principal Aquifer are erroneous and should be corrected. TCE has been measured above 40 ug/L in wells MCAS-1 and MCAS-7 during 1993-95, including 47.8 ug/L in MCAS-7 on 12/22/95. OCWD provided this data to DON and EPA in Spring 1996.

2. Pages 5-1 and 5-2: The repeated statement that the Principal Aquifer VOC contamination will "continue to attenuate as it has in the past, with or without DON or IDP remedial action," is incorrect. We are unaware of any evidence suggesting that the plume has begun to attenuate (except to the extent that spreading of the problem is considered to be "attenuation"). As defined by DON in its model, attenuation involves several mechanisms: advective dispersion

(mechanical dilution), biodegradation, and soil adsorption. As applied to the Principal Aquifer, the plume has spread contaminants at levels exceeding MCLs, and that spread continues as demonstrated by well sampling. Biodegradation has not been a significant factor (as shown by low concentrations of the breakdown product DCE). Indeed reliance on biodegradation as part of a lower cost solution is extremely dangerous, given that over time dechlorination may result in conversion of TCE to DCE, then to the highly carcinogenic compounds, vinyl chloride or 1,2-DCA (each with an MCL of just 0.5 ug/L). Further, soil adsorption can be ruled out as an effective way to safely attenuate TCE-contaminated soil. Extensive testing of the affected soils has shown them to have a low carbon content, with a retardation factor of 1.3 being a reasonable assumption for modeling purposes.

Spread of the TCE plume must stop. Remedial alternatives 2A and 6A are intended to prevent plume spreading.

3. Pages 5-6 and 5-7 (section 5.3.2): The last sentence on page 5-6 reads, "Confirmed exceedance of the MCL leads to . . . consideration of actions, if any, needed to protect actual beneficial uses." This should be modified to state, "actual and anticipated beneficial uses" to be consistent with the Santa Ana River Basin Plan.

4. Page 6-6, top paragraph: The model's initial conditions should have taken into account the TCE plume between the 0.5 and 5 ug/L contours in the Principal Aquifer. Since the model attempts to simulate future dispersion of the TCE plume by mixing of higher concentrations with lower concentrations, it is important to take into account the existing mass of TCE outside the 5 ug/L isoconcentration contour. Neglecting this mass in the model will detract from the aquifer's simulated assimilative capacity to dilute the TCE plume and could result in a significantly underestimated plume migration.

5. Pages 6-7 and throughout the RI/FS: DON factored biodegradation of TCE into its model as a component of natural attenuation. If biodegradation is a significant component of attenuation then DON must describe and analyze whether or not that process is beneficial. TCE may, over time, be converted to one or

more forms of DCE which then may degrade to vinyl chloride or 1,2-DCA. This process does nothing to remove toxic contaminants from the groundwater. To the contrary, biodegradation has the potential to worsen an already unacceptable condition by leaving groundwater contaminated with cis-1,2-DCE (6 ug/L MCL) and vinyl chloride (0.5 ug/L MCL).

Rather than portraying biodegradation as a positive "naturally occurring destructive process," DON should emphasize that TCE can degrade into compounds that are equally or more carcinogenic than TCE itself. There was no discussion on the potential long-term health risks should the large mass of TCE in the Principal Aquifer be allowed to biodegrade to a large mass of vinyl chloride. DON should have taken a more conservative modeling approach by either eliminating biodegradation altogether (evidence of actual degradation of TCE in the Irvine subbasin is minimal), or quantifying and preparing a plan to treat the resultant increases in TCE's very hazardous breakdown compounds.

6. Page 6-28 (section 6.9): DON states, "the retardation factor [applied in its model] is set higher than is believed correct" in an attempt to better estimate total cleanup time. This was done at the cost of sacrificing the model's validity in estimating TCE plume movement in the Principal Aquifer. Because DON relies on the model's prediction of plume containment by Culver Drive irrigation wells in the natural attenuation alternatives, the use of a purposefully inflated retardation factor of 2 raises serious questions as to the validity of the model as a basis for concluding that plume containment will occur.

7. Page 6-33 (section 6.11): There is no basis for DON's statement that "modeling results appear reasonable when compared with available data . . .." DON fails to say what data was found that indicate "reasonable" modeling results. TCE concentrations have been increasing in wells at the lead edge of the plume. For example, as presented in Dr. Williams's draft report, several years of data from our North Lake well situated 2½ miles from the air station show a steady increase in TCE concentration. Groundwater contour maps from measured water levels also indicate flow paths moving beyond Culver Drive. Actual field conditions, as shown by hard data are quite different than DON's modeling prediction of a relatively stable plume.

8. Page 6-34, paragraph 3: The solute transport model results "showing the 5 ug/L TCE isoconcentration contour remaining to the east of the Culver Drive wells" are inaccurate. As described in Dr. Williams's report, the mistake is the result of flawed assumptions and ill-chosen input parameters used in the model, including the following:

- The model uses unreasonably low hydraulic conductivities, e.g., only 13 ft/day for the Principal Aquifer west of Culver Drive. This understates the higher aquifer permeabilities measured from Principal Aquifer well tests (35 to 60 ft/day), and ignores the fact that the preferential path of pollutants will be through the more permeable zones. The model layering is not detailed enough to take into account the actual permeabilities of individual sandy zones within the Principal Aquifer, resulting in use of average permeability values that include both aquifers and aquitards. This in turn reduces the modeled plume velocity proportionately.

- The model uses a western constant-head model boundary condition based on 1993 water levels, the year when Main Groundwater Basin water levels were near a record high. Application of this unusually high water level data allowed the gradient to be reversed (and the TCE plume contained) in the model with minimal production from the Principal Aquifer;

- The model uses outdated data and insufficient pumping for well TIC-106 west of Culver Drive. TIC-106 has been pumping approximately 1,000 acre-feet/year since 1993, not 52 acre-feet/year as assumed in the model. At its actual rate, the well would be likely to pull the TCE plume further west if the active remediation measures such as Alternatives 2A or 6A are not implemented. In addition, well TIC-47 (for its model DON assumed it is pumping 270 acre-feel/year within the plume) is permanently inactive;

- The model uses an unreasonably high retardation factor that DON acknowledges will underestimate the rate of plume movement.

- The model assumes biodegradation of TCE, which is shown to reduce Principal Aquifer TCE concentrations by approximately 10-15 ug/L over 20

years, but ignores the potential resultant more hazardous daughter compounds.

9. Page 7-12, last paragraph: None of the RWQCBs accept DON's unilateral interpretation of SWRCB Resolution 68-16. We also strongly disagree with DON's attempt to sidestep California law and policy, and will comment on this further under separate cover.

10. Page 7-38, section 7.3.1.2 (pertaining to the Principal Aquifer): The paragraph beginning "In all the alternatives, extracted groundwater is treated . . .," is misleading. Only Alternatives 2A and 6A involve treatment of groundwater from the Principal Aquifer. In addition, Alternative 7A should be deleted from the statement in the following paragraph, as it does not include reinjection of water. The paragraph is also misleading in that it states that Alternatives 7A [sic] and 7B "avoid the possibility of exposure via domestic use by reinjecting the VOC-treated groundwater. This is true with regard to the shallow aquifer, but not with regard to the Principal Aquifer, where exposure via domestic use can only be prevented by not producing water from this valuable groundwater source.

11. Page 7-45, section 7.3.3.4: DON's statement that "The groundwater extraction remedial actions considered for the alternatives are permanent" should be modified to exclude those extraction remedial actions consisting of "background pumping." There is no guarantee that this pumping will continue in the future nor is there a guarantee that pumping will continue in a location that will be conducive to containing the plume. Higher quality groundwater exists in the Irvine subbasin west of Culver Drive where IRWD is considering construction of wells to meet future water demands.

Specific Comments on Appendix A--Groundwater Modeling (Volume VI)

1. Page A5-3, last paragraph: DON acknowledges that the model was unable to "demonstrate a good match between the observed and simulated TCE distributions." Given this, DON's conclusion that the >5 ug/L TCE concentration plume will not migrate is unsubstantiated.

2. Section 7.0 (Sensitivity Analysis): Sensitivity analysis does not substitute for transient calibration of a model. Sensitivity analysis should be used to identify which hydraulic and solute transport parameters should be adjusted for later calibration. DON used the pumping scenario of Alternative 2B for its sensitivity analysis of all alternatives, including 7A and 7B, even though Alternative 2B is not being considered and includes aggressive pumping of the Principal Aquifer, which is not a part of Alternatives 7A and 7B. It is probable that the pumping scenario of Alternative 2B is aggressive enough that even within the range of parameter selection, the results indicated plume containment. However, this scenario has little to do with Alternatives 7A and 7B, which include no active pumping from within the Principal Aquifer TCE plume. A more representative analysis should have been performed to evaluate the model's sensitivity under Alternatives 7A and 7B using the full range of potential model input parameters, because they are least able to adequately capture the TCE in the Principal Aquifer due to relying solely on background pumping. Results of such an analysis would likely show lack of containment of the TCE plume.

3. Page A7-4: DON states "the groundwater flow condition at the northwestern boundary is one of the major uncertainties at the Irvine Subbasin model." The false assumption of the constant head condition at the western model boundary overestimated the amount of inflow to the Irvine subbasin from the Main Groundwater Basin, as acknowledged by DON which states "the actual amount of inflow from the Main Basin available to replenish water . . . will be less than that simulated by the model under a constant-head boundary condition." The overestimation of inflow from the Main Basin will erroneously impede the rate of TCE plume movement in the model.

4. Page A7-5: DON notes that the simulated water level elevations in the Principal Aquifer along the western boundary are as much as 34 feet higher when a prescribed flux condition was used instead of a constant head condition. A constant flux condition specifies a constant rate of groundwater movement into or out of a model but allows the water level elevations to rise or fall. This in turn would allow a steeper gradient to form in the subbasin model which may drive the TCE further west unless sufficient pumping were added to offset the steeper gradient. Although DON states that, under Alternative 2B simulations, the

prescribed flux boundary condition still showed containment of the TCE plume, the prescribed flux rates modeled were not defined, and none of the natural attenuation alternatives were modeled using this boundary condition.

5. Page A7-6: DON again used only Alternative 2B for the sensitivity analysis of its solute transport modeling. As stated previously, this alternative is inappropriate for comparison with Alternatives 7A and 7B.

6. Page A7-6: DON did not run sensitivity analyses of the solute transport model using documented ranges of hydraulic conductivity in the Principal Aquifer. Instead, it adjusted the hydraulic conductivity of Layer 1 (Shallow Groundwater Unit), which has relatively little effect on migration of the TCE in the Principal Aquifer.

7. Page A8-8: DON states, "The accuracy of the simulation of the advance of the plume to its current extent indicates that the estimated η [effective porosity], R [retardation factor], and α [dispersivity] distributions are sufficiently accurate to compare remedial actions that remove water and contaminants from the center of the plume" (emphasis added). Because Alternatives 7A and 7B do not extract water from the center of the TCE plume, DON's statement appears to corroborate OCWD's and Dr. Williams's conclusion that the solute transport model has not been shown to be reliable for predictive analysis of TCE plume migration/capture.

8. Page A8-9: DON's recommended model refinements should have been performed to accurately evaluate the effects (both positive and negative) of natural attenuation. Without these refinements, the model results presented have a high degree of uncertainty. Therefore, they leave DON's findings of the natural attenuation alternatives without a sound technical basis.

Conclusions and Recommendations

OCWD has been managing Orange County's groundwater for over 50 years. Based on our experience and scientific review, and independent expert review of DON's groundwater model documentation and resultant evaluations presented in

the IAFS report addendum, OCWD concludes that DON's flawed analytical methodology and assumptions have not demonstrated that natural attenuation can be used as a primary means of reducing TCE concentrations in the Principal Aquifer. Absent reliable supporting data, Alternatives 7A, 7B, and 8 must be dropped from further consideration.

We would like to schedule a follow-up discussion of these comments in mid-September with you and Herb Levine, others with EPA, and the Santa Ana Regional Water Quality Control Board, Department of Toxic Substances Control, and DON.

Sincerely,

Roy L. Herndon
Manager, Hydrogeology Department

Enc.

cc: Andy Piszkin, Navy SWDIV w/enc.
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October 11, 1996

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Re: Orange County Water District Comments on MCAS El Toro Draft Final Operable Unit 1 Interim RI/FS Report, August 9, 1996

Dear Messrs. Hodges, Mahmoud and Vitale:

Orange County Water District ("OCWD") is commenting on the MCAS El Toro Draft Final Operable Unit 1 Interim RI/FS Report, dated August 9, 1996 ("Draft Report"). We ask that our comments be added to the administrative record in this action, and that our comments be incorporated into each of your agency's comments on the Draft Report to the Department of Navy ("DON"). We also will submit a copy of our comments to the Restoration Advisory Board with the request that DON provide us with a written response, as provided in the Advisory Board's procedures.

I. INTRODUCTION.

As you know from our meeting with you in August and our preliminary comment letter of September 3, 1996, OCWD is deeply concerned about the continuing spread of TCE and other chemicals from MCAS El Toro. We do not believe that

DON's so-called "natural attenuation" alternatives (7A, 7B and 8) would meet remedial objectives. Well monitoring data shows a widespread area of impact, demonstrating the need to actively remediate the Principal Aquifer. This is not the time or place to experiment with natural attenuation. Other, better, cost-effective remedies using accepted technologies are available.

OCWD remains committed to participating with DON to implement Alternative 6A, which is both protective of the environment and cost-effective. We urge each of you to unequivocally advise DON that 6A is the preferred alternative. We are actively negotiating with DON on an agreement to fairly share the costs of the combined VOC treatment and Irvine Desalter Project ("IDP") facilities described in Alternative 6A. Earlier this week, I sent a letter to DON proposing that OCWD and DON each agree to take on a fair share of the actual costs of the common elements of the IDP, based on relative contribution of water to the IDP system. It is time for DON to commit to implementing Alternative 6A and vigorously seek approval of that single, preferred alternative.

OCWD's proposal would result in a clear, useable aquifer, and real savings to DON. Using DON's cost estimates in the Draft Report, DON's share of the costs to construct and operate Alternative 6A would be $31 million, based on the present value of an assumed 20-year project. This compares to DON's estimate of $48.1 million for Alternative 2A, $34.4 million for Alternative 6A (at 50% for common elements), $29 million for Alternative 7A, $39.8 million for Alternative 7B, and $27.6 million for Alternative 8 (at 50% for common elements), also assuming a 20-year project life.

II. SUMMARY OF OCWD'S COMMENTS ON THE DRAFT REPORT.

These comments build upon comments on the Draft Report from Roy Herndon, the manager of our Hydrogeology Department, transmitted in his September 3, 1996 letter to each of you. Mr. Herndon addressed the natural attenuation alternatives which DON described in the Addendum to the Draft Report, and the model used to support those alternatives. In addition, he forwarded a draft report prepared by Dr. Dennis Williams, one of the leading experts in modeling the hydrogeology of northern Orange County. Dr. Williams demonstrated that the hydrogeologic assumptions and input parameters used in DON's model were

inconsistent with actual conditions in the aquifer, and the conclusions drawn from that model are severely flawed.

These comments are focused on four critical flaws in the Draft Report: (i) the alternatives analysis fails because it is based upon a model that incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume; (ii) the natural attenuation alternatives are not consistent with the National Contingency Plan ("Plan"); (iii) critical state and federal applicable and relevant requirements ("ARARs") have not been identified and applied; and (iv) the costs of the natural attenuation alternatives are understated and their cost-benefits in comparison to Alternatives 2A and 6A are misrepresented.

OCWD's comments include those contained herein and those in Mr. Herndon's letter and Dr. Williams's report. In brief, these comments demonstrate:

- The natural attenuation alternatives do not meet remedial objectives, which include preventing the spread of contaminants in the Principal Aquifer.

- DON's model underestimates plume movement, in part because:

  - It uses unreasonably low hydraulic conductivities;

  - It uses a western, constant-head, model boundary condition based on 1993 water levels, a year when the Main Groundwater Basin water levels were near a record high;

  - It assumes that well TIC-106 west of Culver Drive pumps at a rate of 52 acre-feet per year, when its actual rate is approximately 1,000 acre-feet per year;

  - It assumes that well TIC-47 was actively pumping when in fact it is permanently inactive; and

  - It uses an unreasonably high retardation factor that DON acknowledges underestimates the rate of plume movement.

- The aquifer being damaged by this plume is a critically important groundwater resource, supplying approximately 70% of local drinking water needs.

- Well monitoring data and calibrated modeling demonstrate the need to actively remediate the Principal Aquifer. In just five years, another 53,000 acre-feet of high quality groundwater may be contaminated with TCE above 5 ug/L if aggressive cleanup is not initiated.

- Alternatives 2A and 6A achieve OU-1 remedial objectives at a reasonable cost using proven and readily available technology.

- OCWD remains committed to participating with DON to fund the common elements of Alternative 6A.

- DON cannot unilaterally disregard the state's Antidegradation Policy (State Board Resolution No. 68-16) as a state ARAR. The policy applies to ongoing discharges such as those at MCAS El Toro, is more stringent than any federal ARAR identified by DON, and as a matter of law must be applied.

- DON must apply State Board Resolution No. 92-49 as a state ARAR, because it also contains provisions that are more stringent than federal ARARs.

- In evaluating VOC cleanup levels DON failed to consider levels ranging between background values (which DON erroneously dismissed as infeasible) and MCLs (which DON determined are appropriate for this action). DON is required to evaluate remedial levels between those two end points under 22 Cal. Code Regs. § 66264.940(e) and other ARARs.

- DON mischaracterizes Alternatives 7A, 7B and 8 in calling them the "lower cost alternatives." Alternative 6A meets project objectives and allows for the beneficial use of the Principal Aquifer during the course of cleanup <u>at less cost than Alternative 7B</u>, and at a cost of only $2 million more than Alternative 7A. Furthermore, Alternative 2A has been found to be more effective than any of the natural attenuation alternatives and DON has determined it to be a cost-effective remedy.

III. MCAS EL TORO ACTIVITIES HAVE CONTAMINATED AN IRREPLACEABLE GROUNDWATER RESOURCE.

Decades of military activity at MCAS El Toro has had an enormous, toxic impact on the groundwater of Orange County. The extent of the contamination originating at MCAS El Toro was first observed in 1985, when OCWD discovered that a plume of TCE which originated from MCAS El Toro had impacted two irrigation wells near the Base. DON reacted slowly to this discovery, to the point that Governor Pete Wilson, while he was a United States Senator, undertook a fact-finding mission to the Base in July, 1988. As a result of his visit, Governor Wilson criticized the military for refusing to investigate off-Base contamination. Governor Wilson stated:

> "When you have the situation where the liability is pretty clear, there is no reason for this delay."

In February 1990, EPA placed MCAS El Toro on the National Priorities List. Nonetheless, the military continued to be reluctant to accept responsibility for the offsite contamination. After many years of study, consultants retained by DON confirmed that the contamination originating at MCAS El Toro has, in fact, migrated offsite, and now extends several miles downgradient of the Base. DON's consultants further report that the plume contains numerous chemicals of concern, including TCE.

The aquifer which is being damaged by this plume is a critically important groundwater resource. This aquifer supplies approximately 70% of local drinking water needs. As David N. Kennedy, then Director of the California State Department of Water Resources, stated in 1989:

> "The wells which are threatened by this plume are not replaceable in any thinkable way."

Migration of these toxic chemicals has continued for several decades, in the absence of remediation. While EPA, the State, and the impacted community all have been patient, it is absolutely clear that this plume contains contaminants at levels presenting unacceptable risk, and will continue to harm our resources for many decades if

nothing is done. This problem must be remediated by DON now.

IV. OCWD'S FURTHER COMMENTS ON DON'S DRAFT REPORT.

A. The Draft Report Does Not Support Findings that NCP Evaluation Criteria are Met by the Natural Attenuation Alternatives.

DON has not demonstrated that the natural attenuation alternatives satisfy the nine evaluation criteria for alternatives set forth in the National Contingency Plan ("NCP"). (See 40 C.F.R. § 300.430(e)(f)) DON discusses the criteria in Volume IX, Section 7 of the Draft Report.

1. Threshold criteria.

To be eligible for selection, each alternative proposed as a result of the RI/FS must meet two "threshold criteria," "overall protection of human health and environment" and "compliance with ARARs." (40 C.F.R. § 300.430 (f)(1)(I)(A).) DON's consultant reported that the natural attenuation alternatives meet the NCP standard for overall protection of human health and the environment because the alternatives contain the TCE plume west of Culver Drive. (Draft Report, Vol. IX, p. 7-57.) However, as we have commented, DON's uncalibrated model does not demonstrate that the TCE plume will be contained. Even using a simple water-balance approach, it defies logic that DON's model indicates that two existing Culver Drive wells pumping approximately 2,000 acre-feet/year can reverse the gradient in the Irvine Sub-basin, which receives over 10,000 acre-feet/year of natural recharge. Without credible modeling data, DON cannot satisfy the threshold criteria that the overall protection of human health and environment criterion will be met with the natural attenuation alternatives. Therefore, the proposed natural attenuation remedies must be rejected as inconsistent with the NCP.

OCWD is not alone in expressing concern about the ability of the natural attenuation alternatives to protect human health and the environment. In its comments to DON on the Draft Report, the City of Irvine concludes that the natural attenuation alternatives "further compromise the safety and protection of human health." (P. Marsh to J. Joyce, September 16, 1996.) We understand that several

other local public entities will submit similar comments if the natural attenuation alternatives are pursued.

DON's failure to demonstrate that the natural attenuation alternatives meet the second threshold criteria, compliance with ARARs, is discussed in detail in Subsection B below.

2. Balancing criteria.

DON must apply five "balancing criteria" to the proposed alternatives, including an assessment of the "long-term effectiveness and permanence of the remedy." In performing this assessment, DON must evaluate the "degree of uncertainty that each alternative will prove successful," and the "magnitude of the residual risk" associated with the alternative. (40 C.F.R. § 340.430(e)(9)(iii)(C).) It did not make these evaluations.

The uncertainties associated with a complex groundwater remediation project would be minimized by using proven remediation techniques, but inevitably would be amplified by using untested techniques. Alternatives 2A and 6A rely on proven techniques, minimizing uncertainty. Alternatives 7A, 7B and 8 rely on natural attenuation of VOCs on a very large scale, which is untested, and on a model that incorporates improper assumptions, is uncalibrated, and is unable to reproduce observed movement of the TCE plume. Because the techniques proposed in Alternatives 7A, 7B and 8 are untested, and because the success of the alternatives depend upon the accuracy of the model, there is substantial uncertainty whether the natural attenuation alternatives will prove successful. Nonetheless, DON ignored these issues, and failed to address the degree of uncertainty that the natural attenuation alternatives will prove successful, as required under the NCP. (See Addendum, pp. 7-25 to 7-34, pp. 7-39 - 7-45; 40 C.F.R. § 340.430(e)(9)(iii)(C).)

DON also failed to evaluate the magnitude of the residual risk associated with the natural attenuation alternatives, which is the second test required by the NCP to assess the long-term effectiveness and permanence of a remedy. (See Addendum, pp. 7-25 - 7-34, 7-39 - 7-45.) In particular, DON failed to address the fate of TCE in the Principal Aquifer and the residual risk associated with the breakdown products of TCE, including vinyl chloride, which is even more toxic than TCE. (See letter of September 3,

1996 from R. Herndon, pp. 3-4.) Biodegradation of TCE is a significant factor in DON's model, accounting for from approximately 25% to 30% of VOC reduction in areas of higher VOC concentrations. The health risk from the potential resultant mass of vinyl chloride and other toxic breakdown components has been ignored in the Draft Report. This violates the NCP, which requires residual risks to be addressed for each alternative under consideration. (See 40 C.F.R. § 340.430(e)(9)(iii)(C).)

Given DON's failure to assess the degree of uncertainty of success of and magnitude of residual risk associated with the natural attenuation alternatives, it is not surprising that its support for the long-term effectiveness and permanence of such alternatives is, at best, equivocal. In a paragraph addressing long-term effectiveness considerations, DON states:

> "For the alternatives that rely on natural attenuation of contaminants . . . TCE is either biodegraded, adsorbed, or diluted." (Draft Report, Vol. IX, p. 7-45.)

DON makes no comment on whether biodegradation, adsorption or dilution is effective and permanent. Compare this to DON's statement, <u>in the same paragraph</u>, demonstrating the effectiveness and permanence of active remediation measures:

> "The groundwater extraction remedial actions considered for the alternatives <u>are permanent</u>. Groundwater extraction <u>permanently</u> removes mass from the aquifer, and the VOC-removal treatment technologies <u>permanently</u> remove and destroy the contaminants." (Emphasis added.)

The quoted paragraph is as close as DON gets to applying the balancing criterion of long-term effectiveness and permanence. DON does not apply the degree of uncertainty and magnitude of the residual risk tests or otherwise describe, consider, or balance the uncertainties and residual risks associated with the natural attenuation alternatives. Having failed to apply the long-term effectiveness and permanence criterion, DON cannot find the natural attenuation alternatives to satisfy the NCP.

3. Modifying criteria.

DON ultimately will be required to satisfy two "modifying criteria": state acceptance and community acceptance. The state must determine whether the natural attenuation alternatives meet state ARARs and otherwise are acceptable. In addition, the alternatives will need to achieve community acceptance. The Orange County residents, farmers, and businesses that rely on the aquifer contaminated by DON's activities have objected--and will continue to object--to the natural attenuation alternatives, and will ask the same questions about Alternatives 7A, 7B and 8 that we, as the state-chartered agency responsible for this resource, ask:

1) Why should DON be allowed to leave contamination in place, and not compensate the community for the degradation and loss of this resource?

2) Are the same standards being applied to other VOC-contaminated aquifers in the state, and if so on what legal authority?

3) Why did DON commit to participating in the active remediation of the aquifer by sharing fairly in the cost of the IDP and then consider not following through? Would even more groundwater be contaminated as a result of its delay and ultimately backing out of that commitment?

4) Does not the state's proposed Containment Zone Policy limit the use of natural attenuation in drinking water aquifers to situations where there is no other reasonably available remedy, where overlying landowners agree with the approach, and where it can be shown that contamination will not spread?

These questions have straightforward answers:

1) DON should not be allowed to leave contaminated groundwater in place, and if it does, DON must provide compensation for such loss;

2) A "natural attenuation" remedy has not been selected elsewhere in the state for a valuable aquifer that has been contaminated with VOC by an identified and solvent responsible party;

3) DON would be backing out of its long-term commitment to OCWD to participate in the IDP and would, by its delay and inaction, contaminate additional high quality groundwater; and

4) The State Water Board's recently adopted amendments to Resolution No. 92-49 (the "Containment Zone Policy") would guarantee all of the protections listed in the question, and more, before a regional board could allow natural attenuation to be attempted.

B. DON Failed to Apply Critical State Applicable or Relevant and Appropriate Requirements ("ARARS").

DON discusses federal and state ARARs and their application in Volume IV, Appendix B, in its analysis of remedial alternatives in Volumes II (Section 7) and IX (Section 7), and elsewhere in the Draft Report.

DON identified the substantive provisions of the following requirements as the most stringent of the potential federal and state groundwater ARARs for the OU-1 interim action:

- Santa Ana River Basin Water Quality Control Plan Water Quality Objectives, Beneficial Uses and Waste Discharge Limitations;
- Federal MCLs and Non-Zero MCLGs for Organic Compounds;
- State Primary MCLs for Organic Compounds in DTSC's Title 22 Regulations; and
- RCRA Groundwater Protection Standards in 22 Cal. Code Regs. § 66264.94(a)(1), (a)(3), (c), (d), and (e). (Draft Report, Vol. IV, Appendix B, p. B2-2.)

DON did not identify or apply three important state ARARs. It concluded that the State Water Board's Antidegradation Policy contained in Resolution No. 68-16, and the State Water Board's "Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code" contained in Resolution No. 92-49 are not state ARARs. (See Draft Report, Vol. IV, Table B2-2 and p. 2-19.) In addition, DON concluded that section 66264.94 of DTSC's Title 22 regulations, containing the

RCRA Groundwater Protection Standards, are federal (not state) ARARs. (See Table B2-2 and p. 2-19.) In so doing, DON has reached a conclusion that is contrary to law, and it unilaterally and improperly disregarded California's interpretation of its policies and regulations with regard to all three state ARARs.

We note that DON has taken these erroneous positions at other locations, apparently without facing legal challenge. For example, DON unilaterally rejected the applicability of the three disputed state ARARs in the RI/FS and Record of Decision for the Camp Pendleton groundwater cleanup project. California did not accept that DON action, and as discussed below, we agree with the State's position in the Camp Pendleton project that DON must apply State Board Resolutions Nos. 68-16 and 92-49 and 22 Cal. Code Regs. section 66264.94 as state ARARs.

1. DON must apply the State Water Board's Antidegradation Policy as a state ARAR.

The State Water Board's Antidegradation Policy was adopted in October 1968. Resolution No. 68-16 provides:

> "1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.
>
> 2. Any activity which produces or may produce a waste or increased volume or concentration of waste in which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

This crucial groundwater protection policy is directly applicable to the Marine Corps' ongoing discharge of waste to the Shallow Groundwater Unit, to the ongoing discharge of waste from that unit to the Principal Aquifer, and to the continuing migration of TCE into the high quality waters of the Principal Aquifer.

Resolution No. 68-16 consistently has been interpreted by the state and regional water boards as applying to the determination of groundwater cleanup levels. This position is expressed in a February 17, 1994 memorandum from William Attwater, Chief Counsel to the State Water Board ("Attwater Memorandum"). The memorandum explains that Resolution No. 68-16 applies to the determination of in-situ ground water cleanup levels because:

> "it applies to `discharges' of waste, including unauthorized discharges, that occurred after adoption of the policy in 1968 [and it] also applies to such determinations because the presence of pollution in soil or ground water constitutes a `discharge' of waste since polluted ground water migrates to areas of higher quality ground water." (Attwater Memorandum at p. 2.)

The memorandum also explains that Resolution No. 68-16 "satisfies the [Clean Water Act] requirement that the State have a policy which, at a minimum, is consistent with the federal antidegradation policy."

DON acknowledges that Resolution No. 68-16 has been interpreted by the State Water Board to "include a prohibition on the continued migration of existing ground water contaminant plumes at levels that exceed background for the Aquifer" (Appendix B p. B2-3), but entirely disregards that interpretation:

> "[DON] has considered [the State Water Board's] position, and determined that further migration of already-contaminated ground water is not a discharge governed by the language in SWRCB. More specifically the language of SWRCB indicates that it is prospective in intent, applying to new discharges in order to maintain existing high quality waters. It is not intended to apply to restoration of waters

that have already degraded." (Draft Report, Vol. VII, App. B, p. B2-3).

DON's position is insupportable. At best, DON might argue that Resolution No. 68-16 does not apply to discharges of contaminants from base operations that occurred prior to the Resolution's adoption on October 28, 1968. However, any discharges after that date are covered by the policy. These include discharges to the soil that have migrated to the Shallow Groundwater Unit and to the spread of contaminants within the Shallow Groundwater Unit, into the Principal Aquifer, and within the Principal Aquifer. Such movement constitutes current, continuing releases. The releases began before 1968 and continue to date, and they will continue unless active measures are taken to stop the migration.

If DON's position is not challenged by the State now, it may become difficult for the State to enforce its interpretation of Resolution No. 68-16 in the future. Dischargers may take the position that the State is estopped from enforcing its historic interpretation of the Antidegradation Policy after acquiescing to DON's erroneous interpretation. Although it may not have appeared necessary to challenge DON during the Camp Pendleton RI/FS and ROD, it is necessary to do so now. To acquiesce to DON would be a mistake for this remedial action and would jeopardize the State's ability to apply its historic interpretation of Resolution No. 68-16 to other current and future groundwater cleanup actions.

Under Resolution No. 68-16, as it has been explained and enforced in California, DON must address the existing groundwater contamination from its past activities, and ensure that additional high quality waters are not contaminated. It must meet requirements that will result in the best practicable treatment or control of the discharge and ensure that the highest water quality consistent with maximum benefit to the people of the state will be maintained.

2. Resolution No. 92-49 is a State ARAR.

DON unilaterally and erroneously determined that State Water Board Resolution No. 92-49 is not an ARAR "because its pertinent requirements are not more stringent than the federal ARAR provisions of Title 22 CCR 66264.94." (See Draft Report, Vol. VII, App. B, p. B2-20.) DON's flawed

reasoning appears to be as follows: (i) Section III.G of the Resolution requires regional boards to apply section 2550.4 of California's Title 23 regulations in approving cleanup levels less stringent than background; (ii) section 2550.4 is identical to section 66264.94 of California's Title 22 regulations with regard to groundwater concentration limits; (iii) section 66264.94 is a federal ARAR; and (iv) because Resolution No. 92-49 incorporates and relies upon section 2550.4, which is not more stringent than section 66264.9, Resolution No. 92-49 is not more stringent than the corresponding federal requirements and is therefore not applicable. (See id., p. B2-20.)

DON adopted the same position on Resolution No. 92-49 in the Camp Pendleton RI/FS and ROD, and the State explained the flaws in DON's position at that time. The State pointed out that Resolution No. 92-49 requires compliance not only with Section III.G as it references 23 Cal. Code Regs. § 2550.4, but also with the additional requirements of Section III.G, among other provisions of Resolution No. 92-49. We agree with the State, and stress that the "additional requirements" of Resolution No. 92-49 referred to by the State are substantial, and are not contained in any federal ARAR.

We further note that DON's argument is predicated on its characterization of sections 2550.4 and 66264.94 as "identical" with regard to provisions that address groundwater concentration limits. Although the two sections are, in this regard, similar, they are not identical. The State Water Board's Title 23 regulation (§ 2550.4) is more stringent than DTSC's Title 22 regulation (§ 66264.94) with regard to groundwater concentration limits. Section 2550.4 requires that before a concentration limit greater than background is established, the state and regional water boards must consider "potential adverse effects on ground water quality and beneficial uses." (23 Cal. Code Regs. § 2550.4(d) (emphasis added)). The corresponding provision of section 66264.94 provides that DTSC must consider "potential adverse effects on ground water quality," but makes no reference to the need to consider beneficial uses. (22 Cal. Code Regs. § 66264.94(d).) The obligation to consider potential adverse effect on beneficial uses causes section 2550.4 to be more stringent than section 66264.94.

Resolution No. 92-49 is more stringent than section 66264.94 or any federal ARAR, and must be applied by DON as

a state ARAR in this remedial action. This is evident because, in addition to the reasons provided above, the State Water Board has determined that Resolution No. 92-49 does not allow passive remediation of contaminated aquifers such as proposed in Alternative 7A, 7B or 8. Because Resolution No. 92-49 would not allow such passive remediation alternatives to be approved, it is inherently more stringent than any federal ARAR that would allow such a remedy.

The State Water Board only very recently (on October 2) amended Resolution No. 92-49 to allow regional boards, under limited circumstances, to establish containment zones where active remediation is not required. If DON wishes to pursue passive remediation alternatives, it must follow the procedures in Resolution No. 92-49, as amended by the so-called "Containment Zone Policy." These procedures are designed to protect human health and safeguard the rights and interests of water owners and purveyors. To obtain approval for its passive remediation alternatives, DON would be required to apply to the Regional Board for designation of a containment zone, meet stringent procedural requirements, and provide evidence to support mandatory Regional Board findings including that groundwater treatment is economically or technologically infeasible, that contaminants will not spread, and, with limited exceptions, that written permission had been obtained from all fee owners of the land containing the zone. DON could not support any of these findings.

3. DTSC's corrective action program standards in section 66264.94 are state, not federal, ARARs.

DON identifies portions of 22 Cal. Code Regs. section 66264.94 as a federal ARAR, even though the DTSC regulation appears to be more stringent than the RCRA regulation with which it complies (see 40 C.F.R. section 264.94), and DTSC previously has advised DON that section 66264.94 is a state ARAR. This distinction is significant, in part, because DON erroneously rejects State Board Resolution No. 92-49 as an ARAR because it is "not more stringent" than a federal ARAR (referring to Section 66274.94). DON's argument collapses if section 66264.94 is a state ARAR or if it is more stringent than any federal ARAR (which it is, as explained in subsection 2 above).

DON previously addressed the issue of whether section 66264.94 is a state or federal ARAR in its preparation of

the Camp Pendleton RI/FS and ROD. In the October 2, 1995 ROD, DON acknowledged that "the State of California disagrees with DON's assertion that § 66264.94 is a Federal ARAR." (Pendleton ROD, p. D-4.) DTSC was right. Section 66264.94 is more stringent than the federal standard with which it complies (i.e., 40 C.F.R. § 264.94). For example, among other provisions for which there is no equivalent in section 264.94, section 66264.49© requires that a finding be made that it would be "technologically or economically infeasible to achieve the background value" for a constituent of concern. (See 22 Cal. Code Regs. § 66264.94(c).)

C. DON has not Demonstrated that MCLs are the Appropriate Cleanup Standard.

DON does not provide support for its conclusion that it is neither technologically nor economically feasible to achieve background levels of VOCs. After discussing background levels as feasible cleanup levels, DON states that, "as provided in 22 CCR 66294.94(c), concentration limits based on MCLs, non-zero MCLGs and health-based criteria have been set as the remedial goals for this interim action." (Draft Report, Vol. IV, App. B, pp. B2-2, B-9.)

We have two main concerns with DON's conclusion. First, DON has not demonstrated that it is technologically or economically infeasible to achieve background levels of VOCs applying the State's Antidegradation Policy (Resolution No. 68-16) or Resolution No. 92-49. Second, even if an appropriate finding were made that it is technologically or economically infeasible to achieve the background value for a constituent of concern, section 66294.94© does not provide that the only alternative concentration limits shall be MCLs, non-zero MCLGs, or any other fixed criteria. Instead section 66294.94© provides that the concentration limits "shall not exceed" other applicable statutes or regulations, such as MCLs, and shall not exceed "the lowest concentration that the owner or operator demonstrates and the department finds is technologically and economically achievable." (22 Cal. Code Regs. § 66264.94(e) (emphasis added)).

