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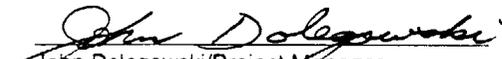
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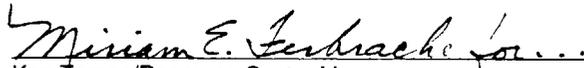
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TO: Ms. Robin Green
Contracting Officer, Code 0232
Southwest Division
Naval Facilities Engineering Command
Contracts Department, Room 131
1220 Pacific Highway
San Diego, California 92132-5187

DATE: 21 Feb 1995
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John Dolegowski/Project Manager


Ken Tomeo/Resource Center Manager

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Groundwater Modeling, Telephone conference date: 31 January 1995

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Copies To:	<u>J. Rogers - Code 18C1 w/attach</u>	<u>M. Huddleston - CH2M HILL w/o attach</u>
	<u>A. Piszkin - Code 1831.AP w/attach</u>	<u>Mike Bitner - CH2M HILL/ABQ w/attach</u>
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Delivered To: Contracting Officer RPM/EIC

Name: _____ TITLE: AGENCY COMMENTS ON OU-1 IAFS
GROUNDWATER MODELING, TELEPHONE
CONFERENCE DATE: 31 JAN 1995

AUTHOR: JOHN DOLEGOWSKI/CH2M HILL

DATE: 02/21/95
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PROJECT NO.
 01-F145-H6

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.	

**ACTION
 REQ'D. BY**

ITEM

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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	<p>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.</p> <p>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.</p> <p>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.</p> <p style="text-align: center;">DISCUSSION OF MAJOR AGENCY COMMENTS</p> <p>N. Raykhman reviewed the major comments as follows:</p> <p>DTSC General Comment 1 (Need For a Site-Specific Groundwater Model)</p> <p>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).</p> <p>A. Findikakis: Simulated plumes were wider than observed plumes due to numerical dispersion. A finer grid is needed in the area of TCE plume.</p> <p>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.</p> <p>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.</p>

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	<p>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.</p> <p>DTSC Comments A-2 and A-16 (Hydraulic Conductivity Estimates Used In The Model)</p> <p>N. Raykhman: We had few comments on the basis of the hydraulic conductivity (K) values used in the groundwater model.</p> <p>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.</p> <p>R. Herndon: Agrees with the suggestion but points out that we are limited to using the regional K values under the circumstances.</p> <p>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.</p> <p>R. Herndon: We can model what we want, but we need actual aquifer tests; that is, long-term tests.</p> <p>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.</p> <p>A. Piszkin: Does it make a difference if we are comparing alternatives?</p> <p>R. Herndon: We will probably never have enough data until we turn the system on. Additional modeling may not be productive.</p>

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	<p>J. Woodling: It could make a difference if we are overestimating the K of the shallow unit - could affect the outcome.</p> <p>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.</p> <p>R. Herndon: He clarified that we are talking about a 60 to 600 gallon per minute (gpm) system, not 600 to 6,000 gpm.</p> <p>A. Piszkin: This analysis is conceptual. The CH2M HILL approach is conservative.</p> <p>J. Dolegowski: More aquifer testing will be done by CLEAN II.</p> <p>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.</p> <p>DTSC Specific Comment 14 (Why a 20-Year Simulation Period Is Used)</p> <p>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 dewater 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.</p> <p>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.</p> <p>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.</p>



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	<p>N. Raykhman: Added that the longer we run the model, the less certain the model results would become.</p> <p>Consensus was reached to proceed with a 20-year simulation period.</p> <p>EPA/Bechtel Comment Number 66 (Verification Of The Time Step Used In The Model)</p> <p>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).</p> <p>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.</p> <p>DTSC Specific Comment 15, A-23, and A-27 (Retardation Factor)</p> <p>R. Herndon: What retardation factor was used in the model?</p> <p>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.</p> <p>R. Herndon: Is that conservative enough?</p> <p>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.</p> <p>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?</p> <p>N. Raykhman: We had to use higher K than field values even without retardation to get the plume to migrate far enough.</p>

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	<p>J. Woodling: He was happy to hear H. Nezafati say that the transport model was used primarily to calibrate the flow model.</p> <p>A. Findikakis: What is the criteria on using a porosity value of 0.2? Using 0.2 leaves little room to change this value.</p> <p>N. Raykhman: During sensitivity analyses, we changed retardation, porosity, and K on capture zone analyses. Changes of <u>±</u> 50 percent didn't change the results much.</p> <p>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.</p> <p>Consensus was reached to use a retardation factor of 2.</p> <p>DTSC Specific Comment 24 (Why Are The Northeastern Contamination Plumes (Site 2) Not Addressed)?</p> <p>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.</p> <p>B. Arthur: Is aquifer testing included in the OU-2/3 work plan?</p> <p>A. Piszkin: Yes, CLEAN II will coordinate with CLEAN I input.</p> <p>A. Findikakis: Simulations did not include the source(s) for Site 2.</p> <p>A. Piszkin: These sources will be treated under other OU programs.</p> <p>DTSC General Comment 2 (Requesting Maps Showing The Capture Zones For Extraction Wells)</p> <p>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.</p> <p>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?</p>

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	<p>R. Herndon: Irrigation wells and deep extraction wells are fully penetrating.</p>
	<p>N. Raykhman: Unless we get detailed water quality data, we will assume fully penetrating wells in the model.</p>
	<p>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.</p>
	<p>N. Raykhman: Three layers are used for the Principal Aquifer; hydrogeologic properties are the same for all 3 layers.</p>
	<p>A. Findikakis: It may be useful to get the model to simulate observed vertical variability. Are there discontinuities in the intermediate layer?</p>
	<p>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.</p>
	<p>It was agreed that new figures will be produced to graphically depict the simulated capture zones around extraction wells (a 2-D presentation).</p>
	<p>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?</p>
	<p>H. Nezafati: We could assume linear groundwater velocity.</p>
	<p>B. Arthur: We need hand drawn maps for Tank 398. How soon could we get the plume maps?</p>
	<p>D. Tedaldi: Wouldn't expect much change from the most recent maps.</p>
	<p>B. Arthur: Would Tank 398 and Site 2 plumes move into parcels identified as clean?</p>
	<p>D. Tedaldi: We need to state that for CERFA, the existing maps would be valid.</p>

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	<p>DTSC Specific Comment A-19 (Accuracy Of Flow Calibration; RMS Of 15 Feet Is Too Large)</p> <p>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.</p> <p>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.</p> <p>N. Raykhman: Yes, we have compared observed heads with simulated; we will incorporate them into the report.</p> <p>A. Findikakis: There are some differences between the interpreted and simulated flow direction.</p> <p>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.</p> <p>A. Findikakis: Can we reinterpret TCE data in light of what we learned from the model?</p> <p>H. Nezafati: The plume maps are highly interpretative as it stands now.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p>



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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