DON leaps from dismissing background levels as appropriate cleanup levels, without justification, to adopting MCLs as cleanup levels, without considering

concentration limits falling between these values as is required by section 66264.94. DON must identify the lowest cleanup level that is technologically and economically achievable for each constituent of concern. (See 22 Cal. Code Regs. § 66264.94(e)(2).) There is no indication in the Draft Report that DON made any attempt to satisfy this legal obligation, or that Alternatives 7A, 7B or 8 would be capable of achieving such lower levels.

D. Specific Comments on Volume IX (the "Addendum") Evaluating Alternatives 7A, 7B and 8.

The Addendum was prepared to evaluate the natural attenuation alternatives (7A, 7B and 8). The new alternatives are compared to the two most effective alternatives identified in the IAFS (Alternatives 2A and 6A), and to the No Action Alternative (Alternative 1), using an updated groundwater model. (See Addendum, p. ES-1.) Our main concerns with DON's analysis and conclusions with regard to Alternatives 7A, 7B and 8 in the Addendum are discussed below.

1. Modeling deficiencies.

Mr. Herndon and Dr. Williams have provided detailed comments which address the deficiencies of the CFEST model (as run) for purposes of evaluating the new alternatives. We incorporate those comments by reference, so as to not repeat them here. In view of the problems raised in those comments, DON may not use or rely on the results of its modeling effort. Doing so would run afoul of federal jurisprudence, such as a recent opinion involving TCE contamination of groundwater, in which the district court held:

> "For any scientific evidence to be sufficiently reliable, it must be possible to validate the method by comparing its estimates to real world data." (Carroll v. Litton Systems, Inc., 1990 U.S. Dist. LEXIS 16833, *123 (W.D.N.C.).)

The Litton court relied on a Sixth Circuit opinion, holding that EPA acted arbitrarily in using a model to set emission limits "without adequately validating, monitoring, or testing its reliability or trustworthiness in forecasting pollution." Ohio v. United States Environmental Protection

Agency, 784 F.2d 224, 226 (6th Cir. 1986). The Litton court also relied on another district court opinion holding that groundwater models must be calibrated against sufficient real world data, United States v. Hooker Chemical & Plastics Corp., 607 F. Supp. 1052, 1061 (W.D.N.Y. 1985).

DON's groundwater model forms the basis for all of the significant evaluations and comparisons of alternatives in the Draft Report; from evaluation of whether remedial objectives can be met with the natural attenuation alternatives, to determination of the cost effectiveness of the various alternatives based on criteria such as plume length reduction and mass of TCE removed after 20 years. Because the model as run is not reliable--due to the fact that it uses invalid assumptions, is uncalibrated, and for other reasons--the evaluations and comparisons based on the model are unsupported. In this case, DON asks the United States, California, and the residents of Orange County to rely on a model programmed with demonstrably inaccurate and incomplete data, and which does not accurately predict demonstrated events such as increasing TCE concentrations in the downstream North Lake Well (see Dr. William's Report, at page 6).

2. Failure to overcome statutory preference for permanent measures.

DON has not prepared a record in support of the passive, natural attenuation alternatives that could overcome Congress' specific preference in the Superfund Amendments and Reauthorization Act for permanent remedies involving active treatment. (See 42 U.S.C. § 9621(b)(1).)

3. Faulty cost-effectiveness analysis.

We disagree with DON's characterization of Alternatives 7A, 7B and 8 as the "lower cost alternatives" and with its distortion of the comparative costs of Alternatives 2A and 6A and Alternatives 7A, 7B and 8. Setting aside for now our concern that the natural attenuation alternatives simply will not achieve remedial objectives, DON's cost analysis for the new alternatives does not support its conclusions.

First, it is misleading to characterize the natural attenuation alternatives as "lower cost" than Alternatives 2A and 6A, either on an overall cost or on a cost-benefit

basis. Alternative 8 may have the lowest overall cost but must be rejected because OCWD will not participate with DON on the terms proposed in the Addendum. OCWD categorically will not allow DON to avoid its cleanup responsibilities by using the IDP for disposal of water from the Shallow Groundwater Unit while ignoring remediation of the Principal Aquifer.

Alternative 7A may be somewhat less costly than Alternative 6A, but its projected cost is based on the unsupported assumption that two existing wells will continue to be operated by the Irvine Ranch Water District ("IRWD") and The Irvine Company ("TIC") for decades longer than their expected useful life. (See Addendum, p. 5-3.) Because future operation of the wells is outside DON's control, there is considerable uncertainty whether Alternative 7A could be achieved at the projected cost. If IRWD or TIC decide to remove their wells from service, DON would be required to acquire and operate replacement wells at a significant cost, as presented in Alternative 7B. DON reports that Alternative 7B, which does not assume the continuing operation of the IRWD and TIC wells, costs $8 million more than Alternative 6A.

Second, DON did not find Alternatives 7A, 7B and 8 to be more cost-effective than Alternatives 2A and 6A. (See Addendum, p. 7-56.) Instead, it found Alternative 7A to be more cost-effective than Alternative 2A and Alternative 8 to be more cost-effective than Alternative 6A. DON made selective comparisons of Alternatives 2A and 7B, but did not reach a conclusion as to which, if either, is more cost-effective. Furthermore, DON made no comparisons of Alternative 6A to Alternatives 7A or 7B.

Had DON performed the same type of cost-benefit analysis in the Addendum as it did in the IAFS, we would have seen overall cost benefit comparisons of each of the alternatives: No Action, 2A, 6A, 7A, 7B, and 8. Had such comparisons been performed, each of the alternatives would have been found to be cost-effective, with, we believe, Alternatives 6A and 8 being the most cost-effective and Alternatives 2A and 7B being the least cost-effective.

In addition to our concerns over DON's inaccurate cost comparisons, we are concerned that DON omitted two significant factors in calculating costs and in performing its cost-benefit analysis. First, DON should have factored in a cost for the <u>contingency plan measures</u> common to the

three new alternatives. Each of the natural attenuation measures involve unspecified, but substantial, additional costs in the likely event of failure of the remedies to protect the beneficial uses of the Principal Aquifer. Those potential costs improperly have been ignored. (See Draft Report, Vol. I, p. ES-49.) Second, DON should have considered the benefit provided by Alternative 6A of allowing for use of the groundwater during cleanup, and the cost of eliminating the ability to use at least 200,000 acre-feet of groundwater for a minimum of 60 years under Alternatives 7A, 7B, or 8. (See Addendum, p. 7-40, and Dr. Williams' report at p. 5.)

4. Application of ARARs to Alternatives 7A, 7B and 8.

DON did not support its conclusion that Alternatives 7A, 7B and 8 "are expected to comply with ARARS." (See Addendum, p. 7-39.) First, as discussed above, DON has failed to apply critical state ARARs. In addition, as discussed in Mr. Herndon's and Dr. Williams' comments, Alternatives 7A, 7B, and 8 would not prevent further contamination of the Principal Aquifer. These alternatives rely on source reduction in the Shallow Groundwater Unit to address contamination in the Principal Aquifer. As stated on page 13 of Dr. Williams' report, "[a]s TCE migrates westerly, very low concentrations are detected in the shallow aquifer, and high concentrations are found in the deeper aquifer." Any remedy that does not stop the spread of contaminants into and within the Principal Aquifer fails to meet remediation goals and applicable ARARs. (See Draft Report, Vol. IX, p. 7-39.)

* * *

In DTSC's letter to me of February 28, 1996, the agency explained that although it, EPA and the Regional Board would examine alternatives in the event Alternative 6A did not materialize, the agencies encourage DON and OCWD to successfully conclude negotiations on the IDP "so the preferred alternative can be implemented." We have made Alternative 6A available to DON at a reasonable cost, and we urge the agencies to confirm that it remains the preferred alternative.

If DON refuses to participate in the IDP at a reasonable cost, then it must be required to undertake Alternative 2A. The natural attenuation alternatives have not been shown to

meet remedial objectives, would not meet state and federal ARARS, and would not conform with other NCP standards, including public acceptance.

Very truly yours,

ORANGE COUNTY WATER DISTRICT

William R. Mills, Jr., P.E.
General Manager

cc: The Honorable Christopher C. Cox
The Honorable Robert K. Dornan

Mr. Robert McVicker, IRWD
Mr. Seth Daugherty, OCHCA

Mr. Andrew Piszkin, Navy SWDIV

ATTACHMENT B

GROUNDWATER MODELING MEETING MINUTES

PROJECT NOTE NO.	PROJECT NO.
PN-0145-215 CLE-C01-01F145-I2-0123	01-F145-H6

CONFIRMATION OF:	CONFERENCE	X	DATE HELD	26 September 1996
	TELECOM		DATE ISSUED	18 October 1996
	OTHER		RECORDED BY	John Lovenburg/CH2M HILL
			PLACE	MCAS El Toro

SUBJECT: Contract Task Order (CTO) 0145
Meeting held 26 September 1996 to Discuss OCWD's Comments on Groundwater Modeling for the 09 August 1996 Draft Final OU-1 Interim-Action Feasibility Study Report Addendum
MCAS El Toro Remedial Investigation/Feasibility Study

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See attached attendance list

ACTION REQ'D. BY	ITEM

INTRODUCTION AND OBJECTIVES

Meeting attendees included representatives from the Department of the Navy, Orange County Water District (OCWD), U.S. Environmental Protection Agency (EPA), California EPA - Department of Toxic Substances Control (DTSC), Santa Ana Regional Water Quality Control Board (RWQCB), and consultants for the Navy and OCWD.

Dave Hodges/EPA was introduced as the new EPA Remedial Project Manager (RPM) for Marine Corps Air Station (MCAS) El Toro. The meeting attendees expressed their appreciation for Bonnie Arthur's/EPA positive contribution to the MCAS El Toro project over the past few years.

A. Piszkin/Code 1831.AP indicated that the main objective of the meeting was to assess the regulatory agencies concerns regarding OCWD's comments on groundwater modeling performed for the MCAS El Toro Draft Final Operable Unit 1 (OU-1) Interim-Action Feasibility Study (IAFS) Report Addendum. Roy Herndon/OCWD stated that although OCWD's comments were addressed to the regulatory agencies, OCWD would like responses from both the agencies and the Navy. In response to R. Herndon's query about where OCWD should submit comments in order to get responses from the Navy, J. Joyce/Navy indicated that the comments should be submitted through the MCAS El Toro Restoration Advisory Board (RAB).

SUMMARY OF REGULATORY AGENCY CONCERNS - USE OF GROUNDWATER MODEL AND NEED FOR ADDITIONAL GROUNDWATER MONITORING

After stating the objective for the meeting, A. Piszkin requested feedback from the regulators on which OCWD comments need to be addressed by the Navy prior to regulatory acceptance of the IAFS Addendum. The regulators then requested a short period of time to reach consensus on the key topics of discussion.

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L. Vitale/RWQCB stated that the regulators believe the groundwater model is an acceptable tool to compare the alternatives in the IAFS and that the agencies support a joint OCWD/Navy project (Alternative 6A or 8). A. Piszkin stated that the main use of the model is to compare the relative effectiveness of the alternatives, not necessarily as an absolute predictor of concentrations at a particular point.

L. Vitale asked the Navy how the model would be used in the Proposed Plan if a natural attenuation alternative was selected (Alternative 7A or 8). A. Piszkin stated that additional monitoring wells are planned as part of these alternatives and that observed concentrations in the field will be used in addition to the modeling results. He also noted that, based on the results of these observed concentrations, the alternatives include contingencies to protect beneficial uses.

D. Williams/Geoscience Support Services, Inc. (Geoscience), a consultant to OCWD, stated that the model needs additional calibration for use as a groundwater management tool. H. Levine/EPA stated that the model is accepted by EPA for the intended use of comparing the OU-1 IAFS Alternatives. He added the model results will be further substantiated by empirical data and that the agencies will require installation of additional monitoring wells downgradient of Culver Drive for collection of the empirical data. He also stated that the contingencies in the alternatives will address potential adverse impacts to basin uses.

OCWD CONCERNS

Groundwater Model Calibration

D. Williams stated that solute transport calibration of the model is needed to assess how well the model can predict plume movement. H. Nezafati/CH2M HILL responded that the Coupled Flow and Energy Solute Transport (CFEST) model used for the IAFS was calibrated both for flow and solute transport. The calibration runs are documented in previous drafts of the IAFS. D. Williams stated that he had not reviewed the previous drafts of the IAFS.

Groundwater Model Inputs

A. Piszkin stated that he was surprised at some of OCWD's comments regarding the model, since the model is an adaptation of OCWD's own 1990 two-dimensional MODFLOW model and OCWD has provided input on the model development since that time. He offered that if the agencies required additional sensitivity analyses based on OCWD's comments, that the sensitivity runs could be completed in the next few weeks.

B. Arthur stated that the agencies could agree to accept one of the joint projects prior to the installation of the new monitoring wells associated with the alternatives. T. Mahmoud/DTSC added that if a joint project is selected, he is not concerned about the possible dewatering of the Shallow Groundwater Unit associated with the operation of the Irvine Desalter Project (IDP) in a joint project; he believes soil vapor extraction could be effectively used in the dewatered areas.

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H. Levine stated that the analytical model presented in the model review report by Geoscience does not present a good match with the actual data at the North Lake Well (Figure 8 in the Geoscience report). He stated that he disagrees with the Geoscience modeling approach and believes the data should have been evaluated as a population rather than picking the worst-case scenario (highest concentrations). Because sampling data can be influenced by sampling and analysis variations, as well as heterogeneities, H. Levine believes a model should reflect the response of the entire population of data, not just the highest concentrations.

D. Williams stated that although he believes the IAFS model is a good conceptual model with the proper number of grids and layers, he has three concerns: (1) 1993 is not a representative year to for a steady-state calibration, (2) the downgradient boundary condition is not appropriate, and (3) OCWD is concerned about the impacts of the natural attenuation alternatives on beneficial uses.

H. Nezafati replied that November 1992 was selected for flow calibration because it was the most complete set of water level data available for both the Shallow Groundwater Unit and the Principal Aquifer, when the three-dimensional model was first constructed (MODFLOW Groundwater Model Report, MCAS El Toro [SWDIV, 1994]). In the later groundwater modeling for the IAFS, 1993 data were selected and agreed upon by the regulatory agencies and OCWD. H. Nezafati stated that he would be more than happy to address the boundary condition question in detail if desired. He stated that plumes are very difficult to remediate by pump and treat methods, especially low concentrations as in the Principal Aquifer. The goal is to protect beneficial uses using aggressive extraction in the shallow groundwater, natural attenuation in the Principal Aquifer, and well -head treatment if necessary to protect beneficial uses. H. Levine added that the regulatory agencies may treat Culver Drive as a point of compliance, with monitoring points to evaluate compliance and contingencies if needed. B. Arthur concurred that monitoring at Culver Drive would be required in order to implement the natural attenuation alternatives (Alternatives 7A and 8).

Downgradient Boundary Condition

D. Williams indicated that OCWD's concern with the downgradient constant head boundary condition was that it may artificially keep the water levels elevated, resulting in a reduced gradient and slower plume movement. J. Dolegowski/CH2M HILL stated that the alternatives were previously simulated (1994 FS Report) with both constant-head and prescribed-flux downgradient boundaries and that the agencies, Navy, and OCWD agreed to use a constant-head boundary for future simulations. H. Nezafati stated that the first CH2M HILL groundwater model started with the OCWD model that also used a constant head downgradient boundary. CH2M HILL performed an extensive evaluation of alternative boundary conditions such as a transient boundary condition at the western boundary of the modeled area. Analytical calculations and numerical modeling were performed to estimate appropriate transient fluxes to be prescribed to the western boundary. The details of the transient boundary condition evaluation are documented in the previous groundwater modeling reports. It was determined that due to the limited extent of the Irvine Subbasin model across the boundary and the high interdependency of the Irvine Subbasin on the adjacent Orange County Main Basin, suitable transient boundary conditions could not be calculated.

Therefore, the expected effects of the boundary condition on simulated alternatives were bracketed by performing each transient simulation using a constant head first and then a constant flux boundary condition. There were no major differences in the results based on the different boundary conditions.

H. Nezafati added, that although the results were counter-intuitive at first, the prescribed flux boundary condition actually slightly impeded groundwater flow. He explained that further evaluation of the results revealed that when constant fluxes were prescribed at the boundary, the water levels dropped in the Principal Aquifer, thereby reducing the overall gradient. The reduced gradient resulted in a reduced average linear velocity (since hydraulic conductivity values remained unchanged), thus impeding the migration of the trichloroethylene (TCE) plume. To correct an unreasonably high recharge flux from the Santa Ana Mountains would have to be added that was not supported by the hydrologic regime in Southern California. In the 31 January 1995 groundwater modeling conference call with the regulatory agencies including OCWD, a decision was made to reduce the number of simulations by performing only one set of boundary conditions. An agreement was reached to use constant head boundary conditions for future simulations. D. Williams replied that he had not had the opportunity to review the 1994 FS Report.

Transient Versus Steady-State Calibration

D. Williams asked why a steady-state flow calibration was used rather that a transient calibration. H. Nezafati replied that CH2M HILL originally had the same question regarding OCWD's use of a steady-state flow calibration for its MODFLOW model. CH2M HILL came to the same conclusion as OCWD: that without expanding the model to include the Main Orange County Groundwater Basin, a transient calibration was not possible. Therefore, the team had agreed not to expand the extent of the model and stay with a steady- state calibration. D. Williams stated that they have also reached the conclusion that the two basins are highly interdependent and should be modeled together.

Solute Transport Calibration

D. Williams asked if a solute transport calibration had been completed. H. Nezafati indicated that a solute transport calibration was conducted in the 1994 FS by assuming that TCE was introduced into the aquifer beneath the source area 50 years ago. The added mass was based on an estimate of the dissolved TCE mass in groundwater. He added that the solute transport rationale and simulations are documented in previous drafts of the IAFS.

Sensitivity Analyses for Natural Attenuation Alternatives

D. Williams stated that because the new alternatives presented in the IAFS Addendum partially rely on natural attenuation in the Principal Aquifer, additional sensitivity analyses may be required. H. Nezafati pointed out that previous sensitivity analyses (Draft OU-1 IAFS [15 October 1995]) were completed for the No-Action Alternative (Alternative 1), which will account for a conservative evaluation of migration in the Principal Aquifer. A. Piszkin stated that additional sensitivity analyses were not added to the IAFS Addendum because of the earlier Alternative 1 sensitivity analyses. H.

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Levine stated that he believed it would be better to add additional monitoring wells west of Culver Drive and rely on empirical data rather than reworking the groundwater model.

Culver Drive Containment and Contingencies to Protect Beneficial Uses

A. Piszkin stated that the groundwater OU at Norton Air Force Base (AFB) is similar to MCAS El Toro. The Norton AFB Record of Decision (ROD) includes a soil vapor extraction system, base boundary wells, and attenuation of dissolved compounds. At a downgradient drinking water well, water that is above the Maximum Contaminant Level (MCL) is blended (treated) with other water so that it is below the MCL.

A. Piszkin stated that if the Culver Drive wells were shut off due to decreased demand or unacceptable high total dissolved solids concentrations, migration of TCE may be slowed due to a lower hydraulic gradient. A. Piszkin asked the regulatory agencies what they would require if the Culver Drive wells were eventually shut off. H. Levine stated that if a well is used for drinking water and concentrations are above the MCL, well head treatment would be required. L. Vitale stated that based on Resolution 68-16, the RWQCB's position is that dissolved TCE above the MCL will need to be contained at Culver Drive. A. Piszkin said that if the Culver Drive wells are shut off and it was determined that containment wells are required, wells could be added at Culver Drive. He added that the Navy will provide treatment based on the end use of the water. H. Levine told OCWD that the selected remedy would be presented in the Proposed Plan and that the regulatory agencies will require that the selected alternative include contingencies and contingency levels for action.

Natural Attenuation

D. Williams asked how natural attenuation in the Principal Aquifer would reduce the risk in the aquifer since some of the degradation breakdown products have similar or worse risks than TCE. H. Levine stated that nondestructive processes, including dispersion, dilution, and adsorption, are the main natural attenuation mechanisms, not destructive processes (biodegradation).

J. Lovenburg/CH2M HILL added that the amount of biodegraded TCE mass predicted by the model is not significant compared to the conservative initial mass used in the system. He noted that at locations with multiple screen depths within a groundwater unit (e.g. Principal Aquifer), the highest concentration rather than the average concentration was used as the initial mass in the system. He noted that in some cases this results in some initial (maximum) concentrations are double the average concentrations.

Initial Conditions for TCE

H. Nezafati stated that he would like to respond to a related comment from OCWD. He added that OCWD had questioned why the initial conditions in the solute transport simulations did not include the TCE mass below 5 parts per billion (ppb). H.Nezafati clarified that upon checking the model input files, he confirmed that the TCE mass from 0.5 to 5 ppb had been used in the model as initial conditions in both the Shallow Groundwater Unit and the Principal Aquifer. He added this may have been

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inadvertently implied in the report, because the model simulation result figures show only TCE contours at and above 5 ppb as requested by the agencies.

Retardation Factor

A. Piszkin stated that during a January 1995 groundwater modeling conference call, the Navy agreed to the regulatory agencies request to change the retardation factor (R) from 1 (no retardation) to 2 in order to provide a conservative estimate of aquifer cleanup time. H. Nezafati indicated a sensitivity analysis of the retardation factor (R = 1 to 4) showed that the plume was not significantly affected by the retardation factor. He added that based on the total organic carbon values detected in the Principal Aquifer, a retardation factor of 1.3 (recommended by the Geoscience report) is a reasonable number. H. Nezafati stated that a retardation factor of 2 is conservative for the evaluation of a pump and treat alternative, because the clean up times to TCE MCLs are overestimated.

H. Nezafati indicated that the affect of retardation on the Culver Drive wells was evaluated in the 1994 IAFS (including Appendix A, Groundwater Modeling) and the IAFS Addendum. J. Dolegowski added that this topic was also discussed in the MODFLOW Groundwater Model Report (27 September 1994). J. Dolegowski stated that the MODFLOW Groundwater Model Report may not have been distributed to the agencies because at the time it was completed, the decision had already been made to convert the MODFLOW model to the CFEST code for comparison of alternatives in the 1995 IAFS. CH2M HILL agreed to send a copy of the MODFLOW report to OCWD.

Prediction of TCE Concentrations at North Lake Well

H. Levine stated that the TCE concentrations projected by the graph prepared by Geoscience in their review comments looked only at maximum concentrations, not average concentration and, therefore, was biased. H. Nezafati showed a graph of TCE versus time (attached) for the North Lake Well (N_LAKE) that was generated by the IAFS groundwater modeling simulations. The graph demonstrates that the TCE concentration projected by the groundwater model are similar to the observed concentrations.

Alternative Implementability

R. Herndon and D. Williams stated that if the regulatory agencies believe the groundwater model is not really an issue, then the collection of additional empirical data would be a priority. The regulators asked R. Herndon what OCWD would like them to do with their comments. R. Herndon stated there are three possible options the regulators could consider: (1) Reject the natural attenuation alternatives (7A and 8) based on OCWD's concerns regarding the model, (2) Recalibrate the model per OCWD's suggestions to re-evaluate the natural attenuation alternatives, or (3) Accept the FS with the model as is and delay decisions on the selected alternative. L. Vitale stated that the RWQCB may include some of OCWD's concerns in their comments on the Draft Final IAFS.

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CONCLUDING STATEMENTS

L. Vitale indicated that the next step will be the selection of the preferred alternative in the Proposed Plan and ROD. He emphasized that the agency comments on the Draft Final IAFS will not include selection of the preferred alternative. A. Piszkin stated that implementability may be the deciding factor in the selected alternative; the Navy has presented a revised offer to OCWD and OCWD is currently preparing a counter-offer (due 7 October 1996). A. Piszkin added that the comments from the agencies on the IAFS Addendum are due 11 October 1996.

Attachments

EL TORO GROUNDWATER MODELING

9-26-96

NAME	COMPANY/AGENCY	PHONE /FA
ANDY PISZKIN	NAVY	619-532-2635 / 2469
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Zug Yeaman	DTSC	310 590-5723
BERNIE LINDSEY	SWDIV	619-532-1164 / 2469
JOHN LOVENBURG	CH2M HILL	714-429-2000 / X2371
Boumediene Hadj-Kaddour	CH2M Hill	714-429-2000 / x251
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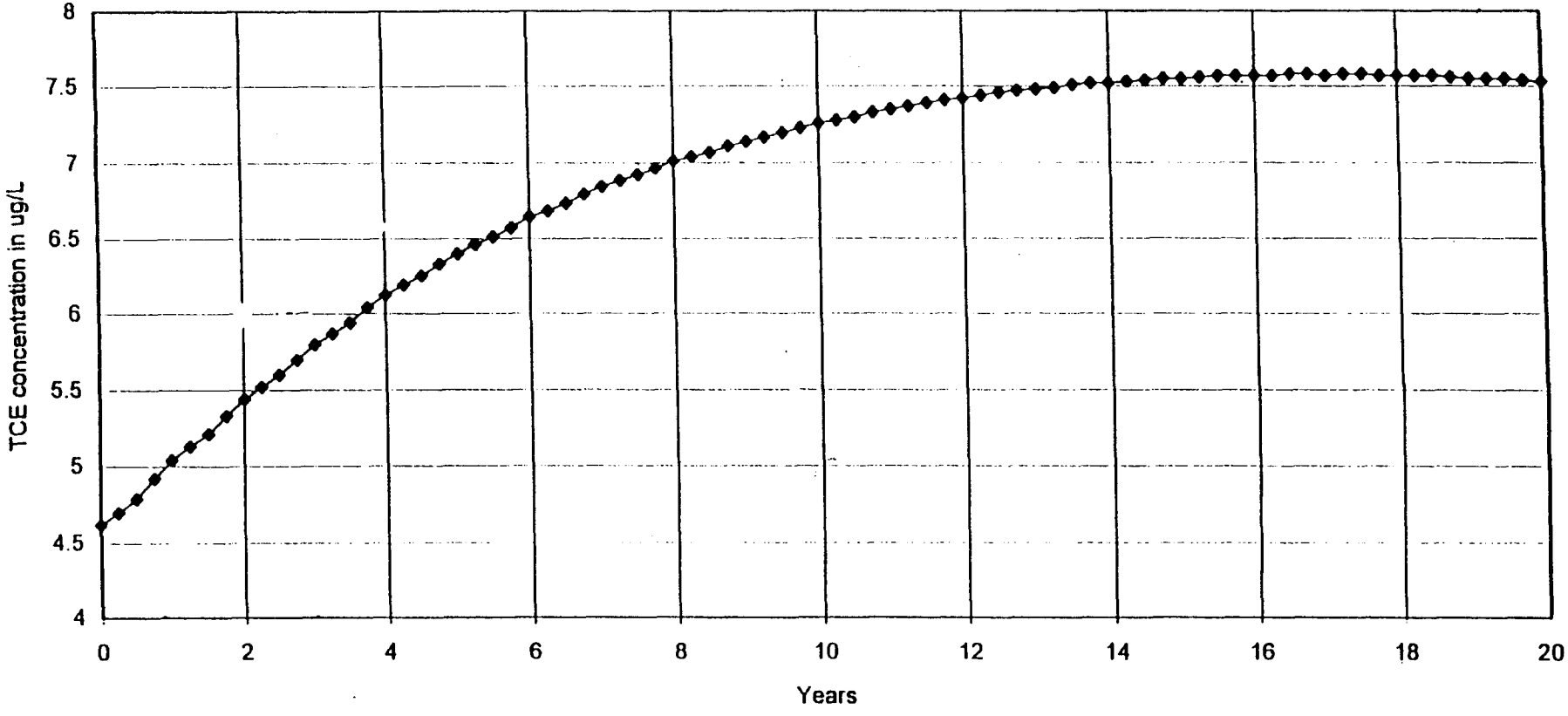
Dave Hodges	USEPA	415-744-2391 / 1916
Herb Levine	USEPA	415.744-2312 / L
Roy Herndon	OCWD	714-378-3260
DENNIS WILLIAMS	GEOSCIENCE	(909) 920-0707
Jun Lu	GEOSCIENCE	(909) 920-07 07

Simulated TCE concentrations at North Lake well after 20 Years Alternative 7a



PROJECT NOTE NO.	PROJECT NO.
PN-0145-213 CLE-C01-01F145-I2-0121	01-F145-H6

CONFIRMATION OF:	CONFERENCE	DATE HELD	07 May 1996
	TELECOM	DATE ISSUED	13 August 1996
	OTHER	RECORDED BY	John Dolegowski/CH2M HILL
		PLACE	SWDIV, San Diego, CA

SUBJECT: Contract Task Order (CTO) 0145
Remedial Investigation/Feasibility Study
OU-1 IAFS Progress Update Meeting
Marine Corps Air Station (MCAS) El Toro

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See attached list of attendees

ACTION REQ'D. BY	ITEM

A progress update meeting to present groundwater modeling simulation results of the new Operable Unit (OU)-1 Interim-Action Feasibility Study (IAFS) alternatives was held in the afternoon of 07 May 1996. Participants represented the following organizations: Southwest Division, Naval Facilities Engineering Command (SWDIV); Orange County Water District (OCWD); U.S. Environmental Protection Agency (EPA); California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC); California Regional Water Quality Control Board, Santa Ana Region (RWQCB); Bechtel National, Inc. (Bechtel); OHM Remediation Services, Inc., and CH2M HILL.

LIST OF ACTION ITEMS

- o CH2M HILL will determine when, if at all, trichloroethylene (TCE) maximum contaminant level (MCL) concentrations (i.e., 5 parts-per-billion [ppb]) will reach Wells IRWD-78 and TIC-113 at the toe of the plume. The determinations will be made based on "Cleanup to MCL" model simulation runs.

- o CH2M HILL will get the George Air Force Base (AFB) Record of Decision (ROD) and review it against the "*trigger levels*" contained in the ROD for possible inclusion in the Marine Corps Air Station (MCAS) El Toro IAFS and ROD.

MEETING SCHEDULE

- o The next OU-1 IAFS progress update meeting is scheduled for 05 June 1996 as part of the weekly Base Realignment and Closure (BRAC) Cleanup Team (BCT) meeting. The location of the meeting is to be determined.

CONSENSUS REACHED

- o The TCE biodegradation term will be included in the model simulation runs.

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- The Risk Assessment will not be reissued to incorporate the potential added risks associated with all the degradation products of TCE. The potential risks posed by the TCE degradation products will be addressed in the IAFS Addendum in a qualitative manner.

- The on-Station shallow extraction wells for modeling will not be relocated to optimize removal of contaminants in the Shallow Groundwater Unit (SGU) due to the latest volatile organic compound (VOC) source term. The exact location of the extraction wells will be determined during the remedial design/remedial action (RD/RA) phases of the program.

IAFS ADDENDUM GROUNDWATER MODELING

CH2M HILL gave a presentation on adjustments to the Coupled Flow and Energy Solute Transport (CFEST) model in support of agency comments and preliminary simulation results for Alternatives 1, 2A, 6A, 7A, 7B, and 8 (see attached meeting agenda and presentation overheads). Note that a discussion of details of the new source term used in the modeling (Item V of agenda) was deferred. The discussions are presented below under each of the presentation topics.

Model Changes

New Source Term and Initial Conditions. Boumediene Hadj-kaddour/CH2M HILL presented the new source term and the initial conditions used in the CFEST model. The new source term was provided by Bechtel to CH2M HILL. The initial conditions were modified based on new shallow groundwater data from the Phase II Remedial Investigation and recontouring of existing data in the Principal Aquifer.

Tayseer Mahmoud/DTSC asked how it is possible that the cumulative mass for the source terms estimated by the CLEAN I and CLEAN II Teams are approximately the same. Angelos Findikakis/Bechtel answered that it was a coincidence and was not planned.

TCE Biodegradation. Yueh Chuang/CH2M HILL presented the TCE biodegradation term (first-order decay constant often expressed as 'half-life') used in the modeling. Based on an evaluation of literature values and site-specific indicators of biodegradation, the occurrence of TCE degradation at MCAS El Toro is believed to be limited. Note that degradation of other VOCs was not considered in the model.

Roy Herndon/OCWD asked whether 1,2-dichloroethylene (1,2-DCE), a degradation product of TCE, will pose additional risks to human health. He asked whether a decrease in TCE concentrations in the Principal Aquifer would necessarily result in a decrease in risk. R. Herndon questioned the validity of only considering degradation of TCE to 1,2-DCE but not the continued degradation of 1,2-DCE. Herb Levine/EPA answered that his agency would want to review the new results first but that the risk to human health is unlikely to change as a result of the formation of 1,2-DCE. He felt that any changes in risk would be negligible. B. Hadj-kaddour attempted to put things in perspective when he indicated that the TCE mass removed by biodegradation is on the order of 2,000 pounds (lbs), as compared to the total mass of 20,000 lbs removed by extraction wells.

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R. Herndon questioned whether the TCE biodegradation term should be included in the "Cleanup to MCL" simulation runs. He said that given a half-life of 100 years, the simulation results will be greatly affected after 100 years. Andy Piszkin/Code 1831.AP answered that TCE biodegradation should be included in the modeling. Bonnie Arthur/EPA said that since the results are ultimately hypothetical, the focus should be on long-term groundwater monitoring. However, she said that TCE biodegradation is likely a minor factor and openly asked whether inclusion of the term is not making the matter more complicated, and therefore, confusing. R. Herndon advocated the elimination of the TCE biodegradation term from the modeling. John Dolegowski/ CH2M HILL said that additional simulation runs that do not include the biodegradation term would be new scope of work that has not been planned in addressing agency comments on the Draft IAFS. B. Arthur recommended that the IAFS Addendum explain the role of TCE biodegradation and any added risks to human health. A. Piszkin agreed to EPA's request.

R. Herndon persisted and further suggested that inclusion of the biodegradation term added uncertainty to the Risk Assessment. Y. Chuang said that vinyl chloride has not been detected in groundwater at MCAS El Toro. Vinyl chloride is the major degradation product of 1,2-DCE which, if present, may likely pose additional risks to human health. B. Hadj-kaddour again attempted to put things in perspective by adding that the initial plume concentrations were assigned conservatively; for example, although 30 parts per billion (ppb) TCE was detected only in a discrete depth interval (usually 20 to 40 feet) for a given well location, the model assumed the entire thickness of the Principal Aquifer at that location is represented by that concentration. R. Herndon offered that if a passive remediation approach is selected, the Navy is likely to receive rigorous questioning on the effects of all the degradation products of TCE.

Model Simulation Results

John Lovenburg/CH2M HILL presented the preliminary modeling results for Alternatives 1, 2A, 6A, 7A, 7B, and 8. He used graphics generated to compare the alternatives that were modeled for 20 years.

20-Year Simulation Runs and MCL Concentration Reaching Toe of the Plume Wells. R. Herndon commented that a plume with concentrations greater than the MCL will continue to migrate beyond 20 years. Sherrill Beard/DTSC asked why the modeling was performed for 20 years only. J. Lovenburg answered that the period selected is best for comparison among the alternatives; for longer time periods, the uncertainties of conditions in the Irvine Subbasin would be much greater. R. Herndon stated that the 20-year period was appropriate when containment was part of the remedial action objectives (RAOs); he felt that with alternatives emphasizing natural attenuation and not active pumping, the plume may extend beyond the Culver Drive wells and, therefore, a 20-year period may not be adequate. T. Mahmoud asked that the simulation runs be extended to periods of 30 and 40 years so that DTSC can assess when MCL concentrations reach the Culver Drive wells. R. Herndon indicated that the Irvine Ranch Water District (IRWD) would be interested in knowing when TCE concentrations greater than MCL will reach their wells. Larry Vitale/RWQCB said he does not need to know exactly when that happens; however, he stated the RWQCB's position with regard to the comparison of alternatives as follows:

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- o Remedial action will be necessary if any of the wells along the current toe of the plume (e.g., IRWD-78, TIC-113) exceeds the MCL.
- o Continued monitoring is needed at the toe of the plume.
- o More guard wells are needed at the toe of the plume.
- o Future water demand and other likely projected scenarios in the Irvine Subbasin need to be considered as part of a contingency plan.

J. Lovenburg stated that CH2M HILL will be evaluating the reduction of risk versus costs for each of the alternatives. R. Herndon reiterated the need to incorporate contingencies into the MCAS El Toro IAFS to deal with potential future conditions.

Water Levels and Cones of Depression of Extraction Wells. H. Levine requested that the modeling results be compared against actual pumping test data. It was asked whether the rise in water levels (as much as 30 to 40 feet) over 20 years as observed for Alternatives 2A, 7A, and 7B is correct. A. Findikakis asked whether we are experiencing a period of rising water levels. R. Herndon answered "yes." J. Lovenburg said that the "No Action" alternative does not include pumping at Well TIC-108.

Containment of Shallow Contamination. J. Lovenburg indicated that the migration of TCE into the Principal Aquifer shown by the groundwater modeling results is probably due to the larger area of the new source term. R. Herndon expressed concerns about the incomplete containment of the contamination in the SGU; he asked whether this is a reflection of the less-than-optimal design of the shallow containment system. A. Piszkin said the shallow containment system can be optimized during the RD/RA phases.

Source Term. A. Piszkin indicated that the public may have comments on the extent of the shallow groundwater contamination. J. Dolegowski indicated that agency concurrence on the modeling approach and preliminary modeling results is needed now since any change in model inputs requires a schedule extension. B. Arthur and H. Levine said that EPA does not have any problems with the source term. However, they want to see the specifics of the long-term groundwater monitoring program spelled out. Discussions on the details of the new source term was deferred.

Well-Head Treatment. J. Dolegowski said that well-head treatment does not appear to be necessary for the IAFS Addendum alternatives; however, the cost of well-head treatment for hypothetical pumping rates and concentrations will be estimated. B. Arthur asked that the hypothetical costs of such treatment for impacted wells be addressed in the IAFS. T. Mahmoud recommended that the "trigger levels" presented in the George AFB ROD be reviewed.

Attachments

MCAS El Toro OU-1 IAFS

2/8

Regulatory Agency Meeting Agenda

07 May 1996

1:00- 4:00 P.M.

Location: SWDIV
1220 Pacific Highway
San Diego, CA

Purpose : To present groundwater modeling simulation results of the new OU-1 IAFS alternatives

I. Introduction, review of agenda (Andy Piszkin)

II. Model Changes

- A. New source term (Boumediene Hadj-Kaddour)
- B. Initial conditions (Boumediene)
- C. Biodegradation half-life for TCE (Yueh Chuang)

III. Model Simulation Results (John Lovenburg)

- A. Comparison with the old simulations: Alternative 2A
- B. Biodegradation effect: Alternative 1
- C. New Simulations: Alternatives 6A , 7A, 7B, and 8

IV. Modeling Discussion (Boumediene)

- A. Shallow Groundwater Containment
- B. Principal Aquifer Containment

V. Source Term Discussion (Yueh)

- A. Underlying assumptions
- B. Potential Modification of Source Term

VI. Open Discussion (all)

VII. Action Items (Andy)

VIII. Plans for Future OU-1 Meetings

Model Changes

Initial Conditions

- TCE Plume in the Shallow Groundwater Unit (CLEAN I Round two & CLEAN II)
- TCE Plume in the Principal Aquifer (CLEAN I Round two. Additional Contour intervals)

Source Term

- Location
- Area
  - →CLEAN I
    - Source area = 38,360 sq.ft
  - →CLEAN II
    - Source area = 3,632,940 sq.ft (95 times CLEAN I source area)
- Strength

Technical Issues/Discussion

- Shallow Groundwater Containment
- Principal Aquifer Containment

Model Simulation Results

- Comparison of old and new model simulations
- Effects of biodegradation term
- Comparison of Alternatives with new simulation results

Comparison of Old and New Model Simulations

- Model Changes
- Comparison of Alternative 2A with old and new model inputs

Model Changes

- CLEAN II results used to revise Shallow Groundwater Unit plume
- Additional contour intervals added to initial Principal Aquifer plume
- Larger source area added
- Biodegradation rate of 100 years added

Comparison of Alternative 2A with Old and New Model Inputs

- Off Station
- On Station

Alternative 2A Offstation: Old and New Simulations

- Lower concentrations offstation in Principal Aquifer with new simulation
- Smaller plume offstation in Principal Aquifer with new simulation
- Above MCL contamination does not reach Culver Drive for either simulation

Alternative 2A Onstation: Old and New Simulations

- Shallow Groundwater Unit:
  - -Plume further upgradient for new simulation due to larger source area
  - -Plume contained onstation for both simulations
- Principal Aquifer:
  - -Some migration to Principal Aquifer due to larger source area; contained onstation

Comparison of Alternative 1 with and without Biodegradation

- Area of plumes reduced with biodegradation
- Additional mass removed with biodegradation

Navy Alternatives With and Without Principal Aquifer Passive Remediation

- Shallow Groundwater Unit: As expected, very little difference between Alternatives 2A, 7A, and 7B
- Principal Aquifer
  - -Plume sizes similar
  - -No above MCL plumes reach Culver Dr.
  - -Site of above 15 ug/L plume after 20 years (Alt. 7A largest, Alt. 2A smallest)

Navy/OCWD Alternatives With and Without Principal Aquifer Passive Remediation

- Shallow Groundwater Unit
  - -Alternatives 6A and 8 similar
  - -Above MCL plume past first line of extraction wells but not second
  - -Upgradient extent similar to Navy Alternatives
- Principal Aquifer
  - -Some migration from SGU to Principal Aquifer onstation but contained prior to migrating offstation
  - -Above MCL plume does not reach Culver Dr. for either Alt. 6A or 8

TCE Biodegradation:
First-Order Decay Rate

Site *[Reference]*	First-Order Decay Rate (day^{-1})	Half-Life Estimates (year)	Subsurface Environment /Comments
Picatinny Arsenal, NJ *[Martin and Imbriogiotta 1994]*	0.0001 to 0.003	0.6 to 19	Laboratory microcosms. Spatial distribution of TCE, DCE and VC indicate reductive dechlorination is occurring.
St. Joseph, MI *[Wilson et al., 1994]*	0.0011 (low K) to 0.0036 (high K)	0.5 to 1.8	Shallow groundwater, sandy aquifer, glacial sediments. High COD uptake measured. Rates from mass flux measurements.
Plattsburgh Air Force Base, NY *[Wilson et al., abstract enclosed]*	0.0015 0	1.3 ∞	Class 3 plume - high organic content, including anthropogenic carbon such as BTEX; anaerobic environment. Class 1 plume - low natural organic content; aerobic environment.
Manufacturing Plant, San Francisco Bay Area *[Buscheck and O'Reilly, abstract enclosed]*	0.00014	13.6	Shallow groundwater, upper zone - water table conditions; lower zone - confined conditions. Low DO. Lacustrine and alluvial bay deposits - expected to have relatively high naturally occurring COD.

TCE Biodegradation:
First-Order Decay Rate

Indicator of Degradation	Favorable Indication?	Field Evidence/Comment
Compound Disappearance	(?)	Low starting TCE (34 ppb in PA). Variations in TCE concentration observed but do not translate easily into definitive trends. Changes in TCE concentrations are combined results of advection, dispersion, sorption and degradation. ***Limited biodegradation.***
Presence and Uptake of Organic Substrate	(-)	Low naturally-occurring organic substrates: TOC measured (maximum of 420 mg/Kg [0.00042] in PA). No anthropogenic sources. ***Limited biodegradation.***
Production of Daughter Products	(+)	1,2-DCE detected at near detection limit (DL = 1 ppb) to low ppb levels in PA. Ratio of 1,2-DCE:TCE ranges from 0.02 to 0.22. However, no VC; ethene not analyzed. ***Reductive dechlorination of TCE appears to be occurring, possibly at low rates.***
Redox Conditions and Presence of Electron Acceptors	(-)	Eh = -35mV to 315mV (150mV to 250mV) DO = ~ 6 mg/L to >10 mg/L Presence of other electron acceptors: Sulfate = ~100 mg/L to >800 mg/L Nitrate = up to 40 mg/L (location-specific) Iron (III) = available ***Redox conditions and presence of alternative electron acceptors not favorable to reductive dechlorination of TCE.***

TCE Biodegradation: First-Order Decay Rate

- Reductive Dechlorination
  - » Anaerobic Conditions; Microbially-Mediated
  - » Only Significant Pathway

    TCE --> *c*-1,2-DCE --> VC --> Ethene
- Literature Half-Life Values

  0.5 to 19 years (vary by ~1 order)
- Half-Life Estimate in Principal Aquifer
  - » Approximate Mid-Range = 10 Years
  - » Increase by 10 Times

    Recommended Half-Life: 100 years

Sign-in Sheet OU-1 Groundwater Modeling

Name	Organization	Ph. No.
Patricia Brooks	CLEAN II	619 687-8851
Angelos Findikakis	"	415.768.8550
David Cowser	Clean II	6878802
G... ... -	D... ...	(... ...
Bill Sedlak	OHM	714-263-1146 x40
Lynn Hornecker	Navy	(619)532 3737
Roy Herndon	OCWD	(714)378-3260
Yueh Chuang	CH2M HILL	(619) 687-0110
John Turbeville	Clean 2	619-687-880
DANTE TEDALDI	CLEAN II	619. 687. 8780
Sherrill Beard	DTSC	310-590-5528
Tayseer Mahmoud	DTSC	(310) 590-489
LARRY VITALE	RWQCB	909-782-4998
ANDY PISZKIN	NAVY	619-532-2635
JOHN LOVENBURG	CH2M HILL	714 250-1900
Bonnevieve Hadj Kaddour	CH2M Hill	714-250-1900
Bonnie Arthur	EPA	415-744-2368
Herb Levine	EPA	415 744 2312
Roy Yeaman	DTSC	310-590-5523
John Dalgowski	CH2M Hill	714/250-0505

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CONFIRMATION OF:	CONFERENCE	X	DATE HELD	06 February 1996
	TELECOM		DATE ISSUED	06 March 1996
	OTHER		RECORDED BY	Hooshang Nezafati/CH2M HILL
			PLACE	San Francisco, California

SUBJECT Contract Task Order (CTO) 0145
Marine Corps Air Station (MCAS) El Toro Operable Unit (OU)-1
Interim Action Feasibility Study (IAFS)
Meeting with the Regulatory Agencies to Discuss Groundwater Modeling Comments for the OU-1 IAFS Report

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

John Dolegowski/CH2M HILL
Andy Piszkin/Navy
Natasha Raykhman/CH2M HILL
Juan M. Jimenz/DTSC
Sherrill Beard/DTSC
Tayseer Mahmood/DTSC
Bonnie Arthur/EPA
Herb Levine/EPA
John Broderick/RWQCB
Larry Vitale/RWQCB
Dante Tedali/Bechtel
Angelos Findikakis/Bechtel
Hooshang Nezafati/CH2M HILL
Roy Herndon/OCWD

ACTION REQ'D. BY	ITEM

A meeting was held on Tuesday, 06 February 1996 at the U.S. Environmental Protection Agency's (EPA's) Region IX Headquarters in San Francisco to discuss regulatory agency comments on groundwater modeling completed for the OU-1 Interim-Action Feasibility Study (IAFS) Report, submitted by the Department of Navy (DON) for agency review on 15 October 1995. The following agencies were represented: EPA Region IX, California EPA - Department of Toxic Substances Control (DTSC), Santa Ana Regional Water Quality Control Board (SAWQCB), and the Orange County Water District (OCWD). The primary objective of the meeting was to discuss and seek clarification of the major comments received from EPA on the groundwater modeling completed to support the OU-1 IAFS. Andy Piszkin/Code 1831.AP started the meeting by asking the participants to introduce themselves and by reviewing the meeting agenda (Attachment A). A. Piszkin introduced Roy Herndon/OCWD, who asked to make a statement to the group before discussion of the review comments.

STATEMENT BY OCWD

R. Herndon stated that OCWD is concerned that DON is getting "off track" on the OU-1 IAFS. He said that based on last week's meeting with EPA, DTSC, and RWQCB, there may be a misunderstanding that the OCWD/DON negotiations are stalled. OCWD reviewed the OU-1 IAFS documents and submitted detailed comments to DON on 15 December 1995. He added that OCWD views Alternative 2A as a hypothetical alternative which was mainly developed to help DON with the negotiations with OCWD. OCWD feels that there are enough data to proceed with the negotiations and does not want to delay the OU-1 IAFS for additional rounds of water quality data. If an agreement between DON and OCWD are reached this Spring, the Irvine Desalter Project (IDP) would not be operational until late 1999. Additional delays will move the start-up date even later. He added that the revised Alternative 2A (No Action in the Principal Aquifer) may be unacceptable to the community.

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R. Herndon proposed that the agencies and DON give Alternative 6A a chance and requested a 45 to 60 day deadline for DON and OCWD to earnestly begin and substantially complete negotiations. OCWD believes that DON has everything it needs to proceed with the negotiations. He concluded that a fallback IAFS alternative is not needed.

A. Piszkin agreed that the negotiations are not stalled and added that DON is waiting on the following OCWD action items:

- o Cost information on Well ET-1
- o OCWD counter offer (proposal) based on information contained in the OU-1 IAFS

R. Herndon asked whether a new OCWD proposal would sit while DON evaluated the new alternatives. A. Piszkin replied he has asked Commander Dos Santos/Code 09E to call Bill Mills (OCWD's General Manager) to discuss that issue.

AGENCY COMMENTS

Sherril Beard/DTSC stated that John Woodling had reviewed her comments on the OU-1 IAFS. Juan Jimenez/DTSC asked when the Navy would respond to th regulatory agencies' comments on the OU-1 IAFS. A. Piszkin replied that the Navy w prepare a letter this week stating that the Navy will proceed with the OU-1 IAFS and preparation of responses to the agency comments. The letter will not provide an updated Federal Facilities Agreement (FFA) schedule.

John Dolegowski/CH2M HILL stated that the EPA comments centered on three main topics:

1. Changes to the groundwater model
2. Presentation of data (graphics)
3. Whether remediation of the contaminant source should be included in the OU-1 IAFS.

Comments on Calibration of the Groundwater Flow

Hooshang Nezafati/CH2M HILL stated that there are a few review comments in EPA's Enclosure C that relate to groundwater flow calibration and validation of the CFEST groundwater model using the available pumping test data. These are General Comments 4 and 6, and Specific Comments 11, 12, and 13. H. Nezafati said that before going over these comments he would like to state the objectives of the groundwater modeling for the OU-1 IAFS and to review the intended use, and the expected predictive capability of the CFEST model.

- o The CFEST Model is a regional model which is based on a conceptual understanding of the regional groundwater flow in the Irvine Subbasin, encompassing an area of approximately 4 by 8 miles. Due to scale difference between a local and a regional model, regional models are not necessarily expected to reproduce detailed local information on a point by point basis but rather on an average basis. The model is intended to be used as a tool to

ACTION REQ'D. BY	ITEM

evaluate the conceptual design of the OU-1 IAFS alternatives and qualitatively compare the effectiveness of these alternatives.

- The understanding is that the selected remedy will be further refined at the Remedial Design phase, if necessary, based on Phase II RI data. The model is not intended to be used as a strict predictive tool due to uncertainties in the future hydrological conditions (land development, pumpings, recharge, and basin replenishment or dewatering). However, the model has been used for a 20-year simulation period, for the sole purpose of relative (qualitative) comparison of the alternatives, with the understanding that the predicted numbers (e.g., mass removals, drawdowns, and cleanup time to MCL) should not be used as absolute numbers.

H. Nezafati presented a chronology of the groundwater modeling work performed for the MCAS El Toro OU-1 IAFS over the past five years (see Attachment B) and stated that all the assumptions and the technical decisions for the model have been made in close consultation and consensus with OCWD and the regulatory agencies in meetings, presentations, and conference calls, as documented in the meeting minutes. H. Nezafati specifically referred to the 31 January 1995 modeling conference call where the model assumptions and groundwater flow calibration was discussed in great detail. In this conference call, some concerns were expressed about the representativeness of the pumping tests that were performed in the Shallow Groundwater Unit (SGU).

The pumping tests were performed in monitoring wells that are screened 20 to 40 feet into the SGU as compared to the assumed saturated thickness of 100 to 150 feet in the model. The pumping tests were mostly short-term and low flowrate tests that exhibited a wide range of transmissivity (0.42 to 3,480 feet^2 per day) and a large spatial variability due to the highly heterogeneous nature of the SGU, particularly in the Site 24 area. A consensus was reached to perform a steady state calibration by using the pumping tests data (i.e., hydraulic conductivities) as initial input parameters. The hydraulic conductivity (K) values were to be adjusted during the calibration process to arrive at a closer match between the observed and simulated heads. It was agreed to check the validity of the calibrated K values and flow rates used in the model by performing long-term pumping tests in the SGU (to be conducted by a CLEAN II contractor at a later time).

It was further agreed in the 31 January 95 conference call that a calibration target of 15 feet for Root Mean Squares (RMS) of the differences between the observed and the simulated heads was considered adequate for an acceptable calibration. H. Nezafati also stated that there was no discussion or recommendation by the agencies to use the available pumping test data to validate the CFEST model in the 31 January 1995 conference call, due to the understanding that the pumping tests performed in the SGU may not be representative.

Herb Levine/EPA asked what value the model has for prediction. Natasha Raykhman/CH2M HILL replied that the model was calibrated to existing drawdowns in the Basin and the model predicted the drawdowns of the Principal Aquifer pumping tests reasonably well. N. Raykhman further stated that reproducing pumping test results by using a model can be best accomplished with a transient calibration which takes into account the storage coefficient of the aquifer where the pumping test has

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been performed. She added, transient calibration for the Irvine Subbasin was not possible due to lack of data, thus, the storage coefficients were not calibrated. However, a sensitivity analysis on the storage coefficients was performed that showed the capture zone of the alternatives are not sensitive to the value of the storage coefficients used in the model. She added that given the heterogeneous nature of the SGU, the K values used in the model represent the average K values for sands and silts. She said that as far as how realistic the flow rates for the alternatives are, the spinner logging performed by OCWD showed that up to 10% of the total flow rates (up to 100 gpm) were from the SGU which is more than what CH2M HILL used in the model (40 to 50 gpm).

H. Levine stated that he has recently reviewed groundwater modeling work performed for a base of 24 square miles and the consultants used the model to reproduce pumping test data to further validate its calibration. H. Nezafati replied that it could be done with representative pumping tests when one has transient calibration. A. Piszkin stated that the Navy is not proposing to make changes to the model.

H. Levine stated that his primary concerns about the groundwater model are: 1) how the model was validated, and 2) and that he can not establish how hydrogeologic properties used in the model were developed from available data. N. Raykhman offered to review the available data and past work that was completed to build the model with H. Levine. A. Piszkin stated that he was hearing that the OU-1 IAFS Report needs to be more of stand-alone document for the administrative record.

H. Levine stated that he does not see well log information on the fence diagram (Figure 4-2) and does not understand how it applies to the model. J. Dolegowski replied that Figure 4-2 is not a fence diagram and it merely depicts the groundwater model nodes and layers (thicknesses) in a 3-D graphic.

H. Levine feels that the model is qualitative and not a predictive tool. N. Raykhman replied that the model was not designed to be a predictive tool, but rather the best tool for the relative comparison of alternatives. N. Raykhman stated that a more detailed model would not change the selection of the preferred alternatives. Dante Tedaldi/Bechtel asked if the modeling has to be redone for the Site 24 source area remediation. J. Dolegowski replied that many of the OU-1 IAFS alternatives included containment of the source area. The hydraulic containment would be needed regardless of the source remediation recommended by the CLEAN II Project Team. Additional modeling would be required by the CLEAN II Team to evaluate the specific source area remediation. A. Piszkin stated that the current CFEST model is good enough for the OU-1 IAFS. A. Piszkin agreed that the IAFS would include clarification on how the model was developed.

H. Levine asked R. Herndon what pumping tests were performed by OCWD. R. Herndon responded that all the Irvine Desalter Project (IDP) wells were tested. He said they did not see a response in the SGU from pumping in the Principal Aquifer during the pumping tests. R. Herndon added that it does not mean they would not have seen it if the pumping tests were to be continued beyond the testing duration. He said pumping tests were performed on IDP wells up to a maximum duration of 48 hours. R. Herndon stated that future hydrologic conditions are unknown, in particular the boundary conditions between the Main Basin and the Irvine Subbasin. R. Herndon

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believes that CH2M HILL has made conservative assumptions and that transient calibration may not be possible.

H. Levine stated that he feels the Navy is on a course that does not need the model. He does not think the Navy has enough data to proceed to remedial action. A. Piszkin asked if EPA accepts the model results on final VOC action for OU-1. H. Levine stated that the model supports that containment of the TCE plume within the SGU is needed. EPA accepts the model results for comparative evaluation of the OU-1 Alternatives. H. Levine added that EPA wants the Navy to evaluate natural attenuation and feels that additional groundwater quality data is needed.

D. Tedaldi asked if there is a need to agree on the model to proceed with the OU-1 IAFS. N. Raykhman replied that the selection of the preferred alternatives would not be sensitive to the groundwater model used. A. Piszkin stated the model played a significant role in evaluation of migration of the SGU contamination to the Principal Aquifer and evaluation of the IDP design.

Bonnie Arthur/EPA stated that EPA would like some caveats to be included in the draft Final OU-1 IAFS that would discuss the intended use and limitations of the model.

A. Piszkin offered for the Navy to submit full sized plots of selected groundwater quality graphics to the agencies and into the administration records.

BECHTEL'S COMMENTS

D. Tedaldi stated that Angelos Findikakis/Bechtel had reviewed the groundwater modeling in the OU-1 IAFS and had identified a few issues that were summarized in review comments. The review comments had not been previously distributed, because D. Tedaldi was sick prior to Christmas. A. Piszkin stated that the comments would be accepted as "To Be Considered" and would not be formally responded to.

Angelos Findikakis/Bechtel stated that looking at the grid refinement at Site 24 area gives the impression of greater accuracy than is actually present. N. Raykhman replied that the grid had been refined in that area in response to agency comments to provide flexibility in locating extraction and injection wells, and for better resolution for the graphical depiction of the capture zones. She added that the model could be better built upon in the future with the finer grid already in place. H. Nezafati commented that the finer grid in that area was also adopted to reduce computational errors in the solute transport runs and minimize numerical dispersion in response to A. Findikakis' comments in the 31 January 1995 groundwater modeling conference call.

A. Findikakis feels that it is important we have a better match of the simulated and the observed heads in the SGU at Site 24 area. He added that we may need to qualify the use of a model and improve local calibration in the future. D. Tedaldi stated that mass conservation should be checked; the report should provide the total mass and the mass balance for each alternative (i.e, dissolved, sorbed, and total).

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Model Changes

A. Piszkin asked what Phase II data should be incorporated into the groundwater model, for example more accurate source loading. A. Findikakis stated that he thinks the source is upgradient of the 500 parts per billion (ppb) contour line. A. Findikakis asked if the Navy could compare the new source location with the capture. A. Piszkin felt that would not affect capture and added that the Navy would not want to relocate shallow groundwater extraction wells. Exact well locations would be decided in remedial design.

H. Levine felt that Navy needs to state caveats on the use of the groundwater modeling in the introduction of the IAFS. He also said that Navy should evaluate what happens to the Principal Aquifer if complete containment of the trichloroethylene (TCE) contamination in the SGU is achieved and no action is taken in the Principal Aquifer (rely upon natural attenuation).

A. Piszkin agreed to this approach. He asked for EPA input on what figures should be enlarged in the IAFS Report. H. Levine stated the figures are identified in his comments (Enclosure C). H. Nezafati proposed to get together with H. Levine after the meeting and identify the figures that need to be enlarged.

TCE Plume Contouring

D. Tedaldi inquired about the data that was used to prepare the TCE plume maps for the Shallow Groundwater and the Principal Aquifer (Figures 1-10a and 1-10b in Volume IV). D. Tedaldi did not understand how the current plume extent was estimated based on only the Phase I RI wells. J. Dolegowski stated that water quality data from the offsite OCWD multiport (MCAS) wells during the period listed on the titles of the figures (June 1993 to December 1993) were also used. D. Tedaldi asked that the title or legend of the graphic be modified to include this information. He also pointed out that the concentrations are not posted on the plume maps so one has a difficult time to verify contouring of TCE. J. Dolegowski replied that due to the size of the figures and the small scale used to cover the entire basin (4 by 8 miles), it was not possible to post the concentrations next to the well locations on the 11 by 17 inch graphics. J. Dolegowski stated that the volatile organic compound (VOC) plume maps were prepared by plotting large scale maps with all the data. The contours were hand drawn at this scale, digitized, and reproduced at a smaller scale with zoned concentration ranges for the IAFS Report graphics, as was previously agreed upon with the agencies in the 18 January 1995 meeting at EPA.

D. Tedaldi asked why a maximum value of 34 ppb for TCE is used for the Principal Aquifer while the OCWD data show a maximum concentration of 59 ppb. J. Dolegowski replied that CH2M HILL only used OCWD data with the water quality monitoring periods coinciding with the Phase I RI monitoring periods as stated in the figures, and did not use historical maximum observed concentrations.

B. Arthur stated that she would like to see more concentration zones on the TCE maps. H. Levine stated that he wants to see the data posted by the wells and to describe how CH2M HILL included the data.

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H. Levine asked OCWD what protocol they used for their groundwater sampling. R. Herndon replied that they used a protocol comparable to EPA's. John Broderick/RWQCB asked if OCWD would be willing to analyze EPA audit samples. R. Herndon replied they would.

D. Tedaldi inquired as to where in the report it differentiates the Principal Aquifer well from the SGU wells. H. Nezafati replied that this is shown in the OU-1 IAFS, Appendix A (Volume VI), Table 3-1.

After the conclusion of the meeting, H. Levine, H. Nezafati, and N. Raykhman discussed which IAFS Report figures need to be revised. J. Dolegowski met with B. Arthur to discuss changes in the contouring for the TCE maps. J. Dolegowski offered for CH2M HILL staff to meet with agency members to discuss how contouring for the water quality graphics was completed.

CONCLUSIONS

- Agencies agreed to accept the CFEST model for the comparative analysis of IAFS alternatives, but not for strict prediction of actual concentrations and water levels.
- Eliminate Figure 4-2 and increase size of Figures 4-1, 4-4a, 4-4b, and 4-4c.
- Post data points next to well locations.
- Navy will evaluate the two "front runners alternatives" Alternative 2A and 6A with the new model conditions.
- Navy will send out a letter informing the agencies about DON's approach.

Attachments:
Agenda
Chronology of Groundwater Modeling Activities for MCAS El Toro OU-1 IAFS

Attachment A

MCAS EL TORO GROUNDWATER
OU-1 FEASIBILITY STUDY
GROUNDWATER MODELING COMMENTS
06 FEBRUARY 1996
1000 to 1500

Location: EPA Region IX Headquarters
75 Hawthorne Street (Location TBD)
San Francisco,
POC: Bonnie Arthur (415/744-2368)

Meeting Goals:
- Clarify and Resolve Agency Comments
- Establish Principal Aquifer Concentraction Contours
- Identify Direction for draft Final submittal

1000 - 1020: Introduction
- Participants
- Meeting Goals
- Review of Agenda

1020 - 1145: Discussion of Agency Comments
- Intent
- General and Specific Issues
- Comments vs. Past/current Approach

1145 - 1245: Lunch Break

1245 - 1400: Modeling Comment Resolution

1400 - 1430: Re-Contour of Principal Aquifer Concentractions
- data used for Shallow vs. Principal
- data used: Historical Max vs. Trend vs. Average
- Consensus on Approach

1430 - 1500: Action Items, Meeting Review, and Closure

Attachment B

CHRONOLOGY
GROUNDWATER MODELING ACTIVITIES
MCAS EL TORO OU-1 IAFS

- OCWD 2-D MODFLOW Model (1991)

- MODFLOW model refined incorporating Phase I RI data

  - 3-D groundwater flow model developed in close cooperation with OCWD
  - Two presentation made to OCWD and Navy

- CFEST model (3-D) added solute transport using Round 1 groundwater monitoring data

  - refined grid
  - April 7, 1994 modeling presentation to agencies
  - agency comments incorporated into draft OU-1 IAFS

- Draft OU-1 IAFS (01 Sept 1994)

- OU-1 IAFS Addendum (30 Sept 1994)

  - refined model with downgradient irrigation wells

- Decision to proceed with new IAFS incorporating additional alternatives

- Modeling conference call (31 Jan 1995)

  - discussed and agreed upon detailed modeling assumptions for new IAFS
  - incorporated Round 2 monitoring data

- Modeling presentation to agencies (13 April 1995)

  - summary of groundwater modeling results incorporated into IAFS

- Draft OU-1 IAFS (15 Oct 1995)

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PN-0145-183 CLE-C01-01F145-I2-0107	01-F145-H6

CONFIRMATION OF:	CONFERENCE	DATE HELD	13 April 1995
	TELECOM	DATE ISSUED	02 June 1995
	OTHER X	RECORDED BY	John Dolegowski/CH2M HILL
		PLACE	Santa Ana, California

SUBJECT Contract Task Order (CTO) No. 0145
Remedial Project Managers' (RPM) Meeting
Progress Update on the OU-1 Interim-Action Feasibility Study (IAFS)
Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility Study (RI/FS)

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See Page 8

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A Remedial Project Management (RPM) meeting was held in CH2M HILL's Santa Ana office on 13 April 1995 from approximately 10:00 a.m. until 4:00 p.m. to discuss the latest groundwater modeling results for the Operable Unit (OU)-1 Interim Action Feasibility Study (IAFS) for the Marine Corps Air Station (MCAS) El Toro (also referred to as the Station). The following summarizes the salient topics discussed at the meeting. Participants in this meeting are listed on the last page of this project note. A copy of the meeting agenda is included as Attachment 1. Action items are listed below, followed by the minutes of the meeting.

ACTION ITEMS

- CH2M HILL will provide copies of the water-level maps from the OU-1 IAFS alternative groundwater simulations to OCWD and RWQCB.
- The regulatory agencies will notify the Navy if they will accept average concentrations of constituents in groundwater to calculate risk in the OU-1 Human Health Risk Assessment.
- The Navy will draft a formal letter asking for extension of the Federal Facilities Agreement (FFA) due date for the OU-1 Proposed Plan and Record of Decision (ROD).

OU-1 DEFINITION

Andy Piszkin/Code 1832.AP opened the meeting introducing a clarified definition of OU-1: "Groundwater on- and off-Station that is contaminated with constituents that

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have migrated from past operations at MCAS El Toro that is not addressed site-specifically". Juan Jimenez/DTSC asked whether OU-1 is the same as Site 18. A. Piszkin replied that OU-1 is Site 18 and includes all contaminants. The agency representatives did not object to the clarified definition.

INTERIM/FINAL RODs FOR GROUNDWATER OPERABLE UNITS

A. Piszkin presented a chart (Attachment 2) that shows a proposed flow chart to complete Groundwater Record of Decisions (RODs) for individual OUs and for the entire MCAS El Toro Remedial Investigation/Feasibility Study (RI/FS). Bonnie Arthur/EPA asked why can't we proceed directly to producing the final ROD for the non-volatile organic compound (VOC) contamination. Davi Richards/CH2M HILL replied that it has been the agencies' stance that we can't anticipate the problems with non-VOC constituents in groundwater until we get the additional data from Phase II of the RI, and that non-VOCs can go to either an interim *or* a final ROD. A. Piszkin suggested that the final ROD on the bottom of the chart be a base-wide Groundwater ROD. The Navy maintains that VOCs, are the only regional groundwater contamination migrating from El Toro.

OU-1 IAFS STATUS UPDATE

D. Richards stated that the following OU-1 IAFS tasks are currently underway:

- Groundwater modeling
- Assembly of alternatives
- Treatment (influent water quality characteristics)
- Conveyance (options for piping from wells to treatment to discharge options, and site evaluation)
- Coordination between modeling and treatment/conveyance
- ARARs [Applicable or Relevant and Appropriate Requirements] (meeting with the Regional Water Quality Control Board (RWQCB); beginning to incorporate agency directions into the report)
- Response to comments (Agency comments on the 01 September 1995 draft of the OU-1 IAFS and Navy responses will be attached to new IAFS to reduce review comments.)

D. Richards noted that we are now beginning the following tasks:

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- o Costing alternatives
- o Rewriting/editing the report while keeping the same structure

J. Jimenez asked whether costs for old alternatives will be updated. D. Richards responded that they will be updated (to 1995 dollars value).

REVIEW OF OU-1 IAFS REMEDIAL ALTERNATIVES

John Lovenburg/CH2M HILL reviewed the alternatives for the new OU-1 IAFS (Attachment 3); points of discussion follow.

Alternative 4

John Woodling/DTSC-HQ asked whether the objective of Alternative 4 is to achieve containment with the 600 gallons per minute (gpm) limit for the shallow wells; J. Lovenburg answered yes. D. Richards stated that 600 gpm (60 gpm at 10 wells) is the upper limit of flow that Orange County Water District (OCWD) stated could be accepted by the Irvine Desalter Project. Roy Herndon/OCWD agreed and added that OCWD had to discontinue one well from pumping (Well IDP-2) and reduce pumping of another (IDP-3) to accommodate accepting 600 gpm from the Navy shallow extraction wells.

Injection Rate Estimate

J. Lovenburg explained that the injection rates for the Principal Aquifer and the Shallow Groundwater Unit were estimated by multiplying the available head by a conservative estimate of the specific capacity, and using half of that as the injection rate. He added that specific capacity values were taken from the OCWD *Irvine Desalter Project—Production Well Report* (31 March 1994). He noted that OCWD has documented getting 1/3 to 1/2 of an extraction well rate as the injection rate, and estimated 200 to 300 gpm as an injection rate for the Principal Aquifer, so CH2M HILL is using 200 gpm to be conservative. For the Shallow Groundwater Unit, more head is available (70 to 100 feet), thus an injection rate equal to the extraction rate of 40 gpm is being used. Tim Sovich/OCWD questioned whether you can see 70 feet of head in the Shallow Groundwater; he thought an injection rate of 20 gpm was more realistic. Natasha Raykhman/CH2M HILL replied that these are only estimates using the available data, but before implementation of any remedial action we need to perform field testing to verify the extraction and injection rates. J. Woodling asked about the source of data for the shallow wells. J. Lovenburg answered we used pumping test results that we performed during the Phase I RI. He added that, however, the shallow wells are only screened in the upper 40 feet of the Shallow Groundwater Unit and may not represent extraction rates from the entire saturated zone (up to 100 feet thick on the Southwest Quadrant). J. Dolegowski and Hooshang Nezafati/CH2M HILL reiterated that long-term

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pumping tests are still needed to verify the hydrogeological characteristics of the Shallow Groundwater Unit and this has been documented and communicated to the CLEAN II project team who will be performing field work this coming summer (1995).

Alternative 5

J. Lovenburg presented Alternative 5a. He said the proposed Navy pump and treat system can coexist with the Irvine Desalter Project; injection wells may actually prevent IDP wells from dewatering.

A. Piszkin asked why no well is proposed upgradient of Well ET-1. J. Lovenburg answered that we don't want to have deep wells located closer to MCAS El Toro because of possibly pulling the on-Station shallow contamination downward. Injection wells are placed in the upgradient area to prevent that from happening and also to help flush the upgradient end of the trichloroethylene (TCE) plume. He added that two Navy extraction wells are proposed downgradient to contain the 5-parts per billion (ppb) TCE plume. D. Richards added that, in Alternatives 2 and 5, the three Culver agricultural wells are being used as backup. J. Lovenburg noted that the three wells will probably contain the 0.5 parts per billion (ppb) plume by themselves; we are trying to contain the TCE plume upgradient of the agricultural wells by proposing the two new Navy wells. T. Sovich agreed, and added that you can't always depend on all three wells pumping all the time.

Discharge Options for Alternatives 2 and 5

J. Lovenburg stated that shallow groundwater extracted by the Navy will be injected upgradient of the VOC plume source area. He added that the Principal Aquifer groundwater extracted by the Navy will be injected upgradient in both Alternatives 2 and 5 and/or distributed for other uses (Alternative 2 only). He added that the proposed upgradient injection provides a measure of safety for protection against migration of total dissolved solids (TDS).

D. Richards asked whether we still need an agreement with the three agricultural well owners to maintain a minimum yearly pumpage. We are using MCLs as cleanup levels and have the two Navy wells containing the TCE plume above MCLs, so we do not need to rely upon the agricultural wells anymore. A. Piszkin said we need an agreement for Alternative 4, but not for Alternative 2. J. Woodling said it wouldn't hurt to get an agreement; some contaminants might sneak through. A. Piszkin replied that if the two Navy wells don't capture the VOC plume, we may be able to adjust the pumpage at the Navy wells. B. Arthur stated that how this is presented is up to the Navy; the OU-1 ROD will be interim.

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Remediation/Treatment Goals

The group discussed the aquifer cleanup goals that will be used: Maximum Contaminant Levels (MCLs) or background levels. A. Piszkin stated that George and Mather Air Force Bases have set MCLs as final aquifer cleanup goals, and suggested that we use MCLs for El Toro as well. G. Garelick said that Canada may use an MCL of 50 ppb. She asked what happens if the MCL changes and how this would affect OCWD negotiations. A. Piszkin replied that the Navy would like to agree to a final number for the cleanup goal. EPA would not agree to MCLs as the final cleanup goals.

D. Richards replied that the RWQCB has said if we can credibly demonstrate that it is cost prohibitive to treat to background, this would be good justification not to treat to background levels. She added that a possible alternative is to ratio up capital costs from the volume of the TCE plumes.

IAFS GROUNDWATER MODELING SIMULATIONS

J. Lovenburg described the groundwater modeling simulations that are in progress to evaluate the new OU-1 IAFS alternatives (Attachment 4). The groundwater modeling results were presented by Natasha Raykhman/CH2M HILL. She reviewed the modeling results for each alternative by discussing figures that showed the contaminant transport and particle tracking simulations for both the Shallow Groundwater Unit and the Principal Aquifer. The regulatory agencies were given a copy of the figures.

Modeling Assumptions/Methods

Dante Tedaldi/Bechtel asked what source term was used for the contaminant transport modeling. J. Lovenburg replied that a source term was calculated based on the estimated mass of TCE in the plumes; this mass was released over a period of 40 years.

R. Herndon asked whether we have accounted for the fact that Desalter wells extract from both the Principal Aquifer and the Shallow Groundwater Unit; N. Raykhman replied that we have.

N. Raykhman elaborated on the solute transport modeling, in which the most updated TCE distribution (from the Round 2 groundwater monitoring results) was used as the initial conditions. Areas above 500 ppb of TCE were given a conservative value of 2000 ppb (the maximum observed concentration in the source area). In the Principal Aquifer, an initial condition of 30 ppb was assigned to the entire Principal Aquifer TCE plume (30 ppb is the maximum observed concentration in the Principal Aquifer). She emphasized that the intention of solute transport modeling is not to predict absolute

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concentrations but to evaluate and compare capture of the contaminated groundwater by the OU-1 IAFS alternatives. She added that water-level contours for capture zones will be included in the groundwater modeling report. Particle tracking was used for this purpose by placing particles along certain contour lines and tracking their movement to depict capture zones for the extraction wells; for the Shallow Groundwater Unit, contours of 5 and 500 ppb were used, and for the Principal Aquifer, a contour of 5 ppb was used.

T. Sovich asked whether each line segment on the particle tracking figures represents a time step. N. Raykhman replied that the segments do not, and added that this information is available in the output files.

T. Sovich asked whether we looked at time periods. N. Raykhman replied yes, we looked at time steps in flow calibration.

D. Tedaldi asked whether CH2M HILL will provide information on mass removed for each alternative. N. Raykhman replied that the mass removals under each alternative will be provided in the report.

T. Sovich asked whether steady-state simulations were used for the solute transport simulations. N. Raykhman replied that transient simulations were used with a 3-month time step. Mountain front recharge is not transient; she did not see differences in water levels over seasons from wells close to the mountains, but few wells are available close to the mountains. J. Lovenburg stated that for evaluation of cleanup to MCL times, uniform yearly pumping rates will be used.

Larry Vitale/RWQCB asked whether there are any agricultural wells close to the Station that are not shown on the map of the modeling results. N. Raykhman replied that there are agricultural wells (owned by the Irvine Company [TIC]) close to the Station. The pumpage from these wells was included in the model, but not all wells have been shown on the graphics in order to highlight the wells included in the alternatives.

A. Piszkin reported that well TIC 47 has been turned off (300-gpm pumpage). R. Herndon said he thinks that this would have little impact on the OU-1 IAFS alternatives simulation results.

Comments on Specific Alternatives

R. Herndon suggested that it would be helpful to compare Alternative 1 (No Action) to Alternative 2.

R. Herndon asked which subalternative was used in the results shown for Alternative 2. J. Lovenburg replied that Alternative 2b was used.

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J. Woodling noted that, in Alternative 2, the two southernmost wells are not capturing contaminants. N. Raykhman replied that those wells provide a safety factor for contaminants downgradient of the 500-ppb TCE, acting as a hydraulic barrier. She added that the solute transport results show that these wells are needed.

A. Piszkin said that Alternative 5 shows that a Navy system can coexist with the Irvine Desalter Project.

R. Herndon expressed concern about the effect of remedial alternatives on the migration of TDS in groundwater, and asked whether Alternative 2 exacerbates TDS migration in the Principal Aquifer. J. Lovenburg replied that captured groundwater will be injected upstream and that the concentration of TDS will hold steady.

L. Vitale addressed the focus on reclamation and agricultural use, stating that RWQCB is considering limiting agricultural use of reclaimed water. He asked whether VOC treatment would concentrate salts. D. Richards replied that the TDS increase resulting from air stripping is expected to be less than 1 percent (negligible). R. Herndon stated that Irvine Ranch Water District (IRWD) operates under a waste discharge standard of 720 mg/l TDS for reclaimed water produced for agricultural use. He stated that the Rancho Caballero decisions protects groundwater quality from applying high TDS reclaimed water.

R. Herndon asked whether CH2M HILL would compare alternatives with respect to the TDS migration. H. Nezafati replied that, because solute transport modeling of TDS will not be completed, TDS migration can be described only qualitatively.

R. Herndon asked for copies of the water-level maps for the alternative simulations; CH2M HILL offered to give them to OCWD and RWQCB.

OU-1 IAFS SCHEDULE ISSUES

J. Jimenez questioned the timing of public review of the OU-1 Proposed Plan (PP), and whether the Navy would be criticized for releasing it at the same time as the agency review of the ROD. B. Arthur said that a lot of sites have issued their PP and final ROD concurrently.

R. Herndon suggested giving a modeling presentation to the Remedial Advisory Board (RAB). L. Vitale reminded everybody that the RAB was created to provide community concerns. Sherrill Beard/DTSC-Long Beach asked whether we can invite members of the public to meetings so that they can be informed earlier. B. Arthur suggested using two fact sheets to notify the public before the PP.

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A. Piszkin said the OU-1 dates for the Federal Facility Agreement (FFA) have not been re-negotiated. The FFA date for the draft PP is 23 June 1995; the Navy needs to ask for an extension.

A. Piszkin stated that the Navy is asking the agencies for a 45-day review of the new OU-1 IAFS, and a 30-day review of the Draft PP.

A. Piszkin will attach Navy review comments on the Technical Memorandum on Evaluation of Background Concentrations of Inorganic Constituents in groundwater when it is sent to the regulatory agencies for review on 27 April 1995.

INTERIM VS. FINAL ROD

A. Piszkin said that the Navy believes that the ROD for OU-1 VOCs could be final.

B. Arthur said that she has never seen a ROD issued that addresses only certain constituents. She added that she can see it being finalized in a later revision, but could see getting cleanup levels now. A. Piszkin replied that there doesn't seem to be a need to have two more rounds of groundwater sampling before finalizing the ROD.

HUMAN HEALTH RISK ASSESSMENT (HHRA)

Agency representatives stated that they will provide comments to the Navy in 2 weeks on the use of average or maximum concentrations used to calculate risk for the OU-1 HHRA.

Participants

Bonnie Arthur/EPA
Sherrill Beard/DTSC-Long Beach
David Cowser/Bechtel
John Dolegowski/CH2M HILL
Roy Herndon/OCWD
Juan Manuel Jimenez/DTSC
Joseph Joyce/MCAS El Toro
John Lovenburg/CH2M HILL
Hooshang Nezafati/CH2M HILL
Andy Piszkin/Code 1832.AP
Natasha Raykhman/CH2M HILL
Davi Richards/CH2M HILL/CVO
Tim Sovich/OCWD
Dante Tedaldi/Bechtel
Larry Vitale/RWQCB
John Woodling/DTSC-HQ

(draft)

AGENDA

MCAS El Toro RPM Meeting
OU-1 Interim Action Feasibility Study Update

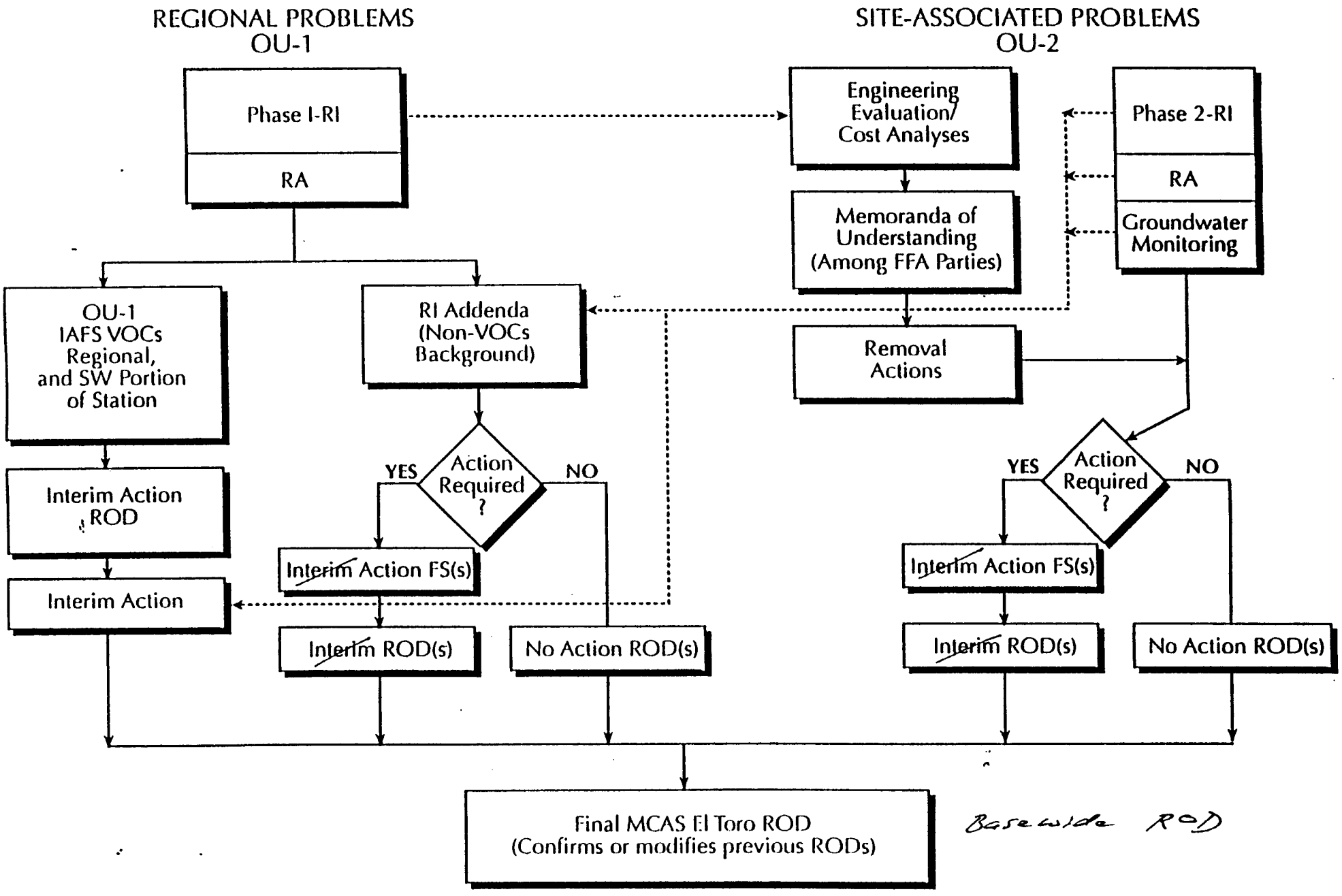
13 April 1995, 10:00

CH2M HILL Santa Ana Office
2510 Red Hill Ave.
Santa Ana, CA 92705
Phone : (714) 250-1900

10:00-10:15	**Introduction** Andy Piszkin
10:15-10:45	**Progress Status Report on the OU-1 IAFS** Davi Richards/CH2M HILL
10:45-11:45	**Review of Alternatives** John Lovenburg/CH2M HILL
11:45-12:00	**Discussion** All
12:00-13:30	**Lunch Break**
13:30-13:45	**Groundwater Modeling Simulations Update** John Lovenburg/CH2M HILL
13:45-14:45	**Groundwater Modeling Simulation Results** Natasha Raykhman/CH2M HILL
14:45-15:30	**Discussion** All
15:30-16:00	**Action Items** Andy Piszkin
16:00	**Adjourn**

Distribution:

A.Piszkin/SWDIV	J. Dolegowski/CH2M HILL
J. Joyce/MCAS El Toro	H. Nezafati/CH2M HILL
B. Arthur/EPA	D. Richards/CH2M HILL
L. Vitale/RWQCB	J. Lovenburg/CH2M HILL
J. Jimenez/DTSC	N. Raykhman/CH2M HILL
D. Tedaldi/Bechtel	


REGIONAL PROBLEMS
OU-1
SITE-ASSOCIATED PROBLEMS
OU-2
Phase I-RI
RA
Engineering Evaluation/ Cost Analyses
Memoranda of Understanding (Among FFA Parties)
Phase 2-RI
RA
Groundwater Monitoring
OU-1 IAFS VOCs Regional, and SW Portion of Station
RI Addenda (Non-VOCs Background)
Removal Actions
Interim Action ROD
Interim Action
YES
Action Required ?
NO
Interim Action FS(s)
Interim ROD(s)
No Action ROD(s)
YES
Action Required ?
NO
Interim Action FS(s)
Interim ROD(s)
No Action ROD(s)
Final MCAS El Toro ROD
(Confirms or modifies previous RODs)
Basewide ROD

PROJECT NOTE NO.	PROJECT NO.
PN-0145-165 CLE-C01-01F145-I2-0099	01-F145-H6

CONFIRMATION OF:	CONFERENCE		DATE HELD	17 February 1995
	TELECOM		DATE ISSUED	07 March 1995
	OTHER	X	RECORDED BY	John Dolegowski/CH2M HILL
			PLACE	Santa Ana, California

SUBJECT Contract Task Order (CTO) No. 0145
Remedial Investigation/Feasibility Study
OU-1 IAFS Progress Update Meeting
Marine Corps Air Station (MCAS) El Toro

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

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ACTION REQ'D. BY	ITEM
	A progress update meeting on the Operable Unit 1 (OU-1) Interim-Action Feasibility Study (IAFS) for the Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility (RI/FS) was held on 17 February 1995 at the CH2M HILL Santa Ana office. Participants represented the following organizations: the Naval Facilities Engineering Command, Southwest Division (SWDIV); MCAS El Toro; Orange County Water District (OCWD); U.S. Environmental Protection Agency (USEPA); California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC); California Regional Water Quality Control Board, Santa Ana Region (RWQCB); Bechtel National, Inc. (Bechtel) and CH2M HILL. The main purpose of the meeting was to discuss the progress made on the additional alternatives evaluation for the OU-1 IAFS. Topics discussed included: (1) Current status of the IAFS and revised list of alternatives for the IAFS; (2) Modifications to and proposed new work using the Irvine Subbasin Groundwater Model; and (3) Discharge options for the new alternatives. In addition to the progress update for the OU-1 IAFS, related topics discussed included: (1) Major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro; and (2) Resolution of agency comments on the *Draft Groundwater Monitoring Plan* (GWMP). These meeting minutes list the action items and summarize the most important issues discussed at the meeting. The agenda is attached (Attachment No. 1). LIST OF ACTION ITEMS o CH2M HILL will publish a draft technical memorandum on the evaluation of background concentrations of inorganic constituents in groundwater for agency review after Navy comments are incorporated.

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- CH2M HILL will publish the Final Draft Groundwater Monitoring Plan 30 days after the Base Realignment and Closure (BRAC) Cleanup Team (BCT) issues an official comment resolutions letter.

- CH2M HILL will send literature on evaluations of pump types on sampling results to USEPA, DTSC, and Bechtel.

MEETING SCHEDULE

The dates and locations of the next two OU-1 IAFS progress update meetings are tentatively set for:

1) 21 March 1995 at USEPA, San Francisco, CA.
2) 13 April 1995 at CH2M HILL, Santa Ana, CA.

OU-1 INTERIM-ACTION FEASIBILITY STUDY

Davi Richards/CH2M HILL gave a presentation on the status of the IAFS. Copies of the handouts used in the presentation are attached (Attachment No. 2). Her first overhead was a draft box-flow diagram showing the groundwater operable units at MCAS El Toro. Bonnie Arthur/USEPA requested that further discussion of the diagram be made an agenda item for the next Remedial Project Managers'(RPM) meeting.

A tentative schedule showing current and upcoming tasks was presented. John Dolegowski/CH2M HILL said that the IAFS would not be ready for agency review before August. Andy Piszkin/Code 1831.AP said that the issue of simultaneous review by the Department of Navy (DON) and the agencies is still under consideration by DON.

Larry Vitale/RWQCB asked whether negotiations between DON and OCWD are suspended. A. Piszkin said that negotiations are on hold while DON develops additional alternatives for the IAFS. OCWD has expressed its willingness to cooperate during development of these alternatives.

L. Vitale pointed out that the correct term is "discharge options" rather than "disposal options" when referring to treated groundwater. D. Richards said the change would be made in the documents under development.

Virginia Garelick/Code 1852.VG asked whether volatile organic compound (VOC) removal technologies other than air stripping will be evaluated in the revised IAFS . D. Richards said that, as in the previous draft, she anticipates doing a simple cost comparison of air stripping and activated carbon, based on flow and VOC concentration estimates.

D. Richards presented the list of alternatives from the previous draft followed by the draft list of alternatives for the revised draft. Although a "Navy stand-alone" alternative appears as Alternative 2 in both places, J. Dolegowski emphasized that in the previous draft, this alternative was screened out early in the IAFS and was not carried through the full analysis. This was because the OCWD Desalter Project was considered to be a baseline condition for the earlier draft.

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Juan Jimenez/DTSC asked when the Navy would be requesting applicable or relevant and appropriate requirements (ARARs) from the state. A. Piszkin replied that a letter would be sent to DTSC within the next 2 or 3 days, asking that state ARARs be identified. According to the National Contingency Plan (NCP), the state will have 30 days to respond.

D. Richards said that the level of detail for evaluations and costing of treatment, conveyance, and discharge options will be the same as in the previous draft.

IRVINE SUBBASIN GROUNDWATER MODEL

Hooshang Nezafati/CH2M HILL gave a presentation on the progress made to date on the groundwater modeling task for the OU-1 IAFS (see Attachment No. 3). He said that the model finite element grid has been refined and digitized to create input data files for simulation of the new alternatives. He added that a review of additional water level data, including the recently collected monthly data in 1994, was performed to evaluate the need for a transient calibration of the groundwater flow in the Irvine Subbasin. He said that overall, the observed fluctuation of water levels in the Subbasin is small and does not justify a transient calibration. Therefore, a steady state calibration is adopted as the calibration method that is consistent with the method used before and that of OCWD. H.Nezafati said a verification was performed of the calculation of the source term that was used in the solute transport portion of the groundwater modeling task as requested by the agencies. He said the result of the verification did not change the mass calculations that were done before so there are still some technical issues on the solute transport modeling remaining to be addressed. H. Nezafati asked for input on discussing these technical issues with the agency modelers over a conference call to reach a consensus with the solute transport modeling runs. The Navy and the agencies seemed to agree with this approach.

Natasha Raykhman/CH2M HILL presented a conceptual preliminary plan of the extraction/reinjection groundwater modeling scenarios for Alternatives 2 and 5 of the new FS. She used a map showing the potential location(s) of the extraction and reinjection wells for each Alternative and emphasized that the injection of extracted groundwater is best to be located upgradient of TCE plume and within the "clean" portion of groundwater rather than the "contaminated" portion. N.Raykhman added that this approach is preferred because it minimizes the spread of contaminated plume to the "clean" portion of groundwater and helps with the "flushing" of the contaminants to enhance remediation. She added that, however, downgradient locations are also being considered. Everybody seemed to be agreeing with the approach, understanding that the reinjection to groundwater is an ARARs issue and will be included in the ARARs request from the state.

GROUNDWATER DISCHARGE ALTERNATIVES

Kimo Look/CH2M HILL gave a presentation of the discharge options for the new alternatives. He discussed the screening procedure and categorized the discharge options between those to be kept for further evaluation and those screened out. Overheads of the discharge options and screening results are included (Attachment No. 4).

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Sherrill Beard/DTSC asked why on-Station land is not being considered for the evaporation pond option. K. Look answered that the real estate value is very high at approximately $500/acre. Dante Tedaldi/Bechtel felt that $500/acre is too high for some Station lands. Dennis Askvig/Code 1852.DA suggested performing the evaluation using a range of costs for land.

Roy Herndon/OCWD indicated the price of land is not the only cost consideration; there is a cost associated with not putting the groundwater to beneficial use. He indicated that OCWD would levy a "fine" worth the full replenishment cost if the extracted groundwater is not recharged. A. Piszkin stated the DON attorney is currently evaluating these issues.

EVALUATION OF INORGANIC BACKGROUND CONCENTRATIONS

Yueh Chuang/CH2M HILL gave a presentation on the major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro. The findings were submitted as a technical memorandum to the Navy for internal review on 16 December 1994. Overheads of the presentation are attached (Attachment No. 5).

The following summarizes the discussions during and after the presentation.

- L. Vitale asked whether each groundwater population defined by PROBPLOT analysis would correspond to a separate aquifer. Y. Chuang replied no and stated that the evaluation did not assume the traditional hydrogeochemical facies model.

- D. Tedaldi asked why the 99th-percentile was used for calculation of soils background concentrations, but the 95th-percentile was used for groundwater. Y. Chuang answered that the 95th-percentile is a good compromise between 90th- (would result in lower background concentrations) and 99th-percentiles (would result in higher background concentrations). In addition, the data appear to fit the definition well; with the exception of a few inorganic analytes (e.g., sodium, nitrate), more than 95 percent of the data fell below the concentrations defined as background using the 95th-percentile.

- S. Beard asked whether the exceedances of background concentrations at Site 2 (Magazine Road Landfill) were due to leachate from the landfill. Y. Chuang answered that it is possible. L. Vitale requested further evaluations on the effects of landfill leachate. J. Dolegowski indicated additional site-specific evaluations of background exceedances are planned.

GROUNDWATER MONITORING PLAN

A. Piszkin stated at the start of the meeting that the scope of work of the GWMP will be addressed at a Preproposal Conference (PPC) to be held on 14 March. B. Arthur indicated a letter providing the BCT's responses and concerns to the eight issues/action items first raised at a meeting held on 14 September 1994 has been drafted. The following summarizes discussions and ***verbal consensus*** reached on

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each of the eight issues. The Draft Final GWMP Report will be published 30 days after the BCT issues an official letter in which ***written responses*** are provided.

1) Due to the length of time to complete each sampling event, the 4-month period proposed for each sampling round is acceptable.

2) The letter will state the appropriate guidance document(s) to be used in the preparation of the quarterly monitoring reports.

3) DTSC raised the issue of air entrainment observed in samples collected during the second sampling round using 4-inch-diameter submersible pumps (see Attachment 6 for CH2M HILL's recommendations to the Navy). After extensive discussions on the causes of the air entrainment and the appropriate actions to address the apparent problem, the Project Team agreed to the following:

   - The Navy will not be required to replace the 4-inch pumps prior to the start of the next sampling event.

   - As part of the upcoming sampling event, CLEAN II will prioritized sample collection starting with wells installed with 4-inch pumps. By doing so, the pumps can be evaluated and problem pumps can be replaced in time to be sampled within the 4-month sampling period.

   - The GWMP will state the objective(s) of the field study and include recommendations for the field study. However, the scope of the study will be described in general terms; specifics of the field study, such as SOPs, will be deferred to CLEAN II.

4) Although a stand-alone document is preferred, the GWMP will state the planning documents (e.g., Quality Assurance Project Plan [QAAP], Sampling and Analysis Plan [SAP]) cited in the plan will be prepared by CLEAN II.

5) Y. Chuang asked for a confirmation on the format/frequency of reporting monthly "water level" data; B. Arthur answered that all data (i.e., monthly) should be tabulated in each of the quarterly monitoring reports. However, only quarterly data (corresponding approximately to the four major seasons) need to be displayed on the "water level" maps (contoured with equipotential lines) in each of the reports.

6) B. Arthur indicated the BCT letter will address the level of detail to be included in the GWMP.

7) B. Arthur indicated the BCT letter will respond to USEPA's request for rearranging Tables 3-1 and 3-4. Y. Chuang stated available well completion data (e.g., screen interval and total depth of well) for RI/FS and existing wells are already provided in the two tables; he also indicated the tables have been modified to become more user-friendly.

8) The USEPA requested that unfiltered samples be collected for metals analysis in future sampling events. The regulatory agencies suggested only select wells

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require dual sampling (collection of filtered and unfiltered samples). A. Piszkin stated it would be in the Navy's best interest to sample all the wells once in order to perform a complete and unbiased evaluation. After extensive discussions on the percentage of wells to sample and the procedure to select wells requiring dual sampling, the Team tentatively agreed to the following:

- o Dual-sampling should be done for all wells during the next sampling event.
- o The need for dual sampling in future sampling events will depend on the findings of the evaluation.
- o A final decision will be postponed until the regulatory agency risk assessors/toxicologists have a chance to discuss the implications of analytical results from unfiltered versus filtered samples.

Attachments

Participants

John Dolegowski/CH2M HILL	Bonnie Arthur/EPA
Dante Tedaldi/Bechtel	Roy Herndon/OCWD
Andy Piszkin/Code 1831.AP	Natasha Raykhman/CH2M HILL
Joseph Joyce/Code 1832.JJ	Davi Richards/CH2M HILL
Ginny Garelick/Navy	Hooshang Nezafati/CH2M HILL
Larry Vitale/RWACB	Yueh Chuang/CH2M HILL
Sherrill Beard/DTSC	Dennis Askvig/Navy
Juan Jimenez/DTSC	Kimo Look/CH2M HILL

AGENDA

MCAS EL TORO
OU-1 INTERIM ACTION FEASIBILITY STUDY (IAFS)
REMEDIAL PROJECT MANAGERS MEETING
FRIDAY, 17 FEBRUARY 1995
0930 - 1600

CH2M HILL, SANTA ANA, CALIFORNIA

0930 - 0945	Review of agenda and schedule - Andy Piszkin
0945 - 1115	Progress update for OU-1 IAFS - Davi Richards, Hooshang Nezafati
1115 - 1130	Break
1130 - 1215	Summary of screening of treated groundwater disposal options for IAFS - Kimo Look
1215 - 1315	Lunch
1315 - 1430	Background concentrations of inorganics in groundwater - Yueh Chuang
1430 - 1530	Final resolution of agency comments on Groundwater Monitoring Plan
1530 - 1600	El Toro funding issues - Andy Piszkin

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CONFIRMATION OF:	CONFERENCE		DATE HELD	31 January 1995
	TELECOM	X	DATE ISSUED	21 February 1995
	OTHER		RECORDED BY	John Dolegowski/CH2M HILL
			PLACE	Santa Ana, California

SUBJECT

Contract Task Order (CTO) No. 145
Agency Comments on OU-1 IAFS Groundwater Modeling
Marine Corps Air Station (MCAS) El Toro

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

Joseph Joyce/El Toro-BEC	Roy Herndon/OCWD	Andy Piszkin/Navy-SWDIV
John Woodling/DTSC	Natasha Raykhman/CH2M HILL	
Herb Levine/EPA	Alice Gimeno/DTSC	
Hooshang Nezafati/CH2M HILL	Bonnie Arthur/EPA	
Sherrill Beard/DTSC	John Dolegowski/CH2M HILL	
Angelos Findikakis/Betchel Corp.	Dante Tedaldi/Bechtel Corp.	

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	A telephone conference call was held on 31 January 1995 to discuss regulatory agency comments on the Groundwater Modeling Report (Appendix A) of the Marine Corps Air Station (MCAS) El Toro Draft Operable Unit 1 (OU-1) Interim-Action Feasibility Study (IAFS) Report (01 September 1995). Hooshang Nezafati/CH2M HILL opened the conference call by stating that the purpose of the conference call was to discuss the major comments received from the regulatory agencies and the Bechtel Quality Assurance/Quality Control (QA/QC) reviewer. H. Nezafati said that overall the comments were very constructive and that the comments have been carefully examined. H. Nezafati added that the comments were categorized into two groups: 1) Comments that CH2M HILL felt needed to be addressed and did not require further discussion, including some modifications to the existing groundwater model, and 2) Comments that needed discussion and hopefully could be resolved. He added that this conference call would focus on the latter group to ensure that all the major concerns are addressed. H. Nezafati stated that Natasha Raykhman/CH2M HILL had compiled a list of the major agency comments for discussion. Before beginning discussion, H. Nezafati asked all of the participants if there were any suggestions or comments. John Woodling/DTSC asked why the OU-1 IAFS was being redone. John Dolegowski/CH2M HILL replied that the Department of Navy (DON) had decided as a result of new information that was made known in negotiations last Fall between DON and the Orange County Water District (OCWD) that analysis of additional alternatives was needed because 1) the possibility existed that OCWD may not proceed with the Irvine Desalter Project (Desalter), 2) a detailed analysis and cost estimate of a DON groundwater extraction and treatment system was needed to support the DON/OCWD

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negotiations, and 3) preliminary groundwater modeling completed last Spring indicated that a DON extraction/treatment system may be more effective than the Desalter, even with a separate Shallow Groundwater extraction system.

J. Dolegowski explained that the Navy is considering two new alternatives in addition to those that were included in the Draft OU-1 IAFS: 1) MCAS El Toro groundwater extraction/treatment system and 2) the Desalter with an independent MCAS El Toro Shallow Groundwater extraction/treatment system. A number of new discharge options for the treated groundwater will be evaluated including groundwater reinjection, recharge to washes, discharge to surface water, discharge to the Desalter, discharge to Irvine Ranch Water District (IRWD) for treatment to potable water standards, discharge to the IRWD reclaimed water line, and direct land application/irrigation.

J. Woodling asked Roy Herndon/OCWD about the status of the Desalter Project. R. Herndon replied that OCWD is proceeding with the Desalter but at a slower pace and is not spending additional money on design.

DISCUSSION OF MAJOR AGENCY COMMENTS

N. Raykhman reviewed the major comments as follows:

DTSC General Comment 1 (Need For a Site-Specific Groundwater Model)

N. Raykhman: The Irvine Subbasin Model is a regional model and does not necessarily represent the detailed site-specific information. Refinement of the model to incorporate site-specific conditions may be considered after the Phase II field investigation is complete during Remedial Design/Remedial Action (RD/RA).

A. Findikakis: Simulated plumes were wider than observed plumes due to numerical dispersion. A finer grid is needed in the area of TCE plume.

H. Nezafati: We agree. Actually the grid refinement is being incorporated. Given the uncertainties with the contaminant transport modeling/calibration in any given groundwater modeling work, for MCAS El Toro the transport modeling was partially used to help with enhancement of the groundwater flow calibration and was mainly used for a qualitative comparison of the OU-1 IAFS alternatives.

A. Findikakis: Agrees with the approach and he added that due to a large number of uncertainties in the model, grid refinement would help to reduce potential for numerical dispersion.

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Consensus was reached that the model is representing the Irvine Subbasin on a regional scale and the grid refinement which is being incorporated would help to reduce the potential for numerical dispersion.

DTSC Comments A-2 and A-16 (Hydraulic Conductivity Estimates Used In The Model)

N. Raykhman: We had few comments on the basis of the hydraulic conductivity (K) values used in the groundwater model.

The hydrostratigraphic units used in the model are based on differences in water levels and extent/distribution of contamination and are not just defined based on the hydrogeologic properties. Initial estimates of hydraulic conductivities (K values) are based on the short-term pumping tests and slug tests performed during the Phase I Remedial Investigation (RI) on monitoring wells that are not specifically designed to test hydraulic properties of the different units because they are screened only in the uppermost 40 feet of the Shallow Groundwater. N. Raykhman suggested that long-term aquifer pumping tests should be performed in each of the defined units during the Phase II field investigation to verify the hydraulic conductivities used in the model. N. Raykhman added that we have performed a sensitivity analysis on the K values and evaluated the associated uncertainties.

R. Herndon: Agrees with the suggestion but points out that we are limited to using the regional K values under the circumstances.

J. Woodling: Need to capture as much of the shallow aquifer plume as possible. We don't have a good handle on sustainable yield of the Shallow Groundwater.

R. Herndon: We can model what we want, but we need actual aquifer tests; that is, long-term tests.

H. Nezafati: Agrees that the hydraulic properties should be verified by field testing but clarifies that even if we have overestimated the flow rates (Q's) for the shallow wells, the drawdown would still be conservative from the hydraulic containment stand point.

A. Piszkin: Does it make a difference if we are comparing alternatives?

R. Herndon: We will probably never have enough data until we turn the system on. Additional modeling may not be productive.

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J. Woodling: It could make a difference if we are overestimating the K of the shallow unit - could affect the outcome.

H. Nezafati: It may be more conservative to overestimate Q's for the shallow wells than underestimate them, because as a result of using lower Q's, the treatment system may be underdesigned which could potentially cost a lot more.

R. Herndon: He clarified that we are talking about a 60 to 600 gallon per minute (gpm) system, not 600 to 6,000 gpm.

A. Piszkin: This analysis is conceptual. The CH2M HILL approach is conservative.

J. Dolegowski: More aquifer testing will be done by CLEAN II.

Consensus was reached that there are uncertainties about the K values selected for the Shallow Groundwater but the CH2M HILL approach is conservative given a conceptual design. However, long-term pumping tests are being planned and will be designed and performed by CLEAN II to verify the model K values and should be incorporated in the final design before implementation of the selected remedy.

DTSC Specific Comment 14 (Why a 20-Year Simulation Period Is Used)

DTSC had asked why a 20-year simulation period was used for transport modeling. N. Raykman said that this simulation period was selected based on uncertainties on boundary conditions between the Irvine Subbasin and the Main Basin. Two sets of boundaries were used to bracket the possible solutions: prescribed heads and prescribed fluxes. N. Raykhman stated that we can't model beyond 20 years with the prescribed flux because the Basin dewaters after 20 years. However, we could project beyond 20 years using the constant head boundary condition which tends to underestimate the drawdowns and consequently reduces the accuracy of the simulations.

H. Nezafati: It would be best to model the Irvine Subbasin with the Main Basin at the same time because these two basins are so interconnected. However, this was beyond the scope of work for the MCAS El Toro IAFS.

R. Herndon: Agreed and stated that this would require additional data/effort. It would be difficult to project where pumping centers will be in 20 years. He suggested that the best bet would be institutional controls beyond 20 years.

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N. Raykhman: Added that the longer we run the model, the less certain the model results would become.

Consensus was reached to proceed with a 20-year simulation period.

EPA/Bechtel Comment Number 66 (Verification Of The Time Step Used In The Model)

N. Raykhman: A sensitivity analysis was completed with 1, 2, and 4-month time steps. Based on this we selected a 3-month time step (largest step we could use without sacrificing accuracy).

Consensus was reached on the approach; a discussion in the IAFS to explain the sensitivity of the model to the selected time step will be added.

DTSC Specific Comment 15, A-23, and A-27 (Retardation Factor)

R. Herndon: What retardation factor was used in the model?

H. Nezafati: We used a factor of 4 for sensitivity analyses and a factor of 1 (no retardation) for simulation of alternatives, because this was more conservative from the hydraulic containment stand point which was the main objective of the OU-1 IAFS. However, for estimating cleanup time, using a retardation factor of more than 1 would be more desirable. N. Nezafati suggested that we may want to use a retardation factor of 2.

R. Herndon: Is that conservative enough?

N. Raykhman: We don't have much data on retardation. It is not conservative to use it, since we focused on containment but for cleanup, this is a number commonly used for TCE retardation in similar geological units. N. Raykhman requested agency input and stated that we could use a factor of 2 for cleanup time.

J. Woodling: The goal is hydraulic containment. DTSC and EPA's highest priority is particle tracking and capture zone analysis. If the transport model is calibrated, we should use a value of 2. What other parameters were modified to calibrate the transport?

N. Raykhman: We had to use higher K than field values even without retardation to get the plume to migrate far enough.

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J. Woodling: He was happy to hear H. Nezafati say that the transport model was used primarily to calibrate the flow model.

A. Findikakis: What is the criteria on using a porosity value of 0.2? Using 0.2 leaves little room to change this value.

N. Raykhman: During sensitivity analyses, we changed retardation, porosity, and K on capture zone analyses. Changes of ± 50 percent didn't change the results much.

J. Woodling: Using a retardation factor of 1 for the capture zone is good for containment but for cleanup time we could use a retardation factor of 2 or 3.

Consensus was reached to use a retardation factor of 2.

DTSC Specific Comment 24 (Why Are The Northeastern Contamination Plumes (Site 2) Not Addressed)?

N. Raykhman: Contaminants from Site 2 will be addressed under the OU-2 FS, but in the draft OU-1 IAFS we did look at how long it would take before drawdown from the Desalter would impact Site 2.

B. Arthur: Is aquifer testing included in the OU-2/3 work plan?

A. Piszkin: Yes, CLEAN II will coordinate with CLEAN I input.

A. Findikakis: Simulations did not include the source(s) for Site 2.

A. Piszkin: These sources will be treated under other OU programs.

DTSC General Comment 2 (Requesting Maps Showing The Capture Zones For Extraction Wells)

H. Nezafati: Particle tracking was used to evaluate containment which shows capture better than water level maps, but we needed more grid refinement around some of the extraction wells to graphically show capture zones. This will be shown on the new figures.

J. Woodling: All he is looking for is the graphics. Comparing size of plumes over time doesn't show capture. All capture zones are 2-dimensional (2-D). Are we assuming that all wells are fully penetrating?

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	R. Herndon: Irrigation wells and deep extraction wells are fully penetrating. N. Raykhman: Unless we get detailed water quality data, we will assume fully penetrating wells in the model. R. Herndon: Multiport well data show concentrations increasing with depth. TCE concentrations are 2-10 ppb at 200 feet, and 30-40 ppb at 500 feet. R. Herndon feels that vertical distribution of contamination is not well enough defined for a surgical extraction scheme. N. Raykhman: Three layers are used for the Principal Aquifer; hydrogeologic properties are the same for all 3 layers. A. Findikakis: It may be useful to get the model to simulate observed vertical variability. Are there discontinuities in the intermediate layer? R. Herndon: We don't have enough data to describe the mechanism for vertical movement or to describe subsurface geology. The shallow groundwater has very even water levels that are not affected by the deeper unit in the western portion of the Basin. It was agreed that new figures will be produced to graphically depict the simulated capture zones around extraction wells (a 2-D presentation). B. Arthur: For the MCAS El Toro Environment Baseline Survey, we can't concur on property transfer with the existing monitoring data. Is there a way to project the extent of the plume in the future? H. Nezafati: We could assume linear groundwater velocity. B. Arthur: We need hand drawn maps for Tank 398. How soon could we get the plume maps? D. Tedaldi: Wouldn't expect much change from the most recent maps. B. Arthur: Would Tank 398 and Site 2 plumes move into parcels identified as clean? D. Tedaldi: We need to state that for CERFA, the existing maps would be valid.

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DTSC Specific Comment A-19 (Accuracy Of Flow Calibration; RMS Of 15 Feet Is Too Large)

N. Raykhman: DTSC has stated that a criteria of 15 feet for Root Mean of Squared Differences (RMS) between simulated and observed water levels is too large. She explained that we looked at the overall head differences of more than 200 feet across the Basin and used less than 8 percent of that for RMS. N. Raykhman asked for input from agencies.

J. Woodling: He didn't write comments. He agrees that we should look at errors relative to overall head loss. He feels 15 feet is adequate. He asked if we have observed data points to check calibration of vertical gradients.

N. Raykhman: Yes, we have compared observed heads with simulated; we will incorporate them into the report.

A. Findikakis: There are some differences between the interpreted and simulated flow direction.

N. Raykhman: Agrees. However, the groundwater flow field was calibrated to reproduce the observed (interpreted) contaminant pattern and to represent average flow conditions in the Subbasin.

A. Findikakis: Can we reinterpret TCE data in light of what we learned from the model?

H. Nezafati: The plume maps are highly interpretative as it stands now.

R. Herndon: Agrees, there is especially uncertainty in the intermediate horizon. What we have done is the best we could do with the existing data. He hopes to be involved in future discussion.

Consensus was reached that a RMS value of 15 feet is adequate for flow calibration, but we should also compare simulated flow direction and gradients to the observed ones for a closer match.

N. Raykhman stated that these discussions had completed all of the major issues that had been identified. Other comments not discussed in this conference call will be responded to in the text of the OU-1 IAFS.

H. Levine asked if data from the new pumping tests will be included in the new IAFS. A. Piszkin replied that the IAFS will be done before any additional field work is completed at MCAS El Toro. J. Dolegowski stated that the CLEAN I Project Team

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	agrees strongly that additional aquifer testing is needed to support the modeling. CH2M HILL looked into the possibility of completing some new long-term aquifer tests in the Shallow Groundwater prior to starting the modeling to support the new IAFS, but contractually it was not possible to complete the field work this winter. H. Levine asked when the Proposed Plan will be submitted. A. Piszkin replied that the OU-1 Proposed Plan will be submitted to the agencies next Fall. He suggested that a team meeting be convened prior to starting the Proposed Plan. The conference call concluded with the understanding that the existing model, with the proposed modifications, is adequate to address the major agency comments and the consensus that was reached on several issues, as stated above, will be incorporated into the future simulation of the OU-1 IAFS alternatives. H. Nezafati requested that an additional conference call be organized if new questions/issues arise in order to make sure that agency views/directions are sought ahead of time. Everybody agreed to this approach. **Nonparticipant Distribution** Juan Jimenez/DTSC

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PN-0145-151 CLE-C01-01F145-I2-0094	01-F145-H6

CONFIRMATION OF:	CONFERENCE	DATE HELD	06 January 1995
	TELECOM	DATE ISSUED	03 February 1995
	OTHER X	RECORDED BY	John Dolegowski/CH2M HILL
		PLACE	San Diego, California

SUBJECT

Contract Task Order (CTO) No. 145
Remedial Investigation/Feasibility Study
OU-1 IAFS Strategy Meeting
Marine Corps Air Station (MCAS) El Toro

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See Page 7

ACTION REQ'D. BY	ITEM

Representatives of the Naval Facilities Engineering Command, Southwest Division (SWDIV) and CH2M HILL held a strategy meeting to discuss the additional work required to complete the Operable Unit 1 (OU-1) Interim-Action Feasibility Study (IAFS) for the Marine Corps Air Station (MCAS) El Toro (or Station) Remedial Investigation/Feasibility Study (RI/FS). SWDIV has requested that CH2M HILL consider two additional remedial alternatives in the OU-1 IAFS: (1) MCAS El Toro Groundwater Extraction/Treatment, and (2) Desalter with Independent MCAS El Toro Shallow Groundwater Extraction/Treatment. The schedule impacts of the additional alternatives analysis were also addressed.

In addition to the OU-1 IAFS, discussion topics included: (1) Proposed changes to the Irvine Subbasin Groundwater Model, which is used to evaluate the OU-1 IAFS alternatives, and (2) Major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro. These meeting minutes list the action items and summarize the most important issues discussed at the meeting. The agenda is attached (Attachment No. 1).

LIST OF ACTION ITEMS

- Rex Callaway/Code 09C.RC and Cindy Dahl/CH2M HILL will confer by phone early in the week of 09 January 1995 to coordinate the research of Applicable or Relevant and Appropriate Requirements (ARARs) for potential discharge options.
- CH2M HILL will pursue with the Regional Water Quality Control Board (RWQCB) Santa Ana issues raised by R. Callaway pertaining to potential discharge options. CH2M HILL will try to schedule a meeting with Gary Stewart/RWQCB the week of 16 January 1995.

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ACTION REQ'D. BY	ITEM

- The Navy will review the technical memorandum prepared by CH2M HILL on the evaluation of background concentrations of inorganic constituents in groundwater. Direction will be provided on how the conclusions of the technical memorandum will be incorporated into the OU-1 RI and the OU-1 Human Health Risk Assessment.

- Navy managers will meet internally to discuss whether draft Contract Task Order (CTO) 145 deliverables will be given to the regulatory agencies at the same time SWDIV receives them or whether the Navy will complete a separate review prior to giving the deliverables to the agencies.

- The Navy will initiate contractual action to fund the additional scope for the OU-1 IAFS.

OPERABLE UNIT 1 INTERIM-ACTION FEASIBILITY STUDY

OU-1 Schedule

The schedule impact of the additional alternative evaluations and resubmittal of the Draft IAFS Report was discussed. John Dolegowski/CH2M HILL stated that he and Andy Piszkin/Code 1831.AP had developed a preliminary detailed schedule incorporating the new work. Based upon the draft schedule, the submittal date for the draft OU-1 Record of Decision (ROD) will be delayed by approximately 9 to 12 months. In order to shorten the schedule, the regulatory and Navy review periods would have to be reduced. Cmdr. William Dos Santos/Code 09B asked that the Project Team do whatever is necessary to meet the current Federal Facilities Agreement (FFA) submittal date for the draft OU-1 ROD (29 December 1995). Cmdr. Dos Santos emphasized that Department of the Navy (DON) is anxious to move from studying the problem to taking action.

A discussion of document review protocols with the agencies ensued regarding whether the regulatory agencies should be provided review drafts of the OU-1 deliverables at the same time as the Navy. The primary argument in favor of prior DON reviews is that the Navy needs to ensure that the documents accurately portray the Navy's position and that they are consistent with the Navy negotiation position with Orange County Water District (OCWD). The arguments in favor of concurrent DON/agency reviews are that they would promote openness and save time. No conclusions were reached at the meeting. Cmdr. Dos Santos asked that this topic be discussed internally at a later date.

Rationale for Early Action

CH2M HILL pointed out that there has been a change in the rationale for proceeding with the OU-1 FS and ROD before completing the Phase II RI. In 1993, the Navy and agencies decided to proceed with early action on OU-1 with the belief that the Irvine Desalter Project (Desalter) would be constructed and operated with or without participation by the DON. It was important in that case to mitigate the effect of the Desalter wells on the groundwater contamination in the southwest portion of the Station. The Desalter Project is now no longer considered completely certain and will

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not be treated as a baseline condition in the revised IAFS, removing what was previously presented as the primary justification for bypassing the Phase II RI.

However, other valid reasons still exist for early action on OU-1. First, proceeding with OU-1 allows progress to be made toward action rather than continuing study. Second, in addition to containment and remediation of the Principal Aquifer, early action will contain the shallow on-Station groundwater source area, minimizing further migration while OU-2 investigates this area in more detail. Third, sufficient data exist to conduct the FS; future data can be used to refine remedial actions but are not required to move toward action. Fourth, as before, it is important to complete the FS for the regional groundwater contamination in time to support the Navy/OCWD cost-sharing negotiations for the Desalter Project. The agencies recognize this need.

The Navy staff present concurred in this reasoning.

Definitions of OU-1 and OU-2

Another change in the IAFS logic pertains to the relationship between OU-1 and OU-2 given that the Desalter is no longer considered as a definite baseline condition. If the Desalter does not proceed, the question could arise whether separating OU-1 from OU-2 (the source areas) still makes sense or whether it would be better to wait for the results of the Phase II investigation results. The existing IAFS argues for on-Station shallow extraction/containment wells to isolate the area in the southwest portion of the MCAS El Toro where the highest concentrations of volatile organic compounds (VOCs) in groundwater have been detected. The purpose of these shallow extraction wells is to intercept the groundwater with the highest concentrations of VOCs in the shallow groundwater, reducing the migration of shallow VOC-contaminated groundwater both horizontally and vertically. The actual performance of the shallow containment wells can begin while OU-2 proceeds with the Phase II RI and evaluates the most appropriate technologies for removal of the contaminants in the source area.

The Navy consensus was that the present division of the project into OU-1 and OU-2 still makes sense in order to proceed with early response to the regional groundwater contamination, with or without the Desalter.

Remedial Action Objectives

Davi Richards/CH2M HILL presented a revised list of remedial action objectives (RAOs) for the OU-1 IAFS; the RAOs are slightly revised for clarification but not substantively different from the ones presented in the Draft IAFS and previously agreed to by the agencies. The revisions are intended to make a clearer distinction between the objectives in the shallow groundwater and the Principal Aquifer. Attachment 2 lists the RAOs from the Draft IAFS and the revised version.

The Navy agreed that the revised version is an improvement.

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ARARs for Discharge Options

D. Richards summarized the progress and plans to research ARARs for potential discharge options other than potable water supply (the discharge option for the Desalter). Cindy Dahl/CH2M HILL (Corvallis), an engineer with extensive regulatory compliance experience, will be taking the lead to prepare a draft narrative analysis to be submitted to R. Callaway by the end of January 1995. She will be supported by Kimo Look/CH2M HILL (Santa Ana), a water resources engineer, by Renu Gupta/CH2M HILL (Santa Ana), a hazardous waste engineer, and by Nanci Klinger/CH2M HILL (Portland), an environmental engineer and attorney. A preliminary list of discharge options is attached.

R. Callaway and C. Dahl will confer by phone early in the week of 09 January 1995 to coordinate the research. Ginny Garelick/Code 1852.VG suggested that CH2M HILL call Maria Rhea and Cat Kuhlman at Environmental Protection Agency (EPA) Region IX, both of whom work with water regulations and issues and may be able to provide leads.

Issues mentioned by R. Callaway to be pursued:

(1) How will basin water quality objectives and the Basin Plan affect reinjection?
(2) How are agricultural discharges regulated?
(3) Are agricultural discharges exempt from regulation?
(4) How are RWQCB decisions and policies accessed?
(5) What are the basin standards for reinjection of municipal effluent?

It was agreed that CH2M HILL will try to schedule a meeting with Gary Stewart/RWQCB the week of 16 January 1995 to address these issues.

The Navy agreed that in making phone calls for researching these issues, CH2M HILL may mention the calls are for the MCAS El Toro IAFS.

Conceptual Alternatives

D. Richards presented the new preliminary list of IAFS alternatives (Attachment 4). The Navy agreed that this was a good starting point.

Cmdr. Dos Santos asked whether DON should consider an alternative that would provide containment of the shallow groundwater in the southwest portion of the Station and rely on natural attenuation in the Principal Aquifer. D. Richards pointed out that: (1) Although EPA seems more willing than previously to consider natural attenuation, the chances are slight that they would accept it here because it is a potential drinking water aquifer, and (2) A serious evaluation of natural attenuation would require a longer FS schedule. A. Piszkin suggested an alternative that would include well-head treatment as needed for the Principal Aquifer. Walter Sandza/Code 185 expressed the opinion that both of these alternatives would likely be unacceptable to the agencies and should therefore not be pursued.

It was agreed that CH2M HILL will proceed with the alternatives listed on Attachment 4 unless instructed otherwise by the Navy.

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PROPOSED MODIFICATIONS TO GROUNDWATER MODEL

Hooshang Nezafati/CH2M HILL presented the proposed modifications, discussed below, to the Irvine Subbasin Groundwater Model, which has been used to support the evaluation of the OU-1 IAFS remedial alternatives (Attachment 5). He explained that the proposed modifications were the minimum refinements necessary to address regulatory agency review comments and to prepare the model for evaluation of the new MCAS El Toro Groundwater Extraction/Treatment System. The model will have to be recalibrated after incorporation of proposed modifications described below.

Refinement of the Finite-Element Grid

Model grid refinement is required to evaluate the new groundwater extraction and injection alternatives in shallow groundwater. Flow rates of the proposed extraction and, in particular, injection wells will generate relatively small cones of depression and can only be evaluated with a finer set of grids than the one currently used in the model. The finer set of grids will also facilitate the preparation of maps showing capture zones around extraction wells (as specifically requested by the Department of Toxic Substances Control [DTSC]). It will also minimize the potential for numerical dispersion and, therefore, lateral spread of the simulated plume (to address IAFS review comments from Bechtel National, Inc. and the EPA). A. Piszkin asked if the model grid refinements could be limited to the evaluation of the new alternatives in order to save time. H. Nezafati answered that there would not be much of a time saving because the effort will be small compared to that which is needed for the simulation of the new remedial alternatives. He added that specific agency comments can not be addressed without performing the proposed grid refinements.

Assessment and Simulation of Transient Groundwater Flow Conditions

Incorporation of the seasonal changes of the water budget (i.e., pumping and recharge rates) is needed to enhance the calibration of the groundwater flow calibration model. H. Nezafati stated that some proposed alternatives would rely upon existing irrigation wells for mass removal and containment. H. Nezafati added that groundwater modeling presented in the draft IAFS assumed that wells were pumped at constant rates year round (i.e. the model assumed steady state conditions), as was assumed by OCWD's MODFLOW groundwater model. However, because we now know that irrigation wells are pumped on a seasonal basis, consideration of seasonal water budget fluctuations is required to generate more accurate conclusions, particularly regarding VOC capture at the toe of the plume.

Verification of the "Active-Source Scenario"

In response to IAFS comments from the California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC), CH2M HILL proposed to verify the "Active-Source Scenario" by estimating the dissolved mass of trichloroethylene (TCE) in groundwater and applying the dissolved mass as a prescribed flux for about 50 years. The proposed modification will help enhance the simulation of the new alternatives, as well as address agency comments.

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A. Piszkin expressed his concerns about whether this modification is necessary and how it would change the modeling results. H. Nezafati responded that the verification would not be time consuming, would help to increase the confidence in the model, and would likely would not change the modeling results.

Cmdr. Dos Santos asked what kind of equation or tool was used to solve similar problems 10 years ago when sophisticated groundwater models were not available. He expressed some concerns that the Navy may be investigating too much and that the existing model may already be adequate to accomplish DON objectives. H. Nezafati answered that in the past, the groundwater scientific community knew much less about the field of groundwater contamination. Previous applications of groundwater models were limited compared to their current uses. He added that the Irvine Subbasin is too complex to be studied with a simple equation or tool, and the Irvine Subbasin Groundwater Model is the appropriate tool for the task at hand. The model has the needed sophistications to match the complexity of the real world.

EVALUATION OF INORGANIC BACKGROUND CONCENTRATIONS

Yueh Chuang/CH2M HILL gave a presentation on the major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro. The findings were submitted as a technical memorandum, to the Navy for internal review on 16 December 1994. Overheads of the presentation are attached (Attachment 6).

The Navy felt the overall approach of the technical memorandum was sound. A. Piszkin indicated the Navy will decide on the use of the information after a more thorough review by Dennis Askvig/Code 1852.DA, the Navy statistician, and Jim Ferris/Code 1853. During the meeting, the Navy requested CH2M HILL address the following issues:

- Research potential historical trends of the inorganic concentrations in the Irvine Subbasin. J. Ferris and A. Piszkin questioned how the current findings compared with earlier trends in groundwater.

- Include additional references and discussions on fertilizer use (therefore nitrates) to the conceptual model. W. Sandza felt the current conceptual model did not explicitly mention fertilizers.

- Provide a description of the power and confidence used in the statistical analyses. D. Askvig felt the power and confidence levels should be based on risk.

- Explicitly quantify the 95th-percent background exceedances (as multiples of the 95th-percent background concentrations). W. Sandza felt the reader would benefit from knowing whether the concentrations were just slightly over, or much greater than, the 95th-percent background values.

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- Perform an analysis of variance (ANOVA) or discuss reason(s) why such an analysis is unnecessary. D. Askvig felt an ANOVA would help the statistical analyses/interpretation.

Other noteworthy issues discussed are summarized below.

- W. Sandza asked why background was set at the 95th-percent level and not 90th- or 99th-percent. Y. Chuang indicated that 95th-percent is a good compromise. D. Askvig concurred. A. Piszkin pointed out that the soils background analysis used 99th-percent levels. Additional discussions ended with the Navy concurring with the current approach of using 95th-percent levels for background concentrations.

- J. Dolegowski indicated additional site-specific evaluations of background exceedances should be performed. Sites to be evaluated include Sites 13 (Oil Change Area), Site 15 (Suspended Fuel Tanks), and Site 16 (Crash Crew Pit No. 2).

- D. Askvig asked whether a 2- or 3-parameter lognormal distribution was assumed for the data. Y. Chuang indicated Dick Glanzman, CH2M HILL's geochemist in the Denver office, will have to be consulted on that issue.

Attachments:

1. Agenda
2. RAOs
3. Preliminary List of Discharge Options
4. IAFS Alternatives
5. Groundwater Modeling Overheads
6. Overheads for Background Inorganics in Groundwater

Participants

* Dennis Askvig/Code 1852.DA
* Rex Callaway/Code 09C.RC
Yueh Chuang/CH2M HILL/SDO
* John Dolegowski/CH2M HILL/SCO
* Cmdr. William Dos Santos/Code 09B
* Jim Farris/Code 1853
Ginny Garelick/Code 1852.VG
* Hooshang Nezafati/CH2M HILL/SCO
Larry Nuzum/Code 1831
Andy Piszkin/Code 1831.AP
* Davi Richards/CH2M HILL/CVO
* Walter Sandza/Code 185

* Denotes Part-Time Attendance

AGENDA

CTO #145
MCAS El Toro RI/FS
OU-1 IAFS STRATEGY MEETING

06 JANUARY 1995
08:30 - 15:30
SWDIV, San Diego, CA.

1. Background Concentrations of Inorganics in Groundwater
2. New OU-1 Schedule
3. Changes to Groundwater Model that Address Agency Comments
4. Rationale for proceeding on Early Action for OU-1 with Alternatives that Don't Include the Desalter.
5. New Operable Unit Definitions
6. Review of Remedial Action Objectives for OU-1 (RAOs)
7. Discharge Options - ARARs Research (scope, schedule, staff)
8. Conceptual alternatives
9. Need for Routine Technical Exchange Meetings with Navy and Regulatory Agencies to Build Consensus.
10. Contractual Issues

MCAS El Toro
OU-1
SCE31981.FU.60
January 6, 1995

REMEDIAL ACTION OBJECTIVES IN PRESENT IAFS

- Minimize further migration of groundwater containing VOCs that have emanated from sites at MCAS El Toro.
- Reduce concentrations of VOCs in the groundwater in the AOC to federal or state MCLs, whichever are more stringent, nonzero MCLGs, or RBCs for compounds that have no promulgated MCLs.
- Prevent human exposure to groundwater containing levels of VOCs above MCLs, nonzero MCLGs, or RBCs.

CLARIFIED REMEDIAL ACTION OBJECTIVES

- Contain VOCs in shallow groundwater in southwest portion of MCAS El Toro.
- Reduce concentrations of VOCs in principal aquifer to federal or state MCLs, whichever are more stringent, nonzero MCLGs, or RBCs for compounds that have no promulgated MCLs.
- Minimize migration of VOCs in principal aquifer.
- Prevent use of groundwater containing VOCs above MCLs/MCLGs/RBCs for drinking water.

MCAS El Toro
OU-1
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ALTERNATIVES

Present List

1. No Action
2. MCAS El Toro Extraction/Treatment/Discharge to further treatment by others for potable use
3. Desalter Only
4. Desalter/Additional Extraction

New Preliminary List of Alternatives for Initial Consideration

1. No Action
2. MCAS El Toro Extraction/Treatment

   Discharge to:

   a. Reinjection
   b. Other discharge options (to be evaluated)
   c. Treatment (by others) for potable use

3. Desalter Only
4. Desalter/Additional Extraction with Discharge to Desalter

   a. Without Pretreatment
   b. With Pretreatment

5. Desalter with Independent MCAS El Toro Shallow Aquifer Extraction/Treatment

   Discharge to:

   a. Reinjection
   b. Other discharge options (to be evaluated)

MCAS El Toro
OU-1
SCE31981.FU.60
January 6, 1995

PRELIMINARY LIST OF DISCHARGE OPTIONS

1. Reinjection
2. Recharge (discharge to washes?)
3. Discharge to surface water (washes?)
4. Discharge to Desalter (Navy removes VOCs only) (for on-Station shallow groundwater)
5. Discharge to IRWD for upgrade to potable water (Navy removes VOCs only) (for DON stand-alone system)
6. Discharge to IRWD reclaim water line (for irrigation, etc.)
7. Evaporation
8. Direct land application/irrigation (e.g., poplar trees; i.e., not through reclaim water line)
9. County Sanitation Districts of Orange County (CSDOC) brine line

PROJECT NOTE NO.	PROJECT NO.
PN-0145-108 CLE-C01-01F145-I2-0074	01-F145-H6

CONFIRMATION OF:	CONFERENCE		DATE HELD	13 January 1994
	TELECOM	X	DATE ISSUED	02 February 1994
	OTHER		RECORDED BY	Renée Jenneskens/CH2M HILL
			PLACE	MCAS, El Toro

SUBJECT

Contract Task Order (CTO) No.145
MCAS El Toro Remedial Investigation/Feasibility Study (RI/FS)
Remedial Project Managers (RPM) Meeting

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See last page

ACTION REQ'D. BY	ITEM

The Remedial Project Managers (RPM) Meeting for the Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility Study (RI/FS) was held at MCAS El Toro on 13 January 1994. Participants represented the following organizations: the Naval Facilities Engineering Command, Southwest Division (SWDIV); MCAS El Toro; U.S. Environmental Protection Agency, Region 9 (EPA); California Regional Water Quality Control Board (RWQCB), Santa Ana Region; the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC); Bechtel Corporation (EPA's consultant); and CH2M HILL (SWDIV's consultant for the CLEAN I Contract). These meeting notes summarize the items discussed at the meeting. A copy of the agenda is attached.

Action Items

- CH2M HILL will resolve the issue of the cost of field screening.
- MCAS El Toro will have a conference call on placing well placards at contaminated production wells.
- MCAS El Toro will investigate ways to identify RI sites at MCAS El Toro and develop a written policy so that workers will not accidentally affect the investigation (e.g., placard, fence, stakes, etc).
- CH2M HILL will present the second round of groundwater sampling results in the Groundwater Monitoring Plan. The agencies will provide feedback to CH2M HILL on the format of the data presentation.
- MCAS El Toro will collect samples from the Site 8 soil pile for Resource Conservation and Recovery Act (RCRA) disposal.

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- The Navy will set up a team building meeting.
- The Navy will respond to the agency letter requesting a removal action in Aqua Chinon Wash and investigate the possible use of a new cone penetrometer test (CPT) fluorescence spectrometer rig to delineate the extent of contamination.
- The agencies will provide feedback to the Navy on the Technical Proposal to conduct the Site 24 soil gas investigation.
- The team will reactivate biweekly conference calls.
- The EPA will prepare a written request to the Navy to get help for Andy Piszkin/Code 1831.AP.
- The Navy will respond to the EPA's request for digitized map files and sample locations.

Partnering Issues

A. Piszkin listed documents distributed to the regulatory agencies prior to this RPM meeting (Generic Sampling and Analysis Plan For A Typical Military Facility, prepared by SiteWorks, Inc. and Target Environmental Services [Jan 1994], MCAS El Toro Streamlined Approach for Operable Unit (OU-1) FS prepared by Davi Richards/CH2M HILL and OU-1 Feasibility Study MCAS El Toro Remedial Investigation/Feasibility Study also prepared by D. Richards. A. Piszkin stated he wanted the meeting to avoid confrontation and emphasize general issues and not debate specifics of comments on Phase II plans. John Hamill/EPA asked that the team go over action items from the last meeting. He also requested that the team discuss planning and scheduling a bottom-up review and have a team-building session. A. Piszkin proposed that these issues be discussed under "Future Meetings" on the agenda. He stated that he would like to meet with J. Zarnoch and J. Hamill to begin setting up the Base Realignment and Closure (BRAC) Cleanup Team.

J. Broderick stated that the RWQCB, according to Federal Facility Agreement (FFA) rules, is supposed to review MCAS El Toro fact sheets prior to publication and this opportunity was not given them for the last fact sheet. J. Dolegowski responded that this particular fact sheet had gone through six drafts with every intention to include everyone. J. Broderick requested that they see the fact sheet 48 hours prior to publication.

A. Piszkin mentioned that Jim Pawlisch/Code 18 had authorized the establishment of a new position - Public Affairs Officer for MCAS El Toro. He also said that CLEAN contractors can't put public notices in the newspaper. The Navy will have to do this from now on.

J. Zarnoch questioned whether Roy Herndon/OCWD had been invited to the meeting. A. Piszkin replied that he had not, but R. Herndon has been given updates on the status of the OU-1 groundwater modeling over the past few months.

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J. Zarnoch asked about the status of the wellhead placards to identify wells that produce contaminated groundwater. Chrisa Mitchell/MCAS El Toro replied that the City of Irvine was supposed to install the placards. The last time she spoke with the City, they had made signs but had not yet installed them.

The status of a recent incident near Site 6 was updated by C. Mitchell. She explained that the workers were overcome by fumes when excavating through concrete near Site 6. It was found to be an old oil-water separator. V. Parpiani said they could not identify the smell, however they believe it was decaying matter. The MCAS El Toro Safety Officer came out and took air samples. V. Parpiani stated that the area in question is more than 30 feet from the Installation Restoration Program (IRP) site.

J. Zarnoch requested they add discussions of underground tanks to the agenda. A. Piszkin replied that this will be discussed as part of the BRAC Cleanup Plan (BCP).

BRAC Cleanup Plan

Mike Arends/CH2M HILL said they had been given the notice to proceed on the BCP on 23 December 1993 and had since been selecting the project team. During the next 2 to 3 weeks, they will be collecting existing information and putting it into a database. He asked that there be a meeting with the RPMs around mid-February to identify data gaps and set direction. The first draft of the BCP is due on 31 March 1994.

J. Hamill voiced concern that Navy contracting has been a stumbling block for progress at El Toro. J. Hamill stated that Contracts has continually delayed work, affecting schedules. J. Allen responded that there was a misunderstanding on what shape the BCP would be in by 31 March 1994. They had felt it was better to commit time for comment up front rather than later. J. Allen added that two rounds of negotiations were conducted, and now there is a clear vision of what is needed. A. Piszkin stated that the regulatory agencies have not been involved in the scoping process. He stated they will start doing this by having the agencies attend the technical proposal conference. G. Garelick added that the responsibilities in the BCP will be divided up; the agencies will be resources and participate in writing. They will not give all the work to the consultants.

A. Piszkin stated that the Environmental Baseline Survey (EBS), the BCP and CERFA reports must all be out by 31 March 1994. The CERFA report summarizes the clean parcels. C. Mitchell is already trying to get clearance for a parcel for Caltrans. J. Zarnoch stated that they are in the process of issuing comments on the final RCRA Facility Assessment (RFA) report and that some of these comments affect the BCP. M. Arends replied that the remaining concerns will be addressed by BRAC.

A meeting date was set for 15-18 February at CH2M HILL. G. Stewart stated that base compliance people are needed for the meeting. J. Broderick commented that compliance issues are extremely important for the BCP. They may take up to two-thirds of the document. J. Broderick stated that the RI/FS and RFA are relatively minor and would like the state form filled out for underground storage tanks (USTs). Darrel Hernandez/CH2M HILL said he needed a copy of the form to direct a file search. J. Zarnoch will provide forms on USTs to Mike Arends. J. Broderick stated that the tank compliance programs were complex. He suggested meeting with the compliance

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program people at El Toro. A. Piszkin added that CH2M HILL needs to meet with RWQCB to make sure all needs are identified. C. Mitchell said that the main compliance person on tanks is George Martinez.

J. Zarnoch asked whether samples (borings) were taken in the center of the yard at DRMO #3. D. Hernandez replied that samples had been taken there as well as in other stains identified at the yard. J. Zarnoch asked what the analyses were. M. Arends replied that it was probably full scope of parameters, but he would need to check.

OU-1 Feasibility Study and Groundwater Modeling

Hooshang Nezafati/CH2M HILL distributed a handout (attached) summarizing work performed to date and work in progress for the OU-1 groundwater modeling task for the MCAS El Toro RI/FS.

He provided a brief background discussion of the groundwater modeling requirements for the OU-1 FS for the benefit of those people who are new to the MCAS El Toro project. He stated that the OU-1 groundwater modeling is evaluating the regional volatile organic compound (VOC) groundwater contamination emanating from MCAS El Toro. The MCAS El Toro team was tasked to evaluate the remedial alternatives needed to meet the OU-1 FS objectives.

Three alternatives are being evaluated: 1) No Action; 2) The Orange County Water District (OCWD) Desalter Project; and, 3) the Desalter Project plus shallow extraction alternatives. OCWD previously concluded by use of their groundwater model that the Desalter Project with seven proposed extraction wells and a projected capacity of 7.3 million gallons per day (mgd) would effectively capture the VOC contamination. Since their study was performed prior to the completion of the Phase I RI field investigation, they did not have the benefit of utilizing the site-specific information in their groundwater model. The MCAS El Toro team was tasked to evaluate the OCWD groundwater model, refine it as necessary in light of the Phase I RI data, incorporate Phase I RI data, recalibrate the refined model, and use the model as a tool to evaluate the Desalter alternative, as well as a number of additional remedial alternatives.

A. Piszkin asked if the CLEAN Team had verified the OCWD model results. H. Nezafati replied essentially yes, but there are a few concerns (listed below).

- The time required by the Desalter Project to capture the shallow contamination; it may take more than 20 years.
- "Smearing" of contaminants within the aquifer, because the Desalter wells would eventually pull down the VOC contamination through more fine-grained silty/clayey formations down to previously uncontaminated zones.
- The "economics" of treating the large volume of groundwater with lower VOC concentrations with the Desalter Project alone, as opposed to extracting the low volume high concentration shallow contamination locally in addition to the Desalter Project. He

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emphasized that it is more cost effective to treat smaller volumes of water with higher concentrations.

- o The long-term feasibility of the Desalter Project due to concerns regarding the long-term yield of the Irvine Subbasin. Under current pumping conditions, the basin is exporting water out of the basin. If the Desalter Project is implemented as planned, it would eventually require that more water be imported from the adjacent basin. The basin may be depleted from its useful capacity if long-term groundwater management measures, such as artificial recharge, are not seriously considered.

J. Zarnoch questioned whether localized extraction wells were included for the northern benzene plume as one of the alternatives. D. Richards responded that because the Desalter is going on-line in 1996, there needs to be shallow extraction wells in place in the southwest quadrant to prevent the smearing of contaminants. She felt that other locations outside of the southwest quadrant could be dealt with later. John Dolegowski/CH2M HILL added that when we acquire more information after Phase II, the design for the more remote locations can be optimized. J. Broderick stated that there will be a long lag time before remote sites are affected. J. Zarnoch expressed concern that if the other problems such as the fuel plumes at the tank farms and the TCE at Site 2 were not handled now, it may be years before they are dealt with. D. Richards responded that OU-1 was separated out and is progressing more rapidly in order to proceed with the Desalter project. She added that Sites 2, 3 and 4 are more properly included in OUs 2 and 3.

Soil Gas Investigation

J. Dolegowski briefly summarized the field test of a vibratory method to install soil gas probes completed at MCAS El Toro by Target Environmental Services on 29 December 1993. J. Zarnoch expressed concern with the amount of time required to hand auger to 7 feet, as required by JEG Standard Operating Procedures (SOPs) to check for utilities. J. Dolegowski expressed concern over the sideways flexing of the probe within the auger hole. J. Zarnoch said this could cause problems in that it would be difficult to get a seal. S. Beard added that this is made worse because the tip head is larger than the probe diameter. This allows air to migrate in. J. Dolegowski replied that this is necessary or else swelling clays can cause difficulties in retracting. S. Beard commented that the traditional "push" methods seem to work well or even better than this method. J. Dolegowski responded that Yueh Chuang/CH2M HILL felt the same way and that he would, therefore, request the traditional hydraulic push method of probe installation. A. Piszkin expressed concern over what the "normal" production rates would be. S. Tindall commented that the normal rate is 30 seconds/foot.

S. Beard expressed concerns with Target's lab techniques. Target said during the demonstration that they could hold samples for one week prior to analysis. S. Beard would like to see this time reduced. S. Tindall explained that Target did 1 million dollars worth of soil-gas work at MCLB Barstow through Jacobs and that their work met Navy requirements. J. Broderick said that Marine Corps Camp Pendleton also used Target, and they were fine. J. Dolegowski explained that the lab can be set up in

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different ways. For the soil gas investigation planned for MCAS El Toro, an onsite mobile laboratory will be used for soil gas analysis. Splits will be sent out to be tested.

S. Beard expressed further concerns with protocol. She asked whether there would be a Soil Gas Work Plan for review. J. Dolegowski gave a breakdown on the soil-gas survey schedule. The fastest time in which it could be completed is four months. Agency review and revision of the Work Plan would add another two months. S. Beard mentioned that she likes the idea of communicating during preparation of the Work Plan. J. Dolegowski agreed and suggested they focus on the areas of greatest concern. A. Piszkin said there will be a reduction in the scope of the soil gas investigation compared to that proposed to the agencies in August 1993. J. Broderick stated that they should start where the main areas are and expand out, not limit the number of sample points. A. Piszkin responded that they had budgeted 500 locations in the current cost proposal, and it would not be possible to change the scope back to the 1,500 locations proposed in August without additional time delays.

S. Tindall expressed concern about the impact of the concrete tarmacs on the soil gas data. He said that during the August 1993 RPM meeting, the agencies suggested installing probes around the tarmac at different depths. J. Dolegowski responded that they had talked to Target about this and Target did not think perimeter sampling would work. S. Tindall commented that he sees funding and time as the major problems.

J. Hamill proposed leaving CH2M HILL to discuss the details of the soil gas survey with LCDR Serafini to come up with a proposal. S. Beard expressed concern that an on-site lab was needed. She also suggested having a meeting to discuss preliminary ideas and outline a work plan together. At A. Piszkin's request, J. Dolegowski distributed the Technical Proposal submitted to SWDIV for the soil gas investigation. S. Beard asked to discuss the 500 soil-gas locations later. J. Broderick responded that he would like to have operations people present when the soil-gas survey is discussed.

S. Tindall commented that "it seems like the Navy limits the field work to the amount of money they have and this seems like a problem." Chuck Elliott/CH2M HILL responded that there is a limited amount of funding. Following this discussion the regulatory agencies requested a caucus for 20 minutes.

Field Screening

J. Hamill commented that Bruce Peterson/CH2M HILL had given a proposal at the August 1993 RPM meeting on a field screening approach that they liked. J. Hamill added that he would like to see a comprehensive field screening/soil gas survey done for all sites at the Station. C. Elliott responded that the techniques to do so are sufficiently expensive that the survey must be limited to specific areas. S. Tindall stated that he believes vendors can deliver massive numbers of data points for the same amount of cost. J. Hamill conceded that the issue of cost is a reality and this must be resolved first. J. Hamill suggested that cost issues be discussed at the meeting with Al Robbat/SiteWorks and Ned Tillman/Target Environmental planned for the following day.

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J. Dolegowski passed out a technical memorandum on the evaluation of field screening for Phase II of the MCAS El Toro RI. C. Elliott stated that there are some technical limitations in the use of the field screening data generated from the mobile mass spectrometer (MS). J. Dolegowski stated that after looking at the cost issue carefully and talking to Al Robbat, the lowest cost that could be obtained for the onsite MS analysis is 40 percent of the cost of a fixed laboratory analysis. He added that the generic work plan prepared by SiteWorks and Target is based upon MCAS Yuma, which is a significantly smaller site that MCAS El Toro. J. Dolegowski requested that the team read the Field Screening memo this evening. J. Hamill asked to set up a separate meeting after tomorrow for this in order to reach a consensus.

Transition of the RI/FS from the CLEAN I to CLEAN II Contract

A. Piszkin explained that there is a proposal for MCAS El Toro to transition the RI/FS to CLEAN II because the CLEAN I contracting capacity is insufficient to complete all RI/FSs in progress. He added that the Navy has had a meeting with Rich Seraderian/EPA regarding the transition as well as the conflict of interest issues related to the use of Bechtel Corporation for the CLEAN II Contract due to Bechtel's current technical support contract with EPA for the MCAS El Toro site. A. Piszkin passed out an issue paper (attached) regarding one of six total options to which they think the Navy and EPA will agree.

A. Piszkin stated that he had asked CH2M HILL to put together a summary response of the regulatory agency comments on the Phase II Work Plan. J. Hamill said he understood that EPA was going to have a say in this. A. Piszkin talked about the issue of how one consultant does not like to implement the work plan of another consultant, and, therefore, there is an option for Bechtel to write the revised Phase II Work Plan based on the comments.

J. Zarnoch expressed a concern about the conflict of interests. S. Tindall responded that when the Bechtel CLEAN II contract is started, he won't be working as EPA's consultant.

A. Piszkin stated that when the CLEAN II contract begins, Bechtel will be the Team's contractor (i.e. Bechtel will be available to complete work for the Navy, the State, and EPA). J. Broderick asked whether CH2M HILL would be available as the Team's consultant for the remainder of the OU-1 work. He asked that this be considered. J. Dolegowski stated that CH2M HILL wants to get as much input as possible from the agencies so that everyone is on board. D. Richards added that the OU-1 RI and FS documents will be out for agency review in few months. A. Piszkin explained that the focus of the coming years will be to bring the agencies into the budget process.

Site 8, Stratum 3 Soil Pile

A. Piszkin explained that in December 1993, the top ten inches of Stratum 3 were excavated from Site 8 by a paving contractor and were placed on the slopes of Bee Canyon Wash. The soil was identified during the Phase I RI to be contaminated with PCBs. When C. Mitchell became aware of this action, she requested that the soil be overexcavated, stockpiled nearby, and covered. The soil pile is approximately 260 cubic yards. S. Tindall asked if LCDR Serafini had given permission for the removal of

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this soil from Site 8. J. Hamill wanted to know what could be done to ensure this does not happen again.

A. Piszkin said they are sampling the piles of soil, to see if it's hazardous waste. He explained that they don't want to move it too much as it may contain high PCBs and other chemicals. A. Piszkin asked for input from the team on what to do. J. Zarnoch replied that if you sample now, the magnitudes will probably be lower because it's now been mixed with clean soil. S. Tindall asked how the sampling would be done. J. Zarnoch replied that three dimensional sampling could be done with one sample for every 25 cubic yards. He recommended sampling for metals, PCBs, and semivolatiles, but not VOCs. A. Piszkin asked that J. Zarnoch and C. Mitchell work out the protocol for sampling the soil pile.

S. Tindall asked if the soil could be put in bins which could be located on top of Stratum 3 in Site 8 and treated later with the rest of the soil from Stratum 3 at Site 8. A. Piszkin and J. Dolegowski responded that the Navy needs to perform removal actions now because the volume is too great to return. J. Broderick added that if the soil is disposed of in a municipal landfill, then a liner is needed and a Subchapter 15 Closure must be done. S. Tindall expressed concern with the high cost of sampling.

J. Hamill asked what has been done since the incident to stop this from happening again. C. Mitchell replied that they must now get verbal permission prior to disturbing soil at an RI site. S. Tindall questioned why placards are not put up at all the RI sites. J. Hamill requested written approval prior to action, not just vocal.

A discussion of the agenda followed and it was decided that the subject of meetings would now be addressed. A discussion of the regulatory comments on the Phase II Work Plan will be delayed to a later date.

Content of the First RAB Meeting

A. Piszkin went over the agenda for the first meeting of the Restoration Advisory Board (RAB), scheduled for later in the evening (14 January 1994). He stated the goals of the meeting were to educate the community regarding base closure and cleanup and talk about the RAB. A discussion of how to identify people to be on the committee followed. J. Broderick stated there can be anywhere from approximately nine to twenty people on the committee. A. Piszkin distributed a handout regarding the RAB. He stated that the applications for RAB membership were due on 14 February 1994 and the final decision would be announced on 23 February 1994.

It was agreed that A. Piszkin, J. Hamill, J. Broderick, and J. Zarnoch would meet in San Francisco on 27-28 January 1994. S. Tindall proposed the four managers go over comments to the Phase II RI documents.

The next Manager's meeting was scheduled for 08-09 February 1994 at MCAS El Toro. It was decided that strategies for the BCP would be among the items discussed at this meeting.

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	Attendance List Jeff Allen - Code 0232.JA *Mike Arends - CH2M HILL/SCA Sherrill Beard - DTSC John Broderick - RWQCB John Burleson - CMC(LFL) Jane Diamond - EPA John Dolegowski - CH2M HILL/SCA Chuck Elliott - CH2M HILL/SAC *Ginny Garelick - Code 1853/VC John Hamill - EPA *Darrel Hernandez - CH2M HILL/SCA Renée Jenneskens - CH2M HILL/SCA *Kris Key - Code 1831.KK Liz Miesner - CH2M HILL/SFO Chrisa Mitchell - MCAS El Toro Hooshang Nezafati - CH2M HILL/SCA Vish Parpiani - MCAS El Toro Andy Piszkin - Code 1831.AP Davi Richards - CH2M HILL/CVO Gary Stewart - RWQCB Sebastian Tindall - Bechtel Corp. Joe Zarnoch - DTSC

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CONFIRMATION OF:	CONFERENCE	X	DATE HELD	30 June 1993
	TELECOM		DATE ISSUED	22 July 1993
	OTHER		RECORDED BY	Hooshang Nezafati/CH2M HILL
			PLACE	MCAS El Toro

SUBJECT

Contract Task Order (CTO) No. 145
Modeler's Meeting Minutes
Remedial Investigation/Feasibility Study (RI/FS)
Marine Corps Air Station (MCAS) El Toro

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

J. Dolegowski - CH2M HILL
R. Freitas - EPA Region 9
J. Hamill - EPA
A. Piszkin - Code 1831.AP
T. Sovich - OCWD
J. Zarnoch - DTSC Region 4
C. Mitchell - MCAS El Toro
G. Stewart - RWQCB
P. Mock - CH2M HILL
LCDR L. Serafini - MCAS El Toro
J. Woodling - DTSC/SAC
R. Herndon - OCWD
H. Nezafati - CH2M HILL
S. Tindall - Bechtel Corp.
J. Broderick - RWQCB

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A groundwater modeler's meeting was held at MCAS El Toro on 30 June 1993. A copy of the meeting agenda is attached.

LCDR Serafini/MCAS El Toro opened up the meeting stating that the goal of the meeting was to decide on the groundwater modeling requirements for the Operable Unit -1 (OU-1) Feasibility Study(FS). He said he hoped that we could make a firm decision during the meeting to proceed with the groundwater modeling task to get the OU-1 FS underway. He added there is a lot of interest in moving ahead with this project, including congressional interest. He said that the Marine Corps wants to proceed rapidly and finalize negotiation with the Orange County Water District (OCWD) for the Desalter Project and to get a Record of Decision (ROD) one year before the Federal Facilities Agreement (FFA) deadline for the OU-1 ROD.

Roy Herndon/OCWD gave an overview of the existing OCWD groundwater model for the Irvine subbasin. He stated that the OCWD modeling objectives were as follows:

- To evaluate potential for trichloroethylene (TCE), nitrate (NO_3), and total dissolved solids (TDS) migration without the Desalter Project
- To develop optional wellfield layout to control/remove TCE, NO_3, TDS

He added that the Desalter Project is essentially a water supply project - there is no incentive to turn off the pumps. Roy described the vertical extent of contaminants in the regional groundwater. The highlights are summarized below :

- Upper Aquifer zone - high NO_3, TDS
  - constant water levels

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- o Middle zone - high production, TCE
  - varying water levels in response to pumping
- o Lower zone - clays/shales, low production, TDS

OCWD used the U.S.Geological Survey's MODFLOW code to construct a one-layer, 2-Dimensional (2-D) model. The major features of the OCWD model are listed below.

- o The principal aquifer is modeled as one layer.
- o 30 rows by 56 columns; uniform spacing (1000 feet apart)
- o Constant hydraulic conductivity (K) of 15 feet/day (a representative average value of the subbasin)
- o Constant-head boundary at Newport Boulevard (-35 feet above mean sea level {MSL})
- o A vertical leakage is estimated to compensate for the upper aquifer.
- o 1990 groundwater elevations were used for steady state calibration
- o Recharge estimates for the Santa Ana foothills were calculated using the estimated leakage value and the change of storage in 1990.

Roy also mentioned that capture zone analyses were performed using MODPATH, a particle tracking code. He summarized the analyses as follows :

- o Steady state simulated heads were used as input.
- o After 20 years production at 7.1 million gallons per day (mgd), the Irvine Desalter could reverse the flow and capture the plume.
- o Simulations do not include the Irvine Ranch Water District (IRWD) production wells.
- o Some of Desalter wells are located on the base perimeter; $750,000 each.
- o 7 extractions wells are planned for the Deslater Project for a total production of 7.1 mgd.
- o The western portion of TCE plume will be captured by the existing The Irvine Company (TIC) Wells (already contaminated with <5 parts per billion [ppb] TCE)

Roy Herdon also stated that for the Desalter Project, 7 wells have already been installed as follows:

- o Four new wells; IDP-1,2,3,4
- o Three existing wells ; TIC-110, TIC-111, and ET-1

Roy Herdon further stated that the Desalter Project capital cost is $35 million, and all approvals have been granted for the project. The Desalter is planned to be operational by Fall 1995. Roy added that groundwater monitoring is needed after the Desalter comes on-line, and he feels that the water level information could be used to calibrate the model as the project progresses. OCWD agreed to pay IRWD should drawdowns be excessive at the IRWD Culver Avenue wells. IRWD has asked for water

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treatment down to non-detect level. Roy said the Navy will pay for treatment down to 0.5 ppb. The volume of the current plume is 150,000 acre feet, and 20 years of pumping at 7.1 mgd would remove one pore volume.

Rich Freitas/EPA suggested that contaminated groundwater could be blended with uncontaminated groundwater to an acceptable quality.

John Woodling/DTSC asked if we have control over the pumpage of water for TIC-100, TIC-113, TIC-78. Roy Herdon responded by stating that if pumpage decreases for some reason, the demand would be made up by IRWD. Roy Herdon said that if for some reason the system doesn't work, then OCWD can construct additional wells.

Summary of CH2M Review of the OCWD Groundwater Model

Hooshang Nezafati/CH2M HILL stated that CH2M HILL has completed a review of the OCWD model and that review comments comprise seven points. With the exception of one or two major points, the rest of the comments just require fine tuning of the model based on newly available information. Copies of his hand outs are attached. He stated that the objectives of the modelling OU-1 are to verify the OCWD groundwater modeling results (i.e, capture zone analyses) and to answer following questions:

- Will the Irvine Desalter Project capture volatile organic compounds (VOCs) originating from MCAS El Toro?
- Will the model support evaluation of alternatives?

He emphasized that to meet the objectives of the OU-1 FS it is imperative that the proposed extraction system (i.e., Desalter Project) effectively capture the VOC impacted regional groundwater. He added that , based on the Phase I RI data, TCE on-Station is found within the uppermost 200 feet in the shallow aquifer underlain by an aquitard predominately comprised of clays and silts. The OCWD model does not explicitly represent the shallow aquifer; it instead compensates for that by incorporating an estimated constant leakage value that is uniformly applied to the entire model grid. The shallow aquifer was bypassed in the OCWD model for a good reason because the shallow aquifer does not offer a potential for water supply. H. Nazafati added that we think the OCWD has done a good job of setting up the model for the purpose of evaluating the water supply potential of the principal aquifer, based on the available information at the time. Representing the hydrologic effect of the upper aquifer through the estimated leakage value is quite justified for this particular purpose.

OCWD's 2-D capture zone analysis based on particle tracking indicates that the TCE-impacted groundwater would be captured by the Desalter wells. Since the model is 2-D, the simulated capture zone is more representative of the TCE-impacted principal aquifer. The OCWD's model assumes that TCE-contaminated shallow groundwater is pulled down into the principle groundwater producing zone. It is unknown whether TCE-contaminated groundwater in the shallow zone would be captured beyond the Desalter extraction wells at the MCAS El Toro perimeter. As a result, it is possible the TCE-contaminated shallow groundwater will migrate further downgradient. The regulatory agencies need to decide whether it is acceptable to pull the TCE-contaminated groundwater down and risk "smearing" TCE across the entire

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thickness of the aquitard, or whether they prefer to intercept and capture groundwater closer to the source areas by installing a series of local shallow extraction wells. H. Nezafati added that if the answer is the latter, then a 3-D model is necessary to incorporate a direct representation of the shallow aquifer and the underlying aquitard. H. Nezafati provided other recommendations to improve the OCWD model, among them the constant-head boundary condition used at Newport Boulevard and the need for a direct estimation of the recharge components of the water budget were discussed in more detail (see attached handouts). He stated it is further recommended that solute transport modeling be performed to complement the proposed flow modeling, since it would provide a better and more efficient evaluation of the OU-1 FS remedial alternatives. He concluded that based on review and evaluation of the OCWD model it is recommended that the existing OCWD model be refined and further updated utilizing Phase I RI data. The refined 3-D flow model in combination with a complementary solute transport model could become an effective tool to evaluate the remedial alternatives for MCAS El Toro.

- o Woodling asked that we concentrate on the capture zone, not just the heads.
- o R. Freitas commented on the fact that containment not cleanup is the goal
- o John Woodling stated that we don't have an understanding of how much water is produced from the shallow aquifer. It is clear that TCE is currently migrating vertically with current pumping.
- o R. Freitas stated that it may be wise to hydraulically isolate the source area if dense non-aqueous liquids (DNAPLs) are present. John Broderick/RWQCB agreed.

Peter Mock/CH2M HILL, talked about model refinements and gave some detail information on the following :

1. Refinement of the northwest model boundary would not take more that one day, an analytical model could be used to calculate fluxes.
2. The leakage estimate needs to be recalculated because constant leakage doesn't vary with applied stresses (pumping)

He suggested using direct hydrologic budget analysis to estimate mountain front recharge and evapotranspiration (ET) to estimate agricultural recharge. He also gave detailed information on the availability of the 3-D data from both OCWD Westbay Wellfield System and the Phase I RI investigation.

- o J. Woodling recommended using a 2-D model with modification on the northwest boundary.
- o R. Freitas thought a 2-D model would be sufficient
- o J. Broderick again asked whether it is smart for the Navy to pull TCE through the aquitard and if a series of shallow local groundwater extraction wells should be used.

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- LCDR Serafini stated that OCWD is afraid that shallow pumping will not be incorporated into the ROD and this will delay participation of the Navy in cost sharing with OCWD.
- Sebastian Tindell/SAIC suggested an interim ROD for the offsite OU-1 if that was the case.
- J. Woodling expressed concern whether the grid spacing for the upper aquifer is tight enough for evaluation of alternatives.

The agencies stated that they do not have any particular requirement for using groundwater models to meet FS objectives and that the MODFLOW code is acceptable. They further indicated that it is the Navy's call to whether use the OCWD model or any other model. The Navy instructed CH2M HILL to incorporate the proposed refinements to the OCWD model as follows:

- Construct a 3-D model
- Incorporate the Phase I RI and OCWD Westbay Wellfield Data into the 3-D model
- Recalculate recharge estimates
- Refine the northwestern boundary condition from constant-head to prescribed fluxes
- Recalibrate the refined model
- Perform sensitivity analysis
- Refine the grid spacing in the southwestern quadrant

Navy also asked CH2M HILL to make an initial assessment of refining the grid spacing from 1000 ft to a smaller spacing in the southwestern quadrant portion of the modeled area to allow for better accuracy to represent the local shallow extraction wells. The meeting was adjourned at 11:55 A.M.

Nonparticipant Distribution

R. Green - Code 0232
K. Reynolds - Code 1841
J. Allen - Code 0232.JA
J. Dolegowski - CH2M HILL
K. Tomeo - CH2M HILL
File - CTO Notebook/PMO
File - PMO
File - CH2M HILL

GROUNDWATER MODELING MEETING
MCAS EL TORO RI/FS
AGENDA

0800-0845	INTRODUCTION	LCDR L. Serafini
0845-0900	OCWD MODEL : An Overview	Roy Herndon/OCWD
0900-0920	SUMMARY OF REVIEW COMMENTS AND RECOMMENDATIONS	Hooshang Nezafati CH2M HILL
0920-0935	REFINEMENTS TO OCWD MODEL: Results of Trial Test Runs	Peter Mock CH2M HILL
0935-1030	OPEN DICSUSSION	TEAM
1030-1045	BREAK	
1045-1130	OPEN DISCUSSION (Cont'd)	TEAM
1130-1145	RESOLUTION : Action Items	TEAM
1145	ADJOURNMENT (MCAS El Toro TRC Meeting Follows at 1300)	

OCWD MODEL OVERVIEW

OCWD Conceptual Model

- One-layer (2-Dimensional) flow model
- Model layer depicts the middle aquifer system
- Estimated leakage value is used to compensate for the water table aquifer and the underlain aquitard
- Water Sources: Mountain front recharges and leakage through the overlying aquitard
- Withdrawals: Pumpage and subsurface flow across the northwestern boundary

OCWD MODEL OVERVIEW

MODFLOW Model

- U.S.G.S's MODFLOW Code
- Block Centered Grid: 30 Rows by 56 Columns with uniform spacing (1,000 ft)
- Hydraulic Conductivity : k= 15 feet/year
- Confined/Unconfined Option: Adjustable Transmissivity (T)
- Aquifer top and bottom elevations (T = k x [aquifer thickness])
- Constant-Head BC along Newport Boulevard (-35 feet mean sea level)
- Recharge BC's Elsewhere

OCWD MODEL OVERVIEW

Simulation Results

- Steady-State simulation (No Desalter Project alternative)
- Potential for TCE to migrate westward (Culver Drive TIC wells)
- 20- year transient simulation (Desalter alternative)
- 7 wells: Existing wells (ET-1,TIC-110, and TIC-111)
- New wells (IDP-1 through -4)
- 8,000 Acre-feet/year (7.1 MGD)
- Approaches Steady-State in 10 Years
- TCE-laden Groundwater would eventually be pulled back eastward (Culver Drive)
- Majority of the groundwater emanating from MCAS El Toro would be captured

REVIEW COMMENTS

Constant Head

- Influenced by the proposed well field
- A source of water for Desalter alternatives
- Long-term water import may not be guaranteed

REVIEW RECOMMENDATIONS

Constant Head

- Move current boundary 3-4 miles to encompass a larger area
- Use a constant-flux BC for steady-state and variable fluxes for Desalter alternative

REVIEW COMMENTS

2- vs. 3-Dimensional Model

- Vertical flow is an important component of the governing flow system
- Not adequate information provided by 2-D representation
- Shallow aquifer (<200 ft) on-Station shows highest TCE (2,000 ppb)
- IDS wells are deep (up to a depth of 700 ft)
- Screened across the entire saturation zone
- Additional local shallow wells may be required
- Simulation of particle tracking or contaminant transport can be greatly improved
- 3-D significantly enhances the existing OCWD model
- The objectives of OU-1 FS are better served

REVIEW RECOMMENDATIONS

2- vs. 3-Dimensional Model

- **Construct 3-D Model**

- **Add layers to represent the shallow aquifer and aquitard, middle aquifer, and deeper aquifers**

REVIEW COMMENTS

Leakage Estimate

- Leakage estimate has inherent uncertainties
- Primarily calculated using one k value not measured or verified
- Larger uncertainties: Water-budget-derived mountain front recharge estimate
- Storage capacity of the aquitard is not presented
- Model exhibits a great deal of sensitivity to the leakage estimate
- Recalculation is needed to minimize the associated uncertainties

REVIEW RECOMMENDATIONS

Leakage Estimate

- Estimate recharge separately for Santa Ana Mountains, San Joaquin Hills, and the agricultural areas
- Use hydrologic analysis: Rainfall, drainage areas
- Estimate agricultural recharge from crop acreages and typical leaching fraction for the area and crop types
- Distribute recharge values according to the surface hydrologic features and land use maps

REVIEW COMMENTS

Calibration: Steady State vs. Transient

- Partial Calibration: Steady-state
- 1990 groundwater conditions are assumed to represent the steady-state conditions
- Basin may not be a steady state currently or in the future

REVIEW RECO...MENDATIONS

Calibration: Steady State vs. Transient

- Review hydrographs: Historical data vs. current conditions
- Use Hydrographs of Westbay, monitoring, and selected irrigation wells
- Calibrate for steady-state or transient conditions, if possible

REVIEW COMMENTS

Incorporation of Phase I RI Data

- Hydrogeological data distribution can be significantly improved
- On-Station portion of the modeled area

REVIEW RECOMMENDATIONS

Incorporation of Phase I RI Data

- **Refine and update the OCWD model using RI data**

REVIEW COMMENTS

Sensitivity Analysis

- **The sensitivity analysis is not fully performed and documented**

REVIEW RECOMMENDATIONS

Sensitivity Analysis

- **Perform a complete sensitivity analysis**
- **Summarize the sensitivity coefficients for significant parameter variations**

REVIEW COMMENTS

FS Objectives and Solute Transport Modeling

- Contaminant transport can significantly enhance the evaluation of remedial action alternatives
- In particular, cost-effective capture and cleanup of the VOC-impacted shallow groundwater on-Station
- Solute transport process can also be incorporated
- Would provide comparative data on the estimated rates of groundwater clean-up: Mass removal and cleanup time
- Can also be used for future evaluations: OU-2 and OU-3 FS

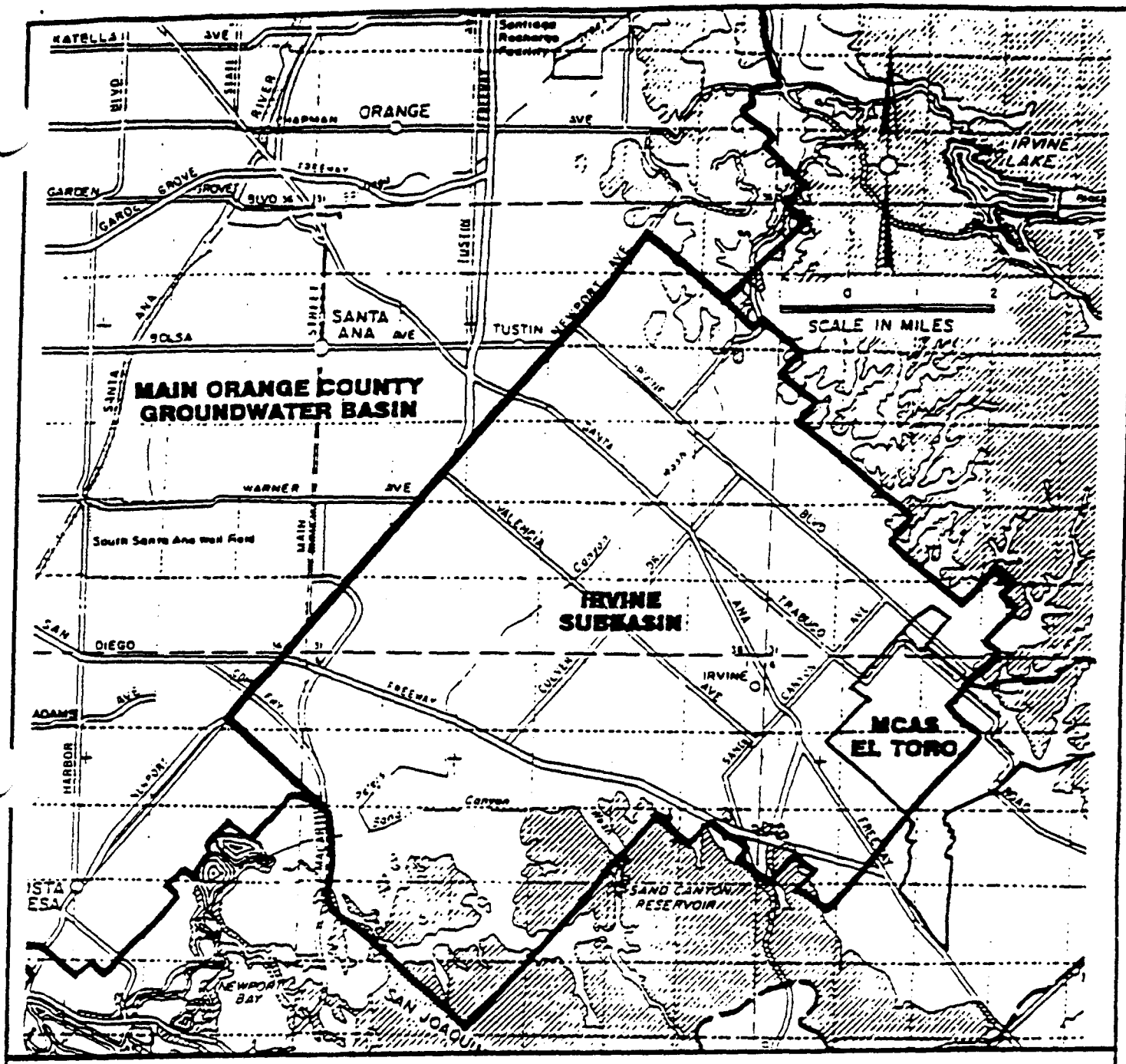
REVIEW RECOMMENDATIONS

FS Objectives and Solute Transport Modeling

- **Perform a solute transport modeling to complement flow modeling**
- **Use MT3d designed specifically to interface with MODFLOW**

CONCLUSION

- Refine and recalibrate OCWD's MODFLOW model using Phase I RI data
- Would update and further enhance the existing OCWD model
- Would provide a technically sound tool for remedial alternatives
- Adverse affects of future developments: May require EIR

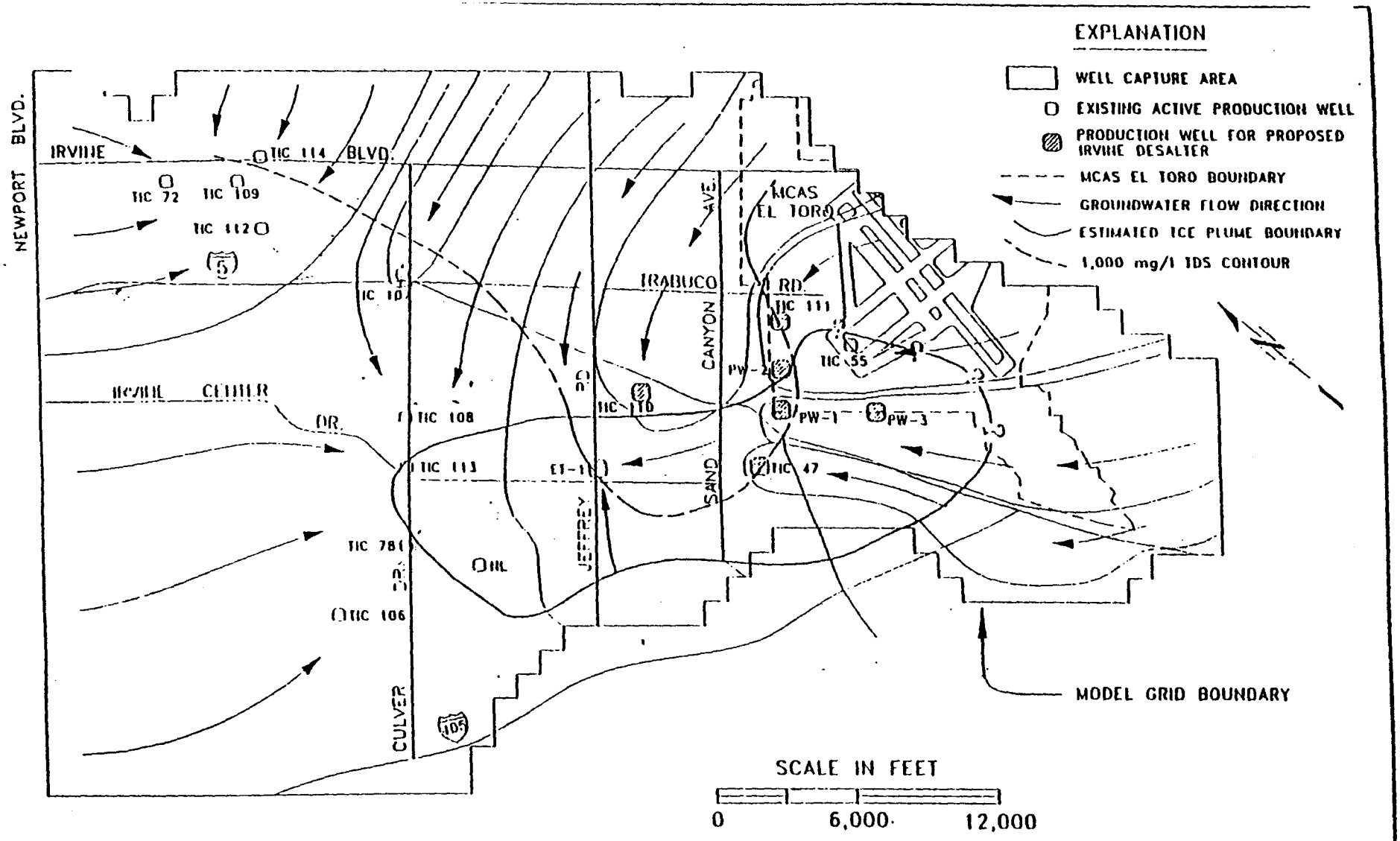


LEGEND

BEDROCK

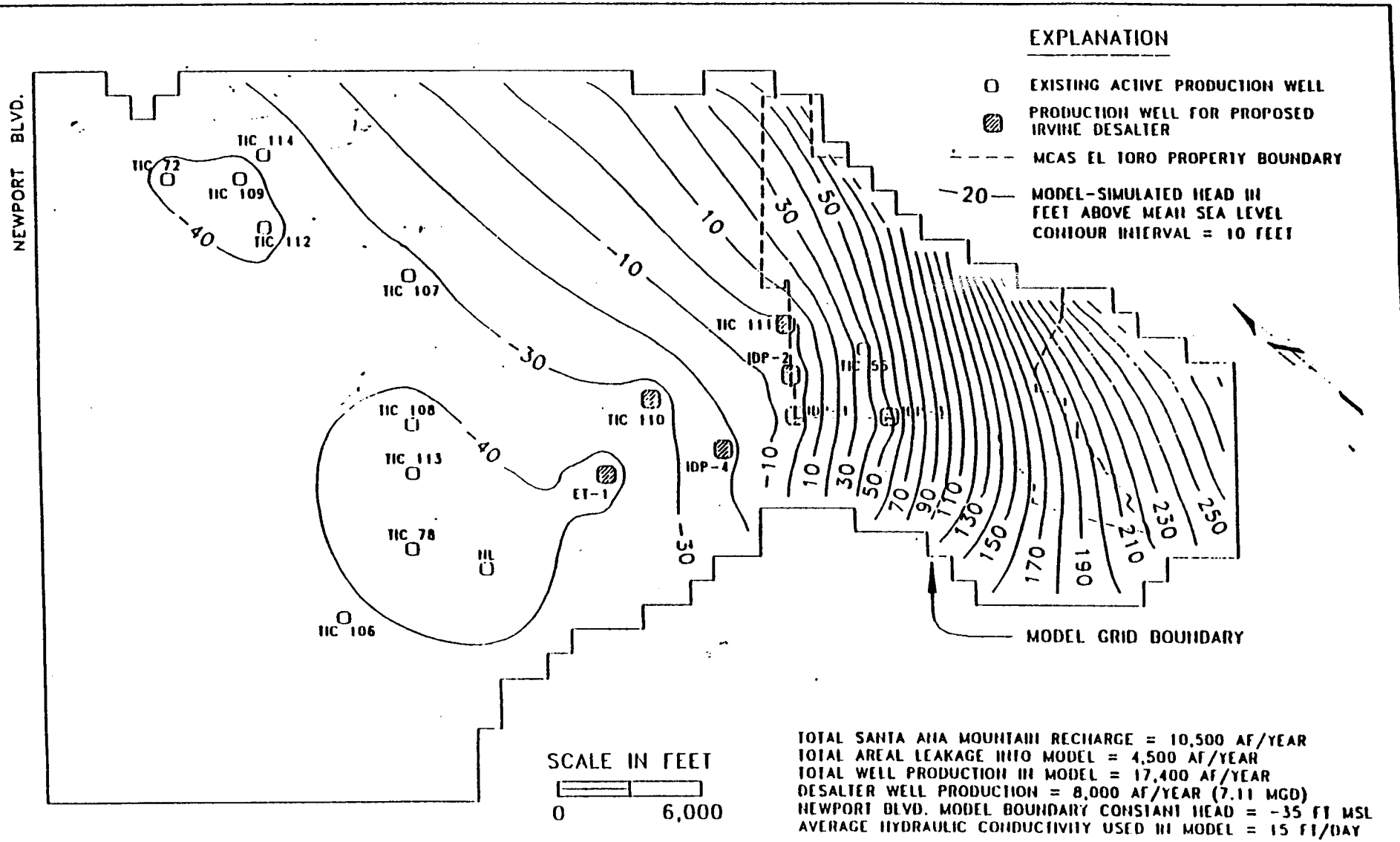
FIGURE 1-7
GROUNDWATER BASIN BOUNDARIES NEAR AND AT MCAS EL TORO
MCAS EL TORO PHASE I RI
TECHNICAL MEMORANDUM

Source: Banks, 1984 and California DWR, 1967



GROUNDWATER FLOW DIRECTIONS AND WELL CAPTURE AREAS FOR PROPOSED 7-WELL, 7.1-MGD, IRVINE DESALTER

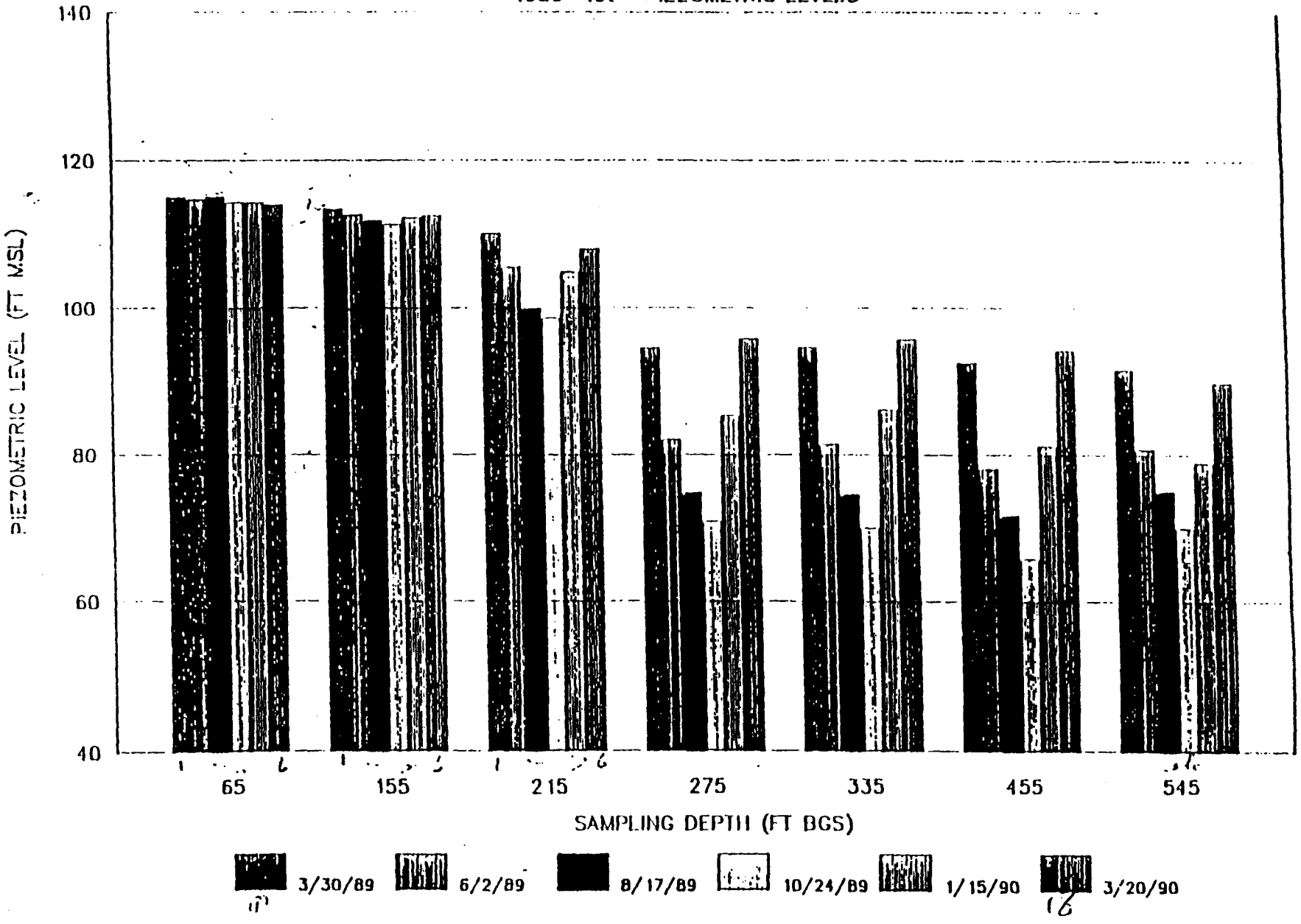
FIGURE 1-4



MODEL-SIMULATED HEAD AFTER 20 YEARS OF PROPOSED IRVINE DESALTER WELL PRODUCTION

FIGURE 5A. MCAS-1 PRESSURE PROFILE

1989-19. EZOMETRIC LEVELS



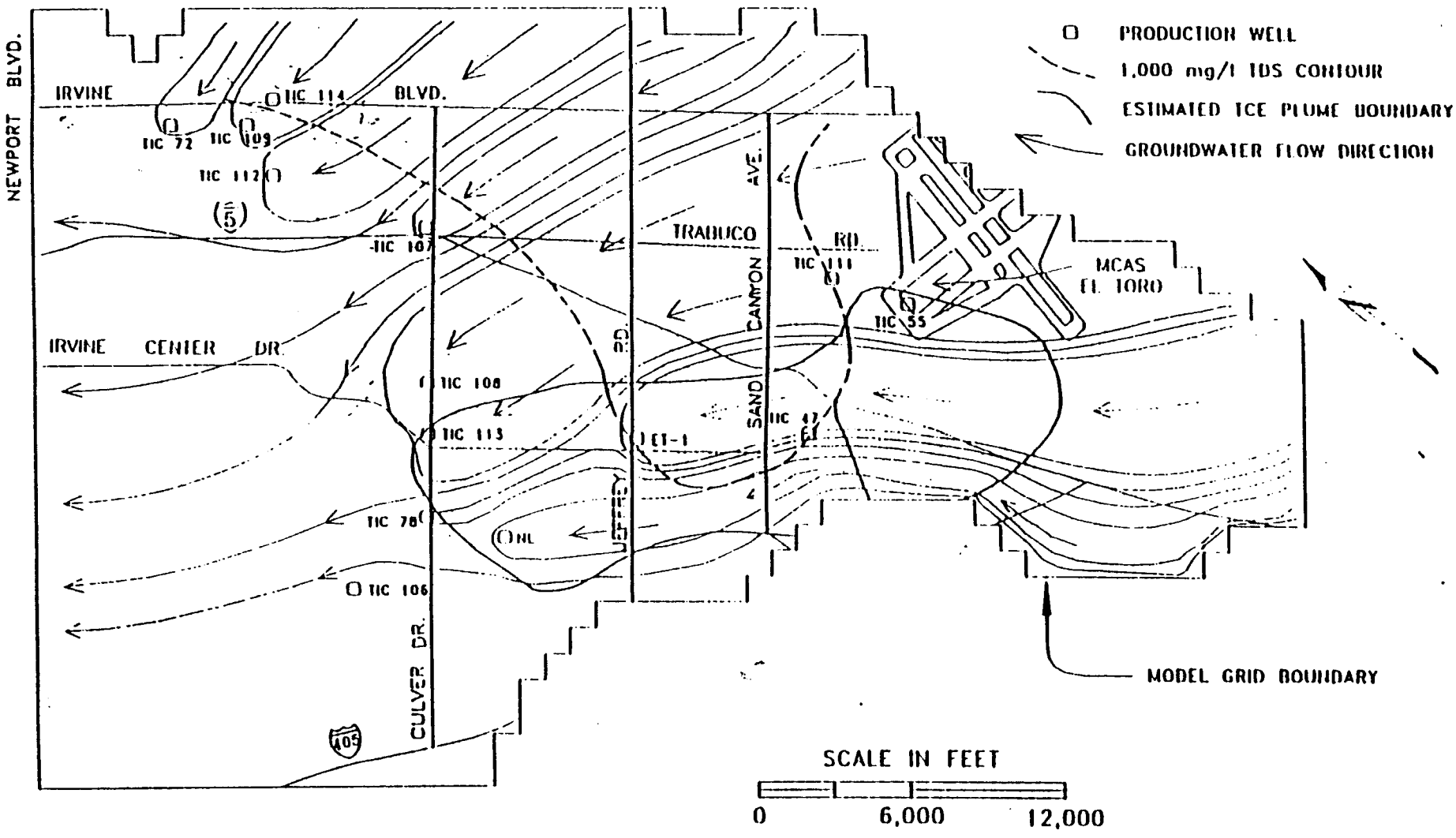


FIGURE 4. Model-Simulated Groundwater Flow Directions and Well Capture Areas for Alternative No. 1 (No Project)

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PN-0145-87 CLE-C01-01F145-I2-0062	01-F145-H6

CONFIRMATION OF:	CONFERENCE	X	DATE HELD	9-10 June 1993
	TELECOM		DATE ISSUED	29 June 1993
	OTHER		RECORDED BY	S. Diehl/CH2M HILL
			PLACE	Santa Ana

SUBJECT

Contract Task Order (CTO) No.145
DQO Meeting Minutes
MCAS El Toro RI/FS

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See list on last page

ACTION REQ'D. BY	ITEM

The second meeting on Data Quality Objectives (DQOs) for the Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility Study (RI/FS) was held in Santa Ana, CA at CH2M HILL on 9-10 June, 1993. Participants represented the following organizations:

the Naval Facilities Engineering Command, Southwest Division (SOUTHWESTDIV); MCAS El Toro; the U.S. Environmental Protection Agency (EPA); the California Regional Water Quality Control Board, Santa Ana Region (RWQCB-SAR); the California Department of Toxic Substances Control (DTSC); Bechtel Environmental, Inc. and CH2M HILL. These meeting notes summarize the decisions reached, the action items, and the discussion of the meeting.

Decisions Reached

- The cutoff depth for surface soils is set at 10 feet below ground surface.
- One week before the start of any sampling event the agencies need to be informed by phone.
- The next Managers' Meeting will be combined with the Technical Review Committee (TRC) Meeting on 29 or 30 June.
- Draft Phase II planning documents will be due on 9 November; agency comments on the documents will be due on 10 December; and the draft final documents will be due on 10 January 1994.

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ACTION REQ'D. BY	ITEM

Action Items

- The Navy will send a letter to EPA by 18 June requesting an extension for the phase II planning documents.
- CH2M HILL will prepare position papers on chemicals of potential concern (COPCs), chemicals to be investigated during Phase II, and on petroleum hydrocarbons by 18 June.
- CH2M HILL will provide a binder with meeting notes and position papers for each team member at the next DQO meeting.
- The agencies will contact their modellers to check on their availability for the 29 June Modellers' Meeting.
- The Navy will call the City of Irvine to inquire about the status of the lining of Agua Chinon Wash.
- The agencies will provide a position paper on the use of soil gas surveys to locate TCE sources at MCAS El Toro by 30 June.
- CH2M HILL will provide a list of cutpoints by 30 June.
- CH2M HILL will provide a list of surface soil background concentrations used for screening by 18 June.
- RWQCB will research the availability of existing petroleum hydrocarbon-contaminated sites to calibrate VLEACH.
- CH2M HILL will provide a list of RFA sites within RI/FS site boundaries that need to be considered in the DQO process by 30 June.
- MCAS El Toro will write a letter concerning the wellhead warning placards by 18 June.
- DTSC will call RWQCB to arrange a visit to observe the second round of groundwater sampling at MCAS El Toro.
- CH2M HILL will update and provide the two tables summarizing organic chemicals in the subsurface by 30 June.
- CH2M HILL will send a copy of the Phase I RI database to Bechtel.
- EPA will respond to the FS consensus memorandum on OU-1 by 18 June.
- CH2M HILL will revise the meeting notes from the DQO meeting on 10-11 May to reflect agency comments.
- CH2M HILL will prepare for the discussion of DQOs for two sites at the next DQO meeting on 6-7 July.

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ACTION REQ'D. BY	ITEM

Wednesday, 9 June 1993

Partnering Issues

Andy Piszkin/SOUTHWESTDIV kicked off the meeting and the team members introduced themselves. The following topics were then discussed briefly:

- DTSC's address will change by 1 July, 1993.
- Negotiations on the DQO schedule extension are still in progress. A. Piszkin has sent a letter to EPA with the Navy's position.
- John Hamill/EPA would like to have a list of "action and discussion topics" included with the agenda to better focus the meetings.
- LCDR Larry Serafini/MCAS El Toro reviewed action items from the first DQO meeting (10-11 May 1993 in San Francisco) and from the last Managers' Meeting (26-27 May 1993 in Riverside).
- A. Piszkin mentioned that he had sent a letter to the California Department of Fish and Game describing the work to be done at Site 2 (Magazine Road Landfill),
- A. Piszkin distributed two newspaper articles on the RI/FS at MCAS El Toro (from the 28 May 1993 Flight Jacket, and the 3 June 1993 Orange County Register).
- A. Piszkin distributed a 4-page summary of upcoming contracting tasks for the RI/FS at MCAS El Toro.

Joe Zarnoch/DTSC requested that three items be added to the agenda: soil gas survey; clarification of the Phase I Technical Memorandum (TM); and regulatory oversight of the second round of groundwater sampling. It was agreed to attach the discussion on soil gas survey to the discussion of OU-2 and 3. The other two topics were discussed right away and are summarized below.

J. Zarnoch expressed his concern that Fuel Farm No. 5 may impact the groundwater at Site 4 (Ferrocene Spill Area), since benzene was detected in Well 18BGMW01-E. He said he was missing a discussion of the relationship between the fuel farm and Site 4 in the TM. A. Piszkin argued that it was not confirmed that the fuel farm was a source of benzene, and he felt that the investigation of the fuel farm was not part of the RI/FS.

J. Zarnoch asked for regulatory oversight during one day of the second round of groundwater sampling. John Dolegowski/CH2M HILL agreed and mentioned that the sampling teams would spend at least four more weeks in the field.

J. Dolegowski then brought up the issue of meeting frequencies. He expressed his concern that it was difficult to get work done on the DQOs if meetings were held every two weeks. He suggested that DQO meetings be combined with Managers' Meetings. The team felt that this was a good idea. L. Serafini proposed that the next Managers' Meeting be combined with the upcoming TRC meeting on 30 June and that the

Modellers' Meeting be held on 29 June. Everybody agreed with that, although Roy Herndon's agreement was still pending. No concensus was reached on reducing the overall number of meetings.

DQO Schedule

J. Hamill stated that EPA had problems with the request for extension of the DQO schedule: boundaries of the two new sites (i.e., Sites 24 and 25) to be incorporated in OU-2 required better definition; a soil gas survey should be completed first; and preliminary drafts of the DQOs needed to be sent to EPA before 12 October so the review time could be reduced from 60 to 30 days. J. Dolegowski remarked that the schedule was too tight already to send out preliminary drafts. L. Serafini urged the team not to establish an enforceable date if the schedule was too tight. He stated it was the Station's position that it would be unacceptable to set a schedule that would cause the document to be released on its deliverable due date and not before. A. Piszkin stated that was not the Navy's position, since the document would go through internal review before being distributed to the regulators. J. Dolegowski argued that a request for preliminary drafts of DQOs would add at least one month to the schedule. J. Hamill responded that they did not need complete drafts; anything in writing would help. Chuck Elliot/CH2M HILL suggested that position papers be written explaining the approaches to be taken during the DQO process, and that the team go through DQOs for some example sites at the meetings.

J. Hamill pointed out that EPA wanted the field work to start in March 1994 so that the overall schedule would not be impacted. L. Serafini underlined his former statement that no date should be set if there is any doubt that it can be made. The Marines would take "political heat" if the due date in October could not be made. C. Elliott asked why the entire schedule could not be extended two months based on the new sites. J. Hamill answered that it was impossible to extend the schedule any further, and that EPA would then be forced to go to dispute resolution. J. Dolegowski argued that the delay in the DQO process was mainly due to the lack of compiled data until the Phase 1 R2 Technical Memorandum was released. Artemis Antipas/CH2M HILL agreed that the schedule was very tight in comparison to other Superfund sites. J. Hamill remarked that this was already the second schedule, the original one having been extended for two years and 8 months, and he felt that EPA could not agree to any further delay.

Discussions of the DQO schedule ended at this point in order to continue with the next agenda item. Yueh Chuang/CH2M HILL distributed the meeting minutes of the first DQO meeting held in San Francisco on 10-11 May 1993.

Groundwater Modelling Status Update

Hooshang Nezafati/CH2M HILL informed the team that the Modellers' Meeting planned for 8 June 1993 had been delayed at the request of the Orange County Water District (OCWD). After discussing CH2M HILL's concerns, Roy Herndon/OCWD felt he needed some time to do more computer work. Since their modeller had been on vacation it became necessary to delay the meeting to give the OCWD time to respond to CH2M

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HILL's comments. H. Nezafati mentioned that the model developed by the OCWD could be used after some refinement. He would prepare a position paper once the OCWD responded to the comments. The next Modellers' Meeting would be held on 29 June at 10 am at CH2M HILL's Santa Ana office. J. Dolegowski added that CH2M HILL had established a good working relationship with the OCWD.

J. Zarnoch requested that the team be provided a list of sites not investigated in the Resources Conservation and Recovery Act (RCRA) Facility Assessment (RFA) because they were to be included in the RI/FS. Mike Arends/CH2M HILL agreed to prepare a list of RFA sites and associated RI/FS sites and to distribute them before the next DQO meeting.

After a lunch break, A. Piszkin proposed the following DQO schedule: the due date for all documents (Work Plan, Sampling Plan, Community Relations Plan, Site Health and Safety Plan and Quality Assurance Project Plan) would be moved from 9 August to 9 November; the agencies would prepare their comments by 10 December; and the draft final documents would then be due on 10 January 1994. All agency representatives agreed in principle to the proposed schedule.

Operable Unit Definitions

C. Elliott proposed to add three new sites to OU-2. One of them would overlap the area of existing Sites 7, 9, 10 and 22. The second one would comprise the area of Site 8 and the motor pool area next to Agua Chinon Wash. The third site would consist of the four surface drainage channels or washes; this way the Phase I sediment, surface water and soil samples originally included as part of Site 18 would be incorporated into the DQO process. Site 18 has been defined as groundwater only.

John Broderick/RWQCB indicated that a soil gas survey should be completed as soon as possible and before any traditional soil sampling; he wondered how DQOs could be developed before the soil gas survey was done. C. Elliott thought that the DQOs could be prepared prior to the soil gas survey using "if, then"-statements. Sebastian Tindall/Bechtel stated that the soil gas survey should be performed Station-wide. J. Broderick added that at least a majority of the sites may need soil gas survey. John Christopher/DTSC expressed his concern that the Work Plan would have too many gaps if soil gas surveys were performed at more than two sites. Y. Chuang agreed and stated that if there were too many "if, then"-statements it would be impossible to write the Work Plan. J. Christopher indicated that the DQO process should proceed in order to evaluate the sites which require soil gas surveys. J. Dolegowski pointed out that CH2M HILL needed a more definitive scope to start planning the work and questioned whether it was necessary to do DQOs at sites where a soil gas survey would be performed. J. Zarnoch asked whether it would be possible to get a longer extension that allowed the team to wait for the soil gas survey results and to include them in the Work Plan. The discussion continued with an emphasis on whether contracting and schedule allowed for inclusion of a survey. Everybody agreed that a soil gas survey was a good thing to do, but no consensus was reached on the number of sites to be surveyed, nor on the schedule of the soil gas survey.

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Risk-Based Concentrations

Liz Miesner/CH2M HILL informed the team that DTSC had provided verbal comments on the risk-based concentrations (RBCs) proposed by her, but that Dan Stralka/EPA had not yet responded. C. Elliott indicated that that caused another delay in the DQO process. J. Hamill explained that D. Stralka had been out of town and the comments would be ready in a few days.

Chemicals of Potential Concern (COPCs) and Statistical Analysis

Bruce Peterson/CH2M HILL distributed two papers on COPCs and chemicals to be investigated in Phase II. He explained that background criteria for metals, pesticides and herbicides were calculated assuming log-normal distributions and applying the 90 percent confidence limit on the 99th percentile of the data values. All chemicals detected in Phase I, except for inorganics and pesticides/herbicides that were less than background, constituted the COPCs.

J. Christopher stated that according to the EPA Risk Assessment Guidance no anthropogenic chemical may be eliminated from the risk assessment. Instead, the incremental risk should be calculated by comparing the site risk to the background risk. Pesticides and herbicides may be screened out by applicable and relevant o appropriate requirements (ARARs) during the FS. He added that chemicals applied in agriculture were exempt from cleanup. J. Hamill indicated that D. Stralka/EPA would agree with J. Christopher.

B. Peterson then explained the method proposed to identify the chemicals to be investigated in Phase II as a subset of the COPCs. The agencies agreed to the approach.

J. Zarnoch requested that CH2M HILL bring more detailed information to the next DQO meeting to allow discussion of actual sites, ratios and risk indices. C. Elliott thought that it would be helpful to establish background concentrations for groundwater. Gary Stewart/RWQCB indicated that the Basin Groundwater Quality Objectives should be considered for background. J. Broderick added that the RWQCB would not require cleanup below background levels, but additional rounds of groundwater sampling would be necessary for the screening.

The question of when to screen out nutrients arose. J. Christopher indicated that the five essential nutrients (Na, K, Mg, Ca, Fe) could be eliminated from the list of COPCs if they were below or only slightly above background levels. If the concentrations were substantially higher (the mean concentration at a site exceeded the upper range of background concentrations), then the nutritients could not be screened out but would have to be carried through the risk evaluation.

B. Peterson suggested the use of sample-specific risk as a basis for statistical analysis instead of chemical-specific risk. J. Christopher thought that was a reasonable approach.

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A. Piszkin then discussed the agenda for the next day and everybody agreed to meet at 9:30 in the morning.

Thursday, 10 June 1993

Soil Depth Cutoff

A. Piszkin started the meeting by agreeing with DTSC's request to set the soil depth cutoff at 10 feet.

J. Hamill requested a list of the background concentrations discussed the day before. C. Elliott stated that some changes were necessary since the agencies had requested not to use pesticides/herbicides in the background screening. B. Peterson agreed to update the list and to send it out before the next DQO meeting.

Soil Gas Survey

A. Piszkin opened the discussion on a soil gas survey. He proposed to proceed with the DQOs and to do the soil gas survey during Phase II. J. Zarnoch rejected the proposal because he thought it was critical to use the survey results as the basis for a sampling strategy. J. Dolegowski remarked that it was imposible to add another phase of work to the tight schedule. J. Hamill said that they would discuss the topic at lunch and get back to the team after lunch. S. Tindall announced that he would advise the agencies to use a portable Mass Spectrometer. He stated that with that new technology, 20 samples a day could be analyzed, and in two to four weeks the entire Station could be surveyed. J. Dolegowski and C. Elliott strongly disagreed with that assumption. Y. Chuang showed calculations that indicated that in the source area alone (Sites 7, 8, 9, 10, 22) 1,200 borings would have to be sampled (using 100-foot centers). Since large areas were covered with asphalt or 14-inch-thick concrete only about 5 to 6 borings per day could be sampled. A. Piszkin suggested that a soil gas contractor be consulted about the different constraints and possibilities. S. Tindall agreed and stated he would gather information from outside professionals and CH2M HILL should do the same. Y. Chuang and J. Dolegowski argued that the logistics on MCAS El Toro were the main time-limiting factor, as was learned during Phase I. No consensus was reached. J. Hamill stated he would present a revised EPA position in the upcoming telephone conference on Tuesday, 15 June 1993. The team members agreed that the soil gas survey should be a topic of discussion at the next Managers' Meeting.

Chemicals Below Eight Feet

Susan Diehl/CH2M HILL presented two tables. The first one compared chemicals detected at each site in the subsurface between 8 and 20 feet with the ones detected below 20 feet. The second table listed, by site, all soil samples that exceeded the allowable total fuel hydrocarbon (TFH) levels according to the California Leaking Underground Fuel Tank (CA LUFT) Manual. G. Stewart pointed out the gasoline hit of 131,000 ppm at Angle Boring 223 completed in Agua Chinon Wash may require a

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ACTION REQ'D. BY	ITEM

removal action. C. Elliott mentioned that the wash would soon be paved. A. Piszkin affirmed he would call the City of Irvine to find out when Agua Chinon Wash would be lined. He requested for the sampling depths of the angle borings below the bottom of the wash. S. Diehl agreed to modify the tables and to send them out with accompanying explanations.

Cutpoints

C. Elliott explained that a cutpoint was a screening value for Phase II data. The team would have to agree on a cutpoint for each chemical to be investigated in Phase II. Each chemical that exceeded the cutpoint would have to be remediated. J. Christopher indicated that the same RBCs could be used as in Phase I. C. Elliott asked what to do when the RBCs were much lower than the detection limits. J. Christopher answered either reanalyze with methods that have lower detection limits, or neglect the samples of concern. C. Elliott agreed to compile a list of cutpoints and to distribute it before the next DQO meeting.

Petroleum Hydrocarbons

Y. Chuang proposed that only TFH-gasoline and TFH-diesel data collected in Phase I be addressed during the screening process and that total recoverable petroleum hydrocarbons (TRPHs) (EPA Method 418.1) data not be used for screening. TRPH concentrations generally indicated the presence of oil and grease, which were not hydrocarbons of concern. He further proposed only to use benzene, toluene, ethylbenzene and xylene, and polyaromatic hydrocarbons (PAHs) in the risk screening of surface soils, since the additional use of CA LUFT Method 8015 would result in the double-counting of these compounds. For subsurface soils he suggested the application of CA LUFT guidance levels as cutpoints for fuel hydrocarbons for evaluation of Phase I data. J. Christopher and J. Zarnoch concurred with the proposal, while J. Hamill requested a week for consideration. J. Broderick agreed that the proposed approach could be followed during the DQO screening, but expressed his concern that the CA LUFT guidance levels were not adequate for decisions during the FS. He requested use of physical tests to show whether a compound had the potential to leach to groundwater. Y. Chuang discussed his research on soil column tests and concluded that they would be impractical. J. Broderick responded that if no physical tests were performed, more conservative cleanup standards may have to be used. S. Tindall suggested performing an extensive literature research instead. J. Broderick added that the usual approach was to apply the best available cleanup technology until no further improvement without high financial investment could be attained. Y. Chuang explained the difficulties of vadose zone modelling and model-calibration. G. Stewart suggested that VLEACH be applied to petroleum-contaminated sites outside MCAS El Toro with existing data to demonstrate whether the model works reasonably. If it were concluded that the model did not work, then "Marshack's levels" (Jon Marshack/RWQCB) should be the guidance for cleanup levels. J. Dolegowski mentioned that the test sites should have no free product since VLEACH only models chemicals dissolved in water. Y. Chuang agreed to modify his proposal and to distribute it before the next DQO meeting.

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ACTION REQ'D. BY	ITEM

The team then went through the list of action items and the meeting ended.

Attendees

A. Antipas - CH2M HILL/SEA
J. Broderick - RWQCB-SAR
Y. Chuang - CH2M HILL/SDO
J. Dolegowski - CH2M HILL/SCO
J. Hamill - EPA
L. Miesner - CH2M HILL/SFO
M. Arends - CH2M HILL/SCO
H. Nezafati - CH2M HILL/SCO
S. Diehl - CH2M HILL/SAC
B. Peterson - CH2M HILL/SEA
A. Piszkin - Code 1812.AP
D. Richards - CH2M HILL/CVO
C. Elliott - CH2M HILL/SAC
G. Stewart - RWQCB-SAR
S. Tindall - Bechtel Corp
J. Zarnoch - DTSC

***Part-time Attendees**

*C. Mitchell - MCAS El Toro
*J. Christopher - Cal EPA/DTSC
*L. Nuzum - Code 1812
*LCDR L. Serafini - MCAS El Toro
*L. Vitale - RWQCB-SAR

Nonparticipant Distribution

R. Green - Code 0232
K. Reynolds - Code 1841
K. Tomeo - CH2M HILL/SCO
File - CTO Notebook/PMO
File - PMO
File - CH2M HILL

PROJECT NOTE NO.	PROJECT NO.
PN-0145-88 CLE-C01-01F145-I2-0063	01-F145-H6

CONFIRMATION OF:	CONFERENCE	X	DATE HELD	26-27 May 1993
	TELECOM		DATE ISSUED	29 June 1993
	OTHER		RECORDED BY	Y. Chuang/CH2M HILL
			PLACE	RWQCB/Riverside

SUBJECT: Contract Task Order (CTO) No. 145
Remedial Project Manager's
Meeting Minutes
MCAS El Toro RI/FS

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See list on last page

ACTION REQ'D. BY	ITEM

The monthly Remedial Project Managers' (RPM) Meeting for the Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility Study (RI/FS) was held on 26-27 May 1993 at the Riverside, CA. office of the California Regional Water Quality Control Board - Region 8 (RWQCB). Representatives of U.S. Environmental Protection Agency (EPA), California Department of Toxic Substances - Region 4 (DTSC), RWQCB, MCAS El Toro, Navy SOUTHWESTDIV, Orange County Water District (OCWD), Bechtel Corporation (EPA's contractor), IT Corporation and CH2M HILL attended the meeting. Marlon Mezquita/EPA filled in for John Hamill/EPA, the EPA RPM.

These meeting notes summarize the decisions reached, the action items, and the discussions of the meeting. The discussions of the meeting are not necessarily summarized in the order in which they were discussed, but rather summarized under logical topic headings.

Decisions Reached

- An additional Data Quality Objective (DQO) meeting is tentatively scheduled for 12-13 August 1993.
- For the DQOs, best available technologies/best practical technologies (BATs/BPTs) will not be used to help set cutpoints for soil.
- Two Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites, Solid Waste Management Unit/Area of Concern (SWMU/AOC) 300 (Solvent Spill Area) and SWMU/AOC 194 (Incinerator Site), will be included in the RI/FS for further investigation.

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PROJECT NO. 01-F145-H6

ACTION REQ'D. BY	ITEM

- o SWMU/AOC 131 (Engine Test Cell) will be investigated further outside the RI/FS.

- o CH2M HILL will update the OU-1 FS schedule.

Action Items

- o The Navy will request an extension to the due date for the Phase II Work Plan specified in the Federal Facilities Agreement (FFA) based on the proposed redefinition of Operable Unit (OU)-2/OU-3/OU-4 sites. The new definition includes the possible creation of sites specifically targeted at locating source areas.

- o The Navy will request immediate action by the agencies to approve the proposed risk-based criteria for use during the DQOs.

- o The Navy will write EPA a letter detailing the OU-1 FS consensus approach.

- o MCAS El Toro will provide documentation on the research done to determine the typical depth of construction (8 feet) in areas surrounding the Station.

- o At DTSC's request, MCAS El Toro will put up warning placards on wellheads at irrigation wells potentially contaminated with volatile organic compounds (VOCs).

- o EPA will develop a position on how to deal with concentrations of "essential nutrients" in the risk assessment process.

- o EPA will develop a position on the use of background data to evaluate pesticides and herbicides as chemicals of potential concern (COPC's).

- o RWQCB will provide the Navy with a letter, similar to the one given to March Air Force Base (AFB), explaining the agency's approach on setting soil and groundwater cleanup levels.

- o RWQCB will reply to the Navy's request for action-specific and chemical-specific applicable, relevant and appropriate regulations (ARARs).

- o At Bechtel's request, the Navy will ensure that Bechtel receives copies of all meeting agendas, memoranda and position papers.

- o CH2M HILL will prepare a Phase I RI summary for the 30 June Technical Review Committee (TRC) Meeting.

Team Health and Miscellaneous Issues

Various team health and miscellaneous issues were discussed prior to the start of discussions on scheduled agenda items. Some of the issues are discussed under their own separate headings; the rest are summarized below:

- o Andy Piszkin/SOUTHWESTDIV felt that the first DQO Meeting did not foster team spirit primarily because of comments made by Sebastian Tindall/Bechtel CORP.

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He felt there was too much of an "us-them" mentality, and there was room for improvement toward better teamwork. A. Piszkin thought there were still many scheduling issues to deal with, and it was important for the team to work together.

- o LCDR L. Serafini/MCAS El Toro stated the Station will be initiating a removal action (by August) at Site 2, the Original Landfill. He asked whether any agency, other than the RWQCB, is interested in participating in a walk-through of the site. The removal action has been funded and the Station has begun contracting for the work. M. Mezquita asked to be filled in on the situation. Joe Zarnoch/DTSC indicated that his agency would like to participate.

- o J. Zarnoch asked about the status of placards on wellheads at irrigation wells. LCDR L. Serafini replied that he is awaiting Chrisa Mitchell/MCAS El Toro to return to work next week (week of 31 May).

Navy's Request for State ARARs

The Navy had sent DTSC a letter to request a list of ARARs with a stipulated deadline for response. J. Zarnoch indicated that the state will probably respond by citing Carole Browner's (EPA Administrator) decision that EPA has the final say on ARARs. The decision stated that the Air Force and Navy are not exceptions to this rule. John Broderick/RWQCB voiced strong objections to the Navy's tactic to force the State to respond within 30 days of the letter request. He indicated most of RWQCB's ARARs are action-specific, and not chemical-specific; if the Navy does not identify actions, the State cannot identify ARARs. Also, since the COPC's have not been identified yet, chemical-specific ARARs cannot be specified either. M. Mezquita said, at this stage, only relevant regulations can be identified, not action- and chemical-specific ARARs. J. Zarnoch indicated that it is premature even to identify action-specific ARARs for OU-1. J. Broderick concurred with J. Zarnoch by adding that the FS will more than likely identify a whole array of alternatives even for OU-1. He felt the identification of ARARs should be an iterative process, not a one-time response as requested by the Navy.

Data Quality Objectives Schedule

Chuck Elliott/CH2M HILL voiced concerns on the current schedule for completing the DQOs process. He reintroduced the proposal for submitting the Work Plan (WP) by 09 August, and completing DQOs in October. M. Mezquita indicated he spoke with J. Hamill, and said EPA had a negative experience with Yuma submitting a work plan without DQOs. C. Elliott said if the agencies expect to receive a work plan (with full DQOs) by 09 August, then the DQOs process will have to proceed without team collaboration; this would be contrary to what was originally envisioned. LCDR L. Serafini stated MCAS El Toro wants consensus along the way, and to avoid getting too many adverse review comments at the end of the DQOs process. He indicated MCAS El Toro does not want to produce a "shell" document (work plan without DQOs); however, he also said the Station is not prepared to ask for an extension.

John Dolegowski/CH2M HILL said implementing the DQOs process is complicated. He indicated that it is physically impossible to accomplish DQOs as envisioned by the

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team by 09 August. J. Dolegowski further stated that, in the name of team spirit, it is unfair for CH2M HILL to shoulder sole responsibility for keeping the FFA schedule on track. He urged each agency RPM to ask for support from their superiors. J. Broderick indicated it is out of the team's control; he has been told by his superior that the work plan submitted on 09 August must be complete and implementable, or else RWQCB will reject the document. Both J. Zarnoch and M. Mezquita indicated that their management said the exact same thing: the work plan must be completed as specified in the FFA schedule. LCDR L. Serafini replied that the Station is only obligated to follow the National Contingency Plan. A. Piszkin indicated that the FFA spelled out additional requirements. S. Tindall voiced support for a collaborative approach to the DQOs process, to be completed with adequate time, but indicated political motives are at play as well. Roy Herndon/OCWD reminded the team that DQOs were not part of the process when the FFA was signed. LCDR L. Serafini felt the RPM's can play a larger role in all this; he challenged the RPM's to lobby for whatever gets submitted on 09 August. J. Broderick indicated that no decision can be made without J. Hamill being present. A. Piszkin asked the team to reconsider the approach agreed to previously: completion of DQOs for OU-1 and OU-2 by 09 August. He indicated the Navy will take responsibility for technical decisions, and proposed to eliminate the DQOs meetings all together. M. Mezquita thought A. Piszkin's proposal had technical merit and suggested the Navy document the proposal formally. LCDR L. Serafini wanted to defer the final decision until the following week's conference call. He reiterated that the Station is unwilling to ask for an extension, and asked that the discussions be tabled until he had a chance to confer with the Navy and CH2M HILL during lunch break.

After lunch break, LCDR L. Serafini stated that MCAS El Toro is committed to submit a work plan with full DQOs in order to meet the 09 August 1993 deadline. He wanted to discuss what constitutes an "implementable" document at the following weekly conference call. He also suggested all DQO meetings be canceled. J. Dolegowski said that by reverting back to the 09 August deadline constitutes a scope change because one of the major assumptions of the Phase I Technical Memorandum was to postpone comparisons against applicable standards until the DQOs. Proposing to forego the collaborative approach to DQOs did not negate the fact that a major delay in schedule had already occurred. J. Broderick said that the Navy never requested an extension. A. Piszkin replied that the Navy could not request an extension. LCDR L. Serafini asked rhetorically on what grounds the agencies would accept an extension request. S. Tindall urged the team to find a way to continue with the DQOs process while seeking for a resolution on the FFA schedule. J. Dolegowski thought the agencies were reneging from earlier agreements to separate OU-1/OU-2 from OU-3. He felt the addition of DQOs alone is grounds for an extension. J. Broderick disagreed with J. Dolegowski, and asked whether it is reasonable for the Navy to now also request OU-1/OU-2 be dropped from the FFA schedule. LCDR L. Serafini again asked rhetorically what justification exists for an extension request. S. Tindall cited the dispute resolution passage in the FFA, and suggested that the RPMs and their superiors confer as soon as possible to break the impasse. J. Zarnoch concurred, and urged further discussions by conference call on Wednesday, 02 June, before the agencies meet with the Navy on Thursday, 03 June.

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OU-2 versus OU-3 Sites

Based on findings of the Phase I RI/FS investigation, it seems reasonable to reassign sites between OU-2 and OU-3. J. Zarnoch proposed to reassign Site 3 (Original Landfill), Site 5 (Perimeter Road Landfill) and Site 17 (Communication Station Landfill) from OU-2 to OU-3, but keep Site 2 (Magazine Road Landfill) and Site 10 (Petroleum Disposal Area) as part of OU-2. He further proposed to add Site 7 (Drop Tank Drainage Area No. 2), Site 8 (DRMO Storage Yard), Site 9 (Crash Crew Pit No. 1) and Site 22 (Tactical Air Fuel Dispensing System) to OU-2.

M. Mezquita asked why retain two different OUs when they are on the same schedule. D. Richards answered that the schedule for the two OUs may diverge in the future. LCDR L. Serafini said the regional groundwater contamination (OU-1) and source areas (OU-2) are the main concerns. A. Piszkin provided an additional reason that funding problems in the future may dictate changes in emphasis. J. Broderick indicated that the main difference lies in the fact that OU-2 sites have both soil and groundwater problems, whereas OU-3 sites only have soil problems; therefore, cleanup of OU-2 sites are likely to be more complicated.

C. Elliott presented a counterproposal: keep Site 2 as part of OU-2, add Sites 7 and 8 to OU-2, and reassign Sites 3, 5, 10 and 17 from OU-2 to OU-3. J. Broderick objected to the reassignment of landfill sites (i.e., Sites 3, 5 and 17) because by doing so, he felt they are being designated as less important. He said, by definition, OU-3 sites are less important than OU-2 sites. Furthermore, he indicated the Station may still want to send wastes generated at other sites to the landfills. A. Piszkin asked whether removal actions can be initiated at the landfills.

The discussions then turned to the need to locate source areas. J. Broderick felt it is important to find the source areas. He urged performing vapor extraction if one of the suspected source areas is below the hangars (area between Sites 7 and 10). LCDR L. Serafini indicated implementing such a remedial action may be difficult because of ongoing operations in the area. A. Piszkin volunteered that the Navy is willing to perform a pilot-scale vapor extraction study; the Navy is directed to spend a large portion of funds for treatment and removal actions. J. Broderick thought it would be a good idea. M. Mezquita said a comprehensive remedial action can be handled as an interim Record of Decision; there would be minimal paperwork and approval can be expected expeditiously from the agencies since they all prefer such a proactive alternative. S. Tindall called implementing the removal action a "bean" for the agencies and the Navy. C. Elliott felt the DQO process will address adequately the benefits of additional sampling versus cleanup. LCDR L. Serafini indicated the Navy wants to implement cleanup but will document the decisions during DQOs. J. Broderick expressed concerns about Sites 5 and 19 (Aircraft Expeditionary Refueling [ACER] Site) groundwater data. He felt because the concentrations detected are low, one round of groundwater samples is insufficient to determine whether there are problems at the two sites. Both J. Broderick and Garey Stewart/RWQCB are worried that when the "worst-first" scenario becomes reality, cleanup of OU-3 sites (the new proposals would include landfill sites) will be delayed.

LCDR L. Serafini opened discussions to the possibility of creating two new sites to address finding the source areas. C. Elliott asked whether these sites would be Sites

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23 and 24 (G. Stewart later corrected the site designations as Sites 24 and 25 because Site 23 [Sewer Lines] already exists). Yueh Chuang/CH2M HILL agreed with the idea because known operations at Sites 7 and 8 do not necessarily support their being the source areas. He urged the team to be more flexible and allow for creation of new sites with boundaries that include many of the sites in the southwest quadrant of the Station. J. Broderick thought the proposal is worthwhile. He argued that it is easier to explain to the public that two new sites are created to focus on finding source areas. By assigning Sites 7 and 8 as the problem sites given the findings does not make sense; it may be difficult to eliminate them from being higher priority sites. J. Broderick further suggested the creation of OU-4 to consist of low priority sites which can proceed at a slower schedule; the OU would be created specifically as a management tool, and it would not be part of the DQO process. A. Piszkin asked whether the work plan for OU-4 would also have to be submitted by 09 August. S. Tindall read the portion of the FFA which outlined procedures allowing significant findings that lead to the establishment of new sites justify an extension request. J. Zarnoch was uncomfortable with the proposal: he objected to using the creation of new sites as justification for an extension. J. Broderick defended the idea by stating that although volatile organic compounds (VOCs) are known to exist in groundwater, the investigations have not located the source areas yet. A. Piszkin also supported the proposal; he said since the FFA was negotiated when only 22 sites were known, creation of two new sites represent significant changes. M. Mezquita agreed that an extension at this stage is justified since Phase II field work is still slated to begin in March 1994. J. Zarnoch reluctantly acquiesced on the condition that the team is only considering a two-month, and not a longer, extension.

Modeling Update and Status of OU-1 Feasibility Study

Hooshang Nezafati/CH2M HILL described the progress made on groundwater modeling issues. He indicated the Modelers' Meeting is still scheduled for 08 June. J. Dolegowski summarized review findings on OCWD's model. He said that no changes will be made to the proposed modeling approach without a thorough discussion of CH2M HILL's findings.

M. Mezquita requested that the meeting agenda be sent to Richard Freydas, EPA's regional hydrogeologist. H. Nezafati said an agenda is required for the meeting. J. Dolegowski indicated the need to meet with R. Herndon to decide on the agenda before it can be sent out on 04 June. R. Herndon suggested CH2M HILL come up with an agenda. LCDR L. Serafini wanted a presentation on a relatively basic level. A. Piszkin felt that since only the modelers will be in attendance, the discussions can be focused and such a presentation would not be necessary. M. Mezquita thought it more important to discuss the assumptions used, and not the mechanics of running the model. S. Tindall asked why the meeting is even necessary; he thought only one model is needed. Davi Richards/CH2M Hill replied that since there are disagreements among the modelers, the meeting would provide a forum for discussion of the issues. S. Tindall then stated that his understanding of the meeting objective is to make sure the model is valid for both the Navy and OCWD. LCDR L. Serafini said things have evolved beyond that. He indicated there is agreement on the model; however, the Navy is evaluating possible modifications to the model. H. Nezafati said that another goal is to incorporate Phase I data into the model. A. Piszkin stated the Navy wanted an independent check on the ability of the Irvine Desalter to capture the plume before

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proceeding with funding. He indicated the Navy needs assurance that MODFLOW, and not a different model, is appropriate to evaluate the Desalter. S. Tindall stated that Bechtel believes it may be entirely appropriate for OCWD to use MODFLOW to model the Desalter; however, the Navy's needs may be different and may very well consider using a different model. R. Herndon felt the Navy and OCWD have the same objectives for OU-1.

D. Richards provided a status report on the OU-1 FS. She indicated that the OU-1 FS is currently tied closely to modeling issues. A. Piszkin indicated he has yet to write the letter to EPA detailing the FS consensus approach; but he will do so. S. Tindall said it is a certainty the Desalter will be operational in the near future. He indicated EPA is promoting the Superfund Accelerated Cleanup Model (SACM) streamlining process to accelerate the usual nine-step FS process. He urged the Navy to be creative and to send the letter out immediately. General discussion followed on whether the normal public comment period would derail the expedited schedule for OU-1.

R. Herndon thought regular status updates on the OU-1 FS should be a permanent agenda item. D. Richards said that for this meeting, progress on the FS is under the topic of "modeling." R. Herndon asked whether the Navy can provide Bill Mills, the General Manager of OCWD, with positive news for his trip to Washington, D.C., in June. CH2M HILL agreed to update the OU-1 FS schedule. A. Piszkin indicated the Navy needs an invoice for the MCAS wells from OCWD; he felt that would speed up the process. R. Herndon said the invoice is 90 percent complete. He reiterated that OCWD is looking for positive news, such as a progress report. J. Dolegowski indicated that CH2M HILL can write a memorandum describing the progress made so far, and state the remedial objectives of the FS.

RCRA Facility Assessment

J. Zarnoch led a discussion on RFA issues of concern to DTSC. He prepared and distributed a hand-out with information on 14 SWMUs/AOCs for discussion. The following summarizes the issues:

- J. Zarnoch thought that further action may not be necessary at SWMU/AOC 26 (Hazardous Waste Storage Area [HWSA]) because the petroleum hydrocarbon level was low (i.e., less than 1,000 mg/kg). Mike Arends/CH2M HILL stated that excavation of the stained soil adjacent to the HWSA was recommended as a best management practice for the Station. He said the presence of stained soil near HWSAs can encourage the continued practice of storing waste outside the HWSA.

- J. Zarnoch suggested that SWMU/AOC 131 (Engine Test Cell) be included in the RI/FS due to the presence of polynuclear aromatic hydrocarbons (PAHs) in one hand-augered boring. The team agreed that this SWMU/AOC should be further investigated outside of the Superfund Program, and should therefore not be included in the RI/FS.

- Several SWMUs/AOCs (e.g., 39, 88, and 171) investigated with 60-foot angle borings had low levels of PAHs and/or polychlorinated biphenyls (PCBs) in the 10-foot samples. Due to the low mobility of these compounds, DTSC is

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concerned that higher concentrations may exist in soils above (note that angle borings are drilled at a 30° angle from vertical). For this reason, DTSC suggested that additional shallow soil samples be analyzed for PAHs and/or PCBs at these SWMUs/AOCs.

- The potential for release of metal plating wastes from SWMU/AOC 265 (Abandoned Metal Plating Sewer Lines), and SWMU/AOC 90 (Former Sewage Treatment Plant) was discussed. M. Arends explained that the lines were constructed in 1945, and were only used to convey metal plating waste for about one year. In addition, these lines were separate from the active sanitary sewer lines. Since this information was not explicitly stated in the Draft Preliminary Review/Visual Site Inspection Report, clarification will be provided in the Final RFA Report.

- It was agreed that both SWMU/AOC 300 (Solvent Spill Area) and SWMU/AOC 194 (Incinerator Site) will be included in the RI/FS. C. Elliot stated the Site 3 (Original Landfill) boundaries will be expanded to include the two SWMUs/AOCs.

A. Piszkin and J. Broderick felt that a site should not be included as part of the RI/FS unless additional investigation is needed. LCDR L. Serafini thought even sites that require additional work should not be included in the RI/FS process. He voiced his preference for conducting the additional work under other programs. General discussion followed on how the work can be funded outside of the RI/FS framework. J. Broderick suggested the sites be included in OU-4, which would allow for further investigation to confirm or to deny whether contamination exists. M. Mezquita said that the RFA can be extended into a RCRA Facility Investigation under the auspices of RCRA, not Superfund. No consensus was reached.

M. Arends was given the opportunity to respond to EPA's comments on the Draft RFA Report. He expressed concerns on EPA's general comments provided on the first page of the review comments. EPA stated that one objective for the RFA was "...to identify all potentially contaminated areas at MCAS El Toro." EPA then commented that there were deficiencies in the Navy's work in fully achieving the objective. M. Arends said it was unreasonable for EPA to assign such a clearly impossible objective to the RFA, and then to criticize the Navy for failing to achieve the goal. He pointed out the significant effort performed to date, which included an extensive field program involving 140 SWMUs/AOCs, and approximately 1,300 VOCs analyses. He said that the RFA has been conducted thoroughly, and that it is always possible to identify additional areas of potential contamination.

S. Tindall responded that he did not personally write the RFA comments and that they came from an experienced Bechtel reviewer. He said that the Navy did not have to address general comments, just specific comments; the Navy has the right to disagree with any of the comments provided. S. Tindall indicated that in EPA's stated objective for the RFA, the word "all" can be replaced by "most." M. Arends said that the Navy will respond to specific comments provided by EPA.

J. Broderick indicated his primary objection to the Draft RFA Report was the use of the El Toro Model; he felt it to be simplistic and not appropriate for MCAS El Toro site conditions. He will accept the use of VLEACH, a vadose zone model currently being

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evaluated. J. Broderick also said that he does not have specific comments on the Navy's recommendations in the RFA report; he would be satisfied if the Navy addresses the issues and concerns raised by DTSC.

Risk-Based Concentrations

At the start of the meeting, J. Zarnoch provided clarification that the more than 140 chemicals with State cancer potency factors are pharmaceutical chemicals, and other chemicals not typically found at hazardous waste sites. He expressed doubts that they would be applicable at an RI/FS site such as MCAS El Toro.

Liz Miesner/CH2M HILL requested that DTSC and RWQCB toxicologists review the methodology used for the risk calculations (separate memorandum listing risk-based concentrations [RBCs]). M. Mezquita indicated EPA is interested in the factors used, and not necessarily the RBCs generated. L. Miesner explained that more exposure pathways were considered than EPA's preliminary risk-based goals (PRGs). However, some of the RBCs may be more conservative because a child-adult scenario was assumed in all the calculations, and different saturation concentrations were used. M. Mezquita reiterated EPA's position that PRGs are to be used only for prioritization of work, not elimination of sites from further investigation. C. Elliott said RBCs will be used instead of PRGs, and only the surface soils will be screened against RBCs.

J. Zarnoch indicated DTSC cannot complete its review of the RBCsearlier than 60 days. C. Elliott said that approval is needed immediately for DQOs. S. Tindall complained that Bechtel did not receive a copy of the RBC memorandum. J. Dolegowski apologized for mistakenly assuming Dan Stralka/EPA would be reviewing the risk section. LCDR L. Serafini asked A. Piszkin to formally request the agencies review Section 7.0 immediately. S. Tindall indicated Bechtel can complete the entire TM review by 07 June. J. Zarnoch promised to assign the highest priority to the review of Section 7.0. C. Elliott ended discussions on risk calculations with a reminder to the team that consensus is critical at each step of the DQO process.

Pesticides and Herbicides

C. Elliott proposed a two-tier screening procedure for pesticides and herbicides: these compounds will be investigated further during Phase II only if their concentrations exceed both background levels and RBCs (as normalized against classes of compounds analyzed). In other words, the risks associated with pesticides and herbicides will be considered only if their concentrations exceed those found in the background. M. Mezquita asked why the comparison against background. LCDR L. Serafini answered that the proposal accounts for typical area application of pesticides and herbicides. J. Zarnoch agreed with the two-tier screening procedure. S. Tindall objected to the screening procedure for herbicides. He stated that pesticides are exempted because of their agricultural status; herbicides are for cost control, and therefore are not exempted chemicals. S. Tindall indicated he needs to consult with D. Stralka on the issue. LCDR L. Serafini thought it unfair to hold the Station to different standards compared to surrounding communities. The discussions ended with the understanding that the issue will be brought up again at the second DQO meeting.

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Best Available Technologies/Best Practical Technologies as Cutpoints for Soil

The Navy had requested Bechtel's help in assembling a list of BATs/BPTs for DQOs in order to consider them in setting cutpoints for soil. S. Tindall indicated Bechtel is not properly funded to research BATs/BPTs. C. Elliott and D. Richards presented reasons for eliminating BATs/BPTs from consideration all together. The major reason is that BATs/BPTs are for treatment of water, not soil. Additionally, cleanup levels achieved are dependent on site conditions; usually the effectiveness of cleanup technologies vary and exact cutpoints are difficult to set. J. Broderick said RWQCB cutpoints are background levels, unless it can be demonstrated the application of BATs is prohibitively expensive. Under such circumstances, site-specific cleanup levels will be based on site conditions and cleanup technologies used. G. Stewart indicated RWQCB wants to set cleanup technology goals, not concentration cutpoints.

Base Realignment and Closure (BRAC) - Status of MCAS El Toro

LCDR L. Serafini said the Marines are fighting hard to keep the Station open. He indicated MCAS El Toro cannot close at the same time as March AFB. J. Zarnoch felt it is important to know the ultimate fate of the Station before proceeding with DQOs. LCDR L. Serafini said the residential risk scenario is still relevant but cleanup will be affected by the final Master Plan. J. Zarnoch expressed concern that funds may b spent unnecessarily on characterizing surface soils at landfills when the sites will have deed restrictions. LCDR L. Serafini replied that the landfills will probably go through closure. D. Richards indicated that the alternatives for landfills are relatively few, and they generally do not include cleanup to residential use standards. She said the second step of DQOs does consider possible remedial actions at each of the RI/FS sites. Additional discussions followed on how remedial action alternatives would affect decisions on further investigations during Phase II.

Land Use Zoning

LCDR L. Serafini reported that most commercial construction in the MCAS El Toro area does not extend below eight feet (top of pile caps); all utilities are buried at depths above eight feet. J. Zarnoch still wanted the Navy to comply with State guidance for residential scenario of 10 feet. J. Broderick defended the Station's research and reminded J. Zarnoch that two extra feet translates to a great increase in volume during excavation/cleanup. J. Zarnoch said he felt uncomfortable in neglecting the State's guidance default depth of 10 feet. M. Mezquita stated that site-specific data outweighs default values. S. Tindall also defended the use of site-specific data; he felt it is unfair for the agencies to insist the Navy performs research, and when the data returns a shallower depth that the Navy still be asked to use the greater default depth. J. Broderick expressed similar sentiments. J. Zarnoch indicated he cannot agree to the 8-foot depth without presenting some written documentation to his superiors. LCDR L. Serafini said he would provide the necessary documentation. C. Elliott requested a resolution by the second DQO meeting (09-10 June).

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Strategy for Petroleum Sites Outside the Federal Facilities Agreement

LCDR L. Serafini wanted to deal with petroleum-contaminated sites outside the framework, and therefore schedule constraints, of the FFA. He is in favor of expediting work even at sites currently part of the RI/FS (e.g., Sites 13, 14 and 15).

J. Broderick presented RWQCB's policy as one of anti-degradation. It is always RWQCB's goal to clean up impacted groundwater to background levels. However, when cleanup to background levels is unattainable even using BATs, RWQCB is flexible and willing to consider a cost-benefit analysis: evaluation of cleanup achieved between use of BATs versus BPTs. J. Broderick said RWQCB has accepted remedial actions based on limitations of current cleanup technologies.

J. Broderick indicated the need to demonstrate that leaching will not occur at sites with soil contamination but where there is no groundwater impact. However, once the groundwater is shown to be impacted, the anti-degradation policy for groundwater supersedes.

Technical Review Committee Meeting Agenda

LCDR L. Serafini wanted to know what will be on the agenda for the 30 June TRC Meeting. He indicated a flyer will be ready for distribution before the meeting, and an executive summary of Phase I findings will also be ready by 16 June. LCDR L. Serafini wanted a presentation of the investigation at the meeting (including slides of field investigation and laboratory findings presented on plume maps, the future direction of the investigation, DQO process, modeling effort, Desalter project, and results of the Public Health Assessment). M. Mezquita informed the team that the new EPA public relations specialist is Dorothy Wilson. A. Piszkin requested that all review comments on the flyer be sent to C. Mitchell. G. Stewart wanted advance copies of the flyer for review. LCDR L. Serafini indicated that the Station appreciates the review comments but reserves the right not to address them all.

Tank 398 Investigation

Maria Shayegan/IT Corporation presented the findings of Tank 398 investigations. Her presentation included a handout of findings at the tank site.

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Attendees

M. Arends - CH2M HILL/SCO
Y. Chuang - CH2M HILL/SDO
J. Broderick - RWQCB/Region 8
C. Elliott - CH2M HILL/SAC
J. Dolegowski - CH2M HILL/SCO
M. Mezquita -EPA
A. Piszkin - Code 1812.AP
LCDR L. Serafini - MCAS El Toro
D. Richards - CH2M HILL/CVO
S. Tindall - Bechtel
J. Zarnoch - DTSC/Region 4

*** Part-time Attendee**

*G. Cummings - Code 1853.VC
*J. Corbert - Code 1852.JC
*R. Herndon - OCWD
*D. Hernandez - CH2M HILL/SCO
*L. Miesner - CH2M HILL/SFO
*H. Nezafati - CH2M HILL/SCO
*T. Smith - CH2M HILL/SCO
*M. Shayegan - IT Corporation
G. Stewart - RWQCB/Region 8

Nonparticipant Distribution

R. Green - Code 0232
File - CTO Notebook/PMO
File - CH2M HILL
K. Reynolds - Code 1841
File - PMO

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CONFIRMATION OF:	CONFERENCE	X	DATE HELD	12-13 January 1993
	TELECOM		DATE ISSUED	10 February 1993
	OTHER		RECORDED BY	Chuck Elliot/CH2M HILL
			PLACE	San Diego, California

SUBJECT: Remedial Project Manager (RPM) Meeting Minutes
CTO No. 145, MCAS El Toro RI/FS
CTO No. 193, MCAS El Toro RCRA Facilities Assessment

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

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A Managers' Meeting was held on 12 January 1993 from 900 hours to 1600 hours and on 13 January 1993 from 800 hours to 1500 hours at the San Diego office of CH2M HILL. In attendance were representatives from Marine Corps Air Station (MCAS) El Toro; Naval Facilities Engineering Command, Southwest Division (SOUTHWESTDIV); U.S. Environmental Protection Agency (EPA); California Environmental Protection Agency, Department of Toxic Substances Control (DTSC); California Regional Water Quality Control Board, Santa Ana Region (RWQCB); Bechtel Corporation (EPA's consultant); and the Jacobs Team (Jacobs Engineering Group [JEG] and CH2M HILL). These meeting minutes provide a summary of the items discussed at the meeting. A list of the attendees is provided at the end of these minutes. A copy of the agenda is attached.

TUESDAY, JANUARY 12, 1993

Partnering Issues

The following partnering issues were brought up by team members:

- Navy concern over the timing and tone of the letter from the RWQCB regarding the exposed banks at the Magazine Road Landfill.
- DTSC concern that the Navy may eliminate constituents or rounds from the ongoing groundwater monitoring efforts.
- Regulatory agency concern over aspects of the December 1992 MCAS El Toro site tour; e.g., the size of the tour group, being divided into three vans, confusion over when the tour was to start, and concern that the tour lacked depth.

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- DTSC concern that not all members of the team were present at the Graphic Planning Meeting.

John Hamill/EPA pointed out that the key to good partnering is communication. Amir Matin/JEG observed that the Number 1 rule of team-building is not to question each other's intent, but to be understanding of each other's limitations.

Team Phone List and Graphic Plan

SOUTHWESTDIV distributed a copy of the new phone list to all team members (attached). Corrections were noted and a new phone list will be distributed at the February 1993 Managers' Meeting. LCDR Larry Serafini/MCAS El Toro suggested that correspondence to MCAS El Toro should be addressed to the Commanding General with an "Attention" line to the appropriate respondent.

A typed revision to the Graphic Plan was also distributed to team members (attached). LCDR Serafini suggested that more time should be spent on the Graphic Plan. For example, the term "quality" should be defined. Desi Chandler/Code 1812.DC suggested that the Graphic Plan be put on the agenda for the February 1993 Managers' Meeting.

Phase I RI Technical Memorandum Format

Sylvia Ross/CH2M HILL distributed a copy of the proposed outline of the Phase I Technical Memorandum (Tech Memo) (attached) to the team members, and discussed its contents. She said that she would add a list of acronyms, and put the References in Section 9, so that the appendixes would all be contained in Volume 2.

LCDR Serafini requested that the Phase I RI Tech Memo summarize the key points of the report in about eight pages. Graphics should be included. LCDR Serafini wondered whether Section 1.3–Regional Background Information–could be deleted. John Dolegowski/CH2M HILL said that the Tech Memo was supposed to be a stand-alone document and background information was, therefore, needed. John Broderick/RWQCB pointed out that Section 1.6–Individual Site Descriptions and Boundaries–should document the changes in site boundaries established in the SAP Amendment.

John Broderick pointed out that the MCAS El Toro RCRA Facilities (RFA) Report will still be in draft form when the Phase I RI Tech Memo is released. There should therefore be a disclaimer in Section 5 (the RFA section). Eventually, the RFA Report should be an appendix to the Tech Memo, even if only by reference.

John Dolegowski asked what Section 7–Baseline Risk Assessment-should be called. After discussion, the team agreed on "Preliminary Baseline Risk Assessment". Amir Matin/JEG pointed out that the real goal of Section 7 is to develop Preliminary Remediation Goals.

Manny Alonzo/DTSC proposed that the title of the report should be changed to "Site Characterization Report", since it will not contain a Baseline Risk Assessment. The team agreed to not change the report name. John Dolegowski said that originally the

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report was designed merely as a data dump with little data analysis due to the short time available to complete the report. With the new Federal Facilities Agreement (FFA) schedule, the Jacobs Team is now trying to approach a full-scale RI Report, but will depart from a complete RI Report in several areas, including the Baseline Risk Assessment. Sebastian Tindall/Bechtel Corporation observed that Section 7 needs to be defined clearly, so that nobody is disappointed. Liz Miesner/CH2M HILL suggested that CH2M HILL write a proposal for what the section will contain, have it reviewed by the Navy, and present it at the February 1993 Managers' Meeting. The team agreed to this. Andy Piszkin/Code 1812.AP said that he would prefer that the section contain as much risk assessment as possible with the existing data, and identify gaps that should be filled in Phase II. John Broderick agreed, and said that this needs to be done quickly, because risk assessment gaps need to be filled during the DQO process.

LCDR Larry Serafini asked why Site 18 was not included in Appendix A, since Chapter 3 is described as only a summary of Site 18. Sylvia Ross/CH2M HILL responded that Chapter 3 was meant to be complete. Andy Piszkin said that it would be good if there would be two volumes to the report: Volume 1 would summarize the data and be portable, while Volume 2 would contain the data. These volumes could be contained in 3-ring binders. LCDR Serafini suggested that Appendix A should be devoted to Operable Unit (OU)-1, while Appendix B should be devoted to OU-2 and OU-3. The team also agreed that the appendixes should use 8 1/2 x 11-inch or 11 x 17-inch figures, at the same scale if possible.

Manny Alonzo said that we need to add an appendix for the lab data. Sylvia Ross responded that this appendix would be huge, consisting of thousands of pages. Sebastian Tindall pointed out that the data will be available electronically on disk. Manny Alonzo and John Broderick said that they will need the raw data at some point during the Draft RI Report. Also, this data must go into the Administrative Record. Larry Serafini proposed sending a disk copy to the regulatory agencies, and a paper copy to the federal repository at Laguna Niguel. Manny asked whether microfiche would be a solution? John Broderick said this issue needs further discussion. The team agreed to provide additional feedback to the Navy on this subject.

Review of Action Items From Previous Meetings

Larry Serafini began the afternoon session by reviewing action items from previous meetings. One of these concerned the costs and benefits of Level III versus Level IV data. John Dolegowski agreed to ask Artemis Antipas/CH2M HILL to provide this information to the team at the next meeting. On the subject of other action items, Manny Alonzo said that he had provided a list of chemicals used at Norton AFB to CH2M HILL. LCDR Serafini said that he had provided a copy of the MCAS El Toro Master Plan to CH2M HILL, to obtain a land-use scenario for use in risk assessment, and explore "institutional control" as a remedial alternative. Manny Alonzo said that a residential use scenario may have to be used. Liz Miesner said that other scenarios may be used in accordance with EPA guidelines. LCDR Serafini said that he would ask the person responsible for the Master Plan to prepare a presentation for the February 1993 Managers' Meeting.

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Items Data Management System

Andy Piszkin said that the establishment of the ITEMS Data Management System was being addressed in Contract Task Oroder (CTO) No. 259. The earliest it would be operational would be by the end of May 1993. All of the data being gathered at CLEAN sites will be contained on a database managed by SOUTHWESTDIV, with a master database at JEG in Pasadena. Users (e.g., regulatory agencies) will have access to the data through a modem. Although the system is being designed to be user-friendly, users will have training on its use as part of the CTO. Ultimately, a user will be able to call up the database, read data, and manipulate it to obtain data files, summaries, and graphics. Manny Alonzo said that it would be good to have a person at SOUTHWESTDIV responsible for keeping the database, so that they could be contacted if users are having difficulty. John Hamill/EPA wondered whether California representatives would still need hard copies of the data if they can call the database? Manny Alonzo said that they would, but microfiche would be sufficient. John Dolegowski said that the CTO No. 145 database is currently EDMS/I, not ITEMS. If the agencies have requests for data before the ITEMS system goes on line, they can request them through Andy Piszkin.

RFA Logic Diagram

Lee Simon/Code 1852.LS distributed and discussed the Draft RFA Logic Diagram (attached). Lee Simon asked whether the agencies had other decision trees that they could use in refining the diagram. John Broderick said yes, and that he would send a copy. Mike Arends/CH2M HILL pointed out that decision trees do not always have application to complex sites. John Broderick observed that non-petroleum sites are driven by risk-based criteria, while petroleum sites are not. The tough question is deciding whether groundwater is potentially impacted in order to trigger a No Further Action response. Discussion then centered over whether this question should be answered through use of leachability models, through development of criteria, or by reliance on professional judgement. Because of time constraints, it was decided to ask Mike Arends to use his best professional judgement for the RFA, recognizing that additional studies may have to be made later. Lee Simon and the SOUTHWESTDIV Technical Branch will present the finalized Logic Diagram at the February 1993 Managers' Meeting.

RI/FS Progress

John Dolegowski provided a summary of recent progress on the RI/FS by quickly reviewing the December 1992 monthly report. Field work has been substantially completed with the exception of drilling at Site 17, and data analysis and report preparation is in progress.

RFA Progress

Mike Arends provided a summary of recent progress on the RFA. The RFA team is working on the RFA Report. Because the RFA Report is due on March 18, 1993, the data will not be validated in the Draft RFA Report. Mike Arends then summarized some of the sampling results. To date, there had been few instances of detected contaminants in samples. The only volatile organic compounds (VOC) detected so far

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are at the former incinerator site. Petroleum hydrocarbons have been detected at about four other sites. The final data should be arriving from the laboratories in about a week. John Hamill requested that a map be put up on the wall for future field updates. Andy Piszkin asked Mike Arends to provide the team an update of potential sites that may be included in OU-4 at the February 1993 Managers' Meeting.

Repair at Site 2 - The Magazine Road Landfill

LCDR Serafini asked the team whether the exposed cut-face at the Site 2 landfill should be remediated on a temporary or permanent basis. He postulated that the residential development upstream from the landfill is partly responsible, since this development caused the storm discharge to increase. MCAS El Toro had raised this objection before the development was built. John Hamill said that MCAS El Toro may have a case. John Broderick said that the RWQCB was thinking of an interim fix with rip-rap. LCDR Serafini proposed that CH2M HILL design a remediation involving a gabion and fill and an impermeable liner as a removal action. John Broderick said that the RWQCB would support this solution, although it had not officially requested an immediate removal. The team agreed that LCDR Serafini's proposal was acceptable. Sylvia Ross reported that TCE had been found in a groundwater sample collected from a well downgradient from Site 2.

LCDR Serafini summarized the discussion and action items agreed upon during the meeting so far, and the team adjourned for the day.

WEDNESDAY, JANUARY 13, 1993

Applicable or Relevant and Appropriate Requirements (ARARs)

Sebastian Tindall began by saying that he felt the ARARs issue was very complex, and the team was not qualified to select them. Manny Alonzo responded that under the terms of the FFA, the agencies are supposed to submit a list to the Navy. The Navy reviews the list and responds. This response should be made before the Draft RI Report. The State has submitted such a list. John Hamill confirmed that the EPA had also submitted a list. Andy Piszkin said that the Navy had these ARARs lists on file, and that Navy attorneys would review them. It was agreed that CH2M HILL would also review the list, and then the Navy would send letters to the agencies. It was also agreed that the team would schedule an ARAR meeting.

LCDR Serafini pointed out that one of the Technical Teams was supposed to examine ARARs as part of the Data Quality Objectives (DQO) process. Sebastian Tindall suggested that these teams be eliminated, because they add too much redundancy to the process. It was agreed that Jacobs Team would go ahead and do the work of these Technical Teams. The "leads" designated for these teams would be "coordinators" and be used as resources, but they would not to manage the activity. Andy Piszkin said that the DQOs will be managed by the Jacobs Team, and they will proceed as soon as funding is available.

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Contracting and Funding for 1993 Tasks

Andy Piszkin distributed a schedule of 1993 and 1994 tasks needed to support the MCAS El Toro RI/FS (attached). He pointed out that the current budget allowed for only one more round of groundwater samples for VOC and inorganics analyses. Sebastian Tindall then reviewed the list of deliverables during 1993. Andy Piszkin pointed out that OU-4 would be blended with OU-2 and OU-3 planning efforts for future field work.

The Road to ROD for OU-1

Larry Serafini began the discussion by reviewing the history of the Desalter Project and its relationship with MCAS El Toro. He then expressed the desire of MCAS El Toro to fast-track the Record of Decision (ROD) for OU-1 in order to expedite their participation in the Desalter Project. The immediate tasks for the team were to define OU-1, decide what additional groundwater modelling is needed, if any, and define the remedial objectives for OU-1.

Groundwater Modelling to Support the OU-1 FS

Andy Piszkin continued that he had contacted Rich Freitas, a groundwater specialist a EPA. Rich Freitas indicated that he approved of the use of the MODFLOW groundwater model to evaluate the impact of the Desalter Project. MODFLOW was previously used by Orange County Water District (OCWD) to model the effect of the Desalter Project pumpage. The model is two-dimensional (2-D), it is conservative and would underestimate the capture zone of the Desalter wells. Manny Alonzo said that the state usually prefers 3-D models. Also, a 3-D model would better define the volumes of water needed for treatment. This may save the Navy money. LCDR Serafini responded that this is a moot point, because the Desalter will go online anyway.

John Dolegowski said that the existing OCWD model may need to be modified to reflect Phase I field data before it could be used to model remedial alternatives. Andy Piszkin agreed that an upgrade instead of a new model may accelerate the Feasibility Study (FS) process. John Broderick expressed concern that the discussion was proceeding in a vacuum without having data to look at. The critical issue is whether the Desalter Project will capture 100 percent of the plume. In addition, the Navy could be assuming responsibility for other potential sources of groundwater contamination if they participate in the Desalter Project due to the large size of the capture zone. Andy Piszkin responded that an evaluation of the existing data will take place in June 1993. Chuck Elliott/CH2M HILL said that if, while observing the response of groundwater system after the Desalter goes on-line, it turns out that 100 percent of the plume is not being captured, then the extraction system can be altered, or additional wells can be drilled. A ROD would not prevent that from happening.

John Hamill said that a representative of OCWD should participate in the discussion. LCDR Serafini responded that OCWD feels confident that the Desalter Project will take care of the problem. OCWD has obtained governmental approval through the permitting process, and have indicated that they will share their modeling information. MCAS El Toro believes that it is more cost effective to participate than not. John

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Broderick repeated that the FS must demonstrate that the Desalter will capture 100 percent of the plume. Manny Alonzo repeated that he is not sure that the existing model will adequately evaluate this 100 percent capture. He will consult with modelers at DTSC.

John Broderick and Manny Alonzo agreed that the State may accept the 2-D model. Davi Richards/CH2M HILL said that we need to address questions such as whether the Desalter will temporarily make the situation worse. The FS may suggest modifications to the design of the Desalter Project. Sebastian Tindall said that he is worried about contaminants other than VOCs that may be out there. The Desalter treatment system may not be able to treat these contaminants. Davi Richards responded that this issue will need to be examined later when the Phase I data are in. The team concluded that we will proceed with the existing OCWD groundwater model until the data are all in. The regulatory agencies will support the model, with reservations, until then.

Flow Chart to Reach a ROD for OU-1

Andy Piszkin asked for agency comments on the "Road to ROD" and explained a flowchart detailing the process (attached). He added that the Navy hopes to be able to influence the Desalter design if necessary. Larry Serafini said that he hoped it would not be necessary to add more monitoring wells for OU-1. John Broderick said that more wells may be necessary for plume definition and we have not discussed the issue of the potential presence of dense non-aqueous phase liquids (DNAPLs). Davi Richards said that we need to wait for the data.

OU-1 Definition

Andy Piszkin said that he had spoken with Walter Sandza/Code 185, who was part of the MCAS El Toro RI/FS at the beginning. Walter Sandza said that he felt the definition included only VOCs in off-Station groundwater. John Hamill responded that according to the terms of the FFA, OU-1 comprises contaminated groundwater on or off-Station. John Dolegowski pointed out that if the team agrees to limit OU-1 to off-Station groundwater, it will greatly expedite the ROD, because it will be much easier to demonstrate that the Desalter Project remediates offsite groundwater contamination than onsite contamination. Davi Richards suggested putting together a position paper that defines OU-1, OU-2, and OU-3 for discussion at the February 1993 Managers' Meeting.

Two Rounds of Groundwater Monitoring to Support OU-1 ROD

Andy Piszkin then made a proposal to the team that the Navy conduct two rounds of groundwater sampling in existing monitoring wells with the same set of analyses as in Phase I (one additional round of sampling); that the Baseline Risk Assessment for OU-1 rely on these two rounds of sample data; that the FS propose an ongoing monitoring network for OU-1; and that the Preliminary Baseline Risk Assessment be retained in the Phase I Tech Memo. Davi Richards added that the team should keep in mind that a mechanism is built into the ROD to adapt to additional information and changes as they occur. LCDR Serafini commented that additional wells could be constructed as part of the Remedial Design/Remedial Action (RD/RA) after the ROD. John Hamill said he would tentatively approve this course of action pending a

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reassessment in May or June 1993 after the Tech Memo has be completed. Manny Alonzo felt that two rounds of complete groundwater data, plus the historic OCWD data, should be sufficient to perform risk assessment on OU-1. John Broderick said that the EPA risk assessors need to be contacted to ensure that they will accept the historic OCWD data as part of the Risk Assessment.

The team concluded that Davi Richards would prepare a position paper that summarizes the consensus reached today for discussion and approval at the next Managers' Meeting. Liz Miesner would contact the EPA risk assessors and discuss the validity of historic OCWD and MCAS El Toro data. She would then prepare a position paper summarizing the team consensus on Risk Assessment issues for discussion and approval at the February 1993 Managers' Meeting. Davi Richards added that after defining OU-1 in February, she would propose a list of Remedial Objectives for team discussion and approval at the March Managers' Meeting.

Data Quality Objectives

Chuck Elliott briefly discussed the DQO process, and said that the schedule will be very tight. In order to make the August 1993 deadline for the DQOs, it will be necessary to have the process essentially complete by July 1, 1993. John Broderick commented that it will be difficult to develop DQOs without data in hand. It will be necessary to have summaries of the Phase I environmental data in advance of the Tech Memo. Andy Piszkin proposed doing the DQOs site by site, and working with Sylvia Ross to develop data summaries as each site is addressed.

John Dolegowski expressed his concern that it will be impossible to complete the DQOs in time for the August 1993 deadline. Sebastian Tindall suggested that we prioritize the sites: Develop DQOs for Site 18 (OU-1) first, then the OU-2 source sites. These DQOs would be included in the August draft, together with a "generic" version of the DQOs for OU-3 and OU-4 sites. A revised draft of the DQOs for OU-3 and OU-4 sites could be inserted in the Fall. John Broderick said that the goal is a quality document. If this is done from the beginning, it may save time later in the schedule because of agency participation. Manny Alonzo said that the regulatory agencies could cut their review time of the Draft DQOs from 60 days to 30 days if everyone has agreed on the DQOs in advance. For the Draft Final DQOs, if the revisions made based on agency comments were identified clearly, it could cut the review time from 30 days to two weeks. John Hamill added that the ROD date is firm, but the interim due dates may be adjusted. Sebastian Tindall continued that the FFA calls for a 60-day agency review of the Draft, followed by a 60-day Navy response. This allows four months to work on the document.

Davi Richards asked whether the DQOs for OU-1 could be eliminated? LCDR Serafini responded that OU-1 DQOs are necessary to validate the team's position on OU-1. John Hamill said that the DQO process would make the OU-1 ROD easier. Davi Richards said that the DQOs could be the vehicle for making the June 1993 evaluation as to whether the existing OU-1 data were sufficient to proceed to a RI Report, or whether a Phase II investigation was needed.

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It was concluded that Chuck Elliott would prepare a schedule for completing the DQO process, including what meetings would be required with the regulatory agencies during Spring 1993.

Future Meetings

It was agreed that the next meeting would take place on 17-18 February 1993 at the office of DTSC in Long Beach, California.

Summary of Conclusions

1. The following conclusions were reached regarding the Phase I RI Tech Memo:

   - o The Executive Summary should be brief, about eight pages in length, and use graphics if possible.
   - o There should be a disclaimer in Section 5 (the RFA section) of the Draft Tech Memo that the RFA Report is still in Draft form. Eventually, the RFA Report should be an appendix to the Tech Memo, even if only by reference.
   - o The Baseline Risk Assessment will be referred to as the "Preliminary Baseline Risk Assessment" in the Tech Memo.
   - o Appendix A should be devoted to OU-1, while Appendix B should be devoted to OU-2 and OU-3.
   - o The outline proposed by Sylvia Ross and modified as noted above was approved by the team.

2. The Jacobs Team will use best professional judgement in the RFA in evaluating which sites may require additional investigation. The team will review these decisions.

3. Navy attorneys would review the ARARs lists submitted by the regulatory agencies. The Jacobs Team will also review the list, after which the Navy will send letters of response to the agencies. The team will schedule an ARARs meeting at some future date.

4. The team OU-1 FS will use the existing OCWD groundwater model, if possible, with appropriate modifications after review of the technical basis of the model. The regulatory agencies will support the model unless Phase I data indicate it should not be used.

5. The Navy will conduct one additional round of groundwater sampling with the same set of analyses as in Phase I. The Baseline Risk Assessment for OU-1 can rely on these two rounds of sample data. The FS will propose an ongoing monitoring network for OU-1. The Preliminary Baseline Risk Assessment for OU-1 will be retained in the Phase I Tech Memo.

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6. DQOs will be developed for Site 18 (OU-1) first, followed by the OU-2 sites. These would be included in the August 1993 draft DQO document, together with a simplified version of the DQOs for OU-3 and any OU-4 sites. A revised draft of the DQOs for OU-3 and OU-4 sites may be inserted in the DQO document in Fall 1993.

Action Items

SOUTHWESTDIV

1. A new phone list will be distributed at the February 1993 Managers' Meeting.
2. The Graphic Plan will be put on the agenda for the February 1993 Managers' Meeting.
3. The person responsible for the MCAS El Toro Master Plan will provide a presentation for the February 1993 Managers' Meeting.
4. The SOUTHWESTDIV Technical Branch will present the finalized RFA Logic Diagram at the February 1993 Managers' Meeting.
5. SOUTHWESTDIV will provide a list of future RI/FS contracts with funding data to the regulatory agencies.

Jacobs Team

1. The Jacobs Team will provide a revised outline of the Phase I Tech Memo to the team.
2. The Jacobs Team will write a proposal for what the Preliminary Baseline Risk Assessment section in the Tech Memo will contain, and present it at the February 1993 Managers' Meeting. The Jacobs Team will also prepare a position paper summarizing the team consensus on Risk Assessment issues for discussion and approval at the February 1993 Managers' Meeting.
3. The Jacobs Team will provide a cost/benefit analysis of Level III versus Level IV data and present it to the team at the February 1993 Managers' Meeting.
4. The Jacobs Team will provide the team an update of potential RFA sites that may be included in OU-4 at the February 1993 Managers' Meeting.
5. The Jacobs Team will prepare a position paper that defines each OU and discusses alternatives for the FS for discussion and approval at the next Managers' Meeting.
6. The Jacobs Team will prepare a list of Remedial Objectives for team discussion and approval at the March 1993 Managers' Meeting.
7. The Jacobs Team will prepare a schedule for completing the DQO process for discussion and approval at the February 1993 Managers' Meeting.

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DTSC

1. DTSC will provide a sample table summarizing risk to the team.

RWQCB

1. The RWQCB will provide an example of a decision tree regarding the potential for contaminants in the soil to leach to groundwater and actions that should be taken.

2. The CTO No. 145 Team will provide additional feedback to the team on whether a complete hard copy of laboratory analyses will be required, a microfiche copy is acceptable, or results on the computer database are sufficient.

Participants - 12 January 1993

John Dolegowski/CH2M HILL
Amir Matin/JEG-Pas
LCDR Larry Serafini/MCAS El Toro
Sebastian Tindall/Bechtel Corp.
Mike Arends/CH2M HILL
Chrisa Mitchell/MCAS El Toro
Chuck Elliott/CH2M HILL
Manny Alonzo/DTSC
Jeff Allen/Code 0231.JA
Desire Chandler/Code 1812.DC
John Hamill/EPA
Liz Miesner/CH2M HILL
Sylvia Ross/CH2M HILL
Andy Piszkin/Code 1812.AP
John Broderick/RWQCB
Lee Simon/Code 1852.LS

Participants - 13 January 1993

John Dolegowski/CH2M HILL
Jeff Allen/ Code 0231.JA
LCDR Larry Serafini/MCAS El Toro
Sebastian Tindall/Bechtel Corp.
Sylvia Ross/CH2M HILL
Andy Piszkin/Code 1812.AP
John Broderick/RWQCB
Davi Richards/CH2M HILL
Desire Chandler/Code 1812.DC
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MANAGERS MEETING
MARINE CORPS AIR STATION EL TORO RI/FS
PHASE II PLANNING ACTIVITIES

12 & 13 January 1993
9:00 A.M.

Location: CH2M HILL - San Diego Office
401 B Street, Suite 900
San Diego
619/239-3550 (Christie)

GOALS: Technical Memorandum Report Format
Format for presenting Phase I results to TRC
DQOs: define subteam charters and final products
OU-1 ROD: Discussion of flowchart & requirements

TUESDAY MORNING

Partnering Issues.
- Team Health & Communication Check
- Screening of agenda topics & set time limits

Current Issues- Status and Handouts.
- Handout: Team Phone List & Graphic Plan (SWDIV)
- Handout: Technical Memorandum Report Format (HILL)
- Status: ITEMS Data Mgt System & RFA logic diagram (SWDIV)
- Update: RFA sampling results and progress (HILL)
- Update: RI/FS sampling results and progress(HILL)
-

Contracting & Funding for 1993 Tasks.
- List and schedule of RI/FS associated tasks
- Funding situation

TUESDAY AFTERNOON

Data Quality Objectives.
- define subteam charters
- define final products

WEDNESDAY (0900 start time)

Road to ROD for OU-1
- Desalter status and impacts
- Guidance- EPA & Navy Counsel
- List & degree of agency requirements
  (e.g. level of sophistication for groundwater modelling)
- General flow chart

Future Meetings.
- Next Managers Meeting: _____

Meeting Assessment & Reality Check.
- Summarize key points & goals accomplished
- Action Items (what, who, when)
- Assessment