JACOBS ENGINEERING GROUP INC.

MEMORANDUM

TO: Andy Piszkin - Code 1812.AP **DATE:** 6 August 1993

FROM: John Dolegowski - CH2M HILL/SCO
Hooshang Nezafati - CH2M HILL/SCO
Davi Richards - CH2M HILL/CVO

SUBJECT: **MCAS El Toro RI/FS**
OU-1 Regional Groundwater VOC Contamination
Ability to Proceed with the OU-1 FS Based on the Phase I RI Data
CLE-C01-01F145-G2-0162

The parties to the Marine Corps Air Station (MCAS) El Toro Federal Facilities Agreement (FFA) agreed in early 1993 to proceed with the Remedial Investigation/Feasibility Study (RI/FS) for Operable Unit (OU)-1, the Regional Groundwater Contamination Investigation, on an accelerated schedule by attempting to complete the OU-1 FS after completion of the Phase I RI rather than after the end of the Phase II RI. The current FFA calls for a Draft Record of Decision (ROD) in December 1995; the accelerated schedule would attempt to reach a ROD in mid-1994. The agreement to explore such an accelerated schedule is due, in large part, to the scheduled construction and operation of the Orange County Water District (OCWD) Irvine Desalter Project in 1995. The planned Irvine Desalter Project, a large scale groundwater extraction and treatment system, is anticipated to provide capture of regional contaminated groundwater naturally, from agricultural operations, and from Volatile Organic Compounds (VOCs) emanating from MCAS El Toro. Groundwater modelling completed during the OU-1 FS will evaluate whether capture of the entire plume does occur.

The feasibility of an accelerated schedule for OU-1 depends on an evaluation of the data sufficiency of the Phase I RI to complete an FS, the Proposed Plan, and ROD. The Phase I RI Technical Memorandum (TM) was submitted by the Navy to the regulatory agencies on 07 May 1993. From the data collected, the Comprehensive Long-term Environmental Action Navy (CLEAN) Project Team has gained a sufficient understanding of the contaminant hydrogeology of the regional groundwater system to complete the OU-1 FS on the basis of the RI Phase I data. The recommendation to proceed assumes that the following activities will occur:

- Hydraulic containment and extraction of the shallow on-Station trichloroethylene (TCE) plume
- Installation of a shallow groundwater monitoring system to monitor the effectiveness of the shallow containment system
- Source investigation of OU-2 sites during Phase II of the RI

Hydraulic Containment and Extraction of Shallow On-Station TCE Plume

Based on the current understanding of the hydrogeologic system in the Irvine Subbasin and beneath MCAS El Toro, hydraulic containment and extraction of the shallow on-Station TCE contamination is advisable in order to minimize the extent to which contaminants are smeared between the source areas and the Desalter extraction wells and possibly to reduce the cost of groundwater treatment. The containment/extraction system would be constructed to specifically address the shallow zone of TCE contamination.

Phase I RI and OCWD piezometric head, water quality chemistry, and contaminant chemistry data suggest that the on-Station TCE groundwater contamination occurs predominantly in the shallow groundwater hydrogeologic unit. The shallow groundwater unit consists of low permeability interbedded silts, fine sands, and clays. The underlying principal aquifer unit consists of interbedded silts, sands, gravels, and clays of significantly higher permeability. The confined principal aquifer unit is the primary source of groundwater pumped by nearby agricultural wells.

Vertical hydraulic gradients from the shallow groundwater unit to the principal aquifer vary in response to extraction from deep production wells located off-Station in the central portion of the Irvine Subbasin. During months of high groundwater extraction from these production wells, downward vertical gradients are enhanced from the shallow zone to the deeper principal aquifer. Existing data suggest the on-Station TCE contamination migrates with advected groundwater into the deeper principal aquifer in response to the downward vertical gradient imposed by deep production wells located off-Station.

OCWD has prepared a two-dimensional groundwater flow model to help evaluate the effect of the Desalter Project on the regional groundwater contamination. The Irvine Subbasin is represented as one continuous hydrogeologic unit; the shallow aquifer and principal aquifer are not separately represented. The model simulation results indicate that the TCE-impacted groundwater in the principal aquifer is contained by the Desalter Project; the effectiveness of the containment of the shallow TCE-contaminated groundwater cannot be assessed with the OCWD model. It is possible that the large vertical gradient expected to be imposed by the Desalter Project may have the undesirable effect of smearing of TCE from the shallow aquifer on-Station to the deeper principal aquifer.

A meeting of groundwater modelers representing OCWD, the CLEAN Project Team, the Environmental Protection Agency (EPA), the Regional Water Quality Control Board (RWQCB), and the California EPA - Department of Toxic Substances Control (DTSC) was held on 30 June 1993 to decide upon the degree of groundwater modelling needed to evaluate the OU-1 FS alternatives. The consensus reached at this meeting was that, in addition to the current Desalter Project design, localized groundwater extraction in source areas should be evaluated and potentially implemented to limit potential migration of TCE contamination in shallow groundwater. Capture of the shallow contamination can be achieved with a series of extraction wells screened entirely in the shallow water-bearing zone.

The Navy will propose and evaluate alternatives for extraction-well configurations for hydraulic containment/extraction of shallow contamination in the OU-1 FS. The evaluation will be performed according to EPA RI/FS guidance in fulfillment of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements under the FFA.

Shallow Groundwater Monitoring System

The OU-1 FS will also evaluate configurations for a shallow monitoring well network to monitor the effectiveness of the extraction system in achieving shallow groundwater contamination containment and remediation objectives.

Source Investigation During Phase II of RI

The Phase II RI will focus on OU-2 and OU-3 sites. Investigation of source areas for groundwater contamination (OU-2 sites) will be implemented with the help of a soil gas survey during the Fall of 1993. OU-2 sites are defined to include all soils within the site boundaries, and groundwater in the shallow zone directly beneath the sites. Soil and groundwater data obtained during the Phase II RI will be evaluated as part of OU-2. Any needed modifications in remedial response actions for shallow groundwater contamination identified as a result of the Phase II RI will be addressed as part of the OU-2 FS and ROD.

Conclusion

The CLEAN Project Team recommends proceeding with the FS for OU-1 based on Phase I RI data. Sufficient data currently exist to evaluate the effectiveness of the capture of regional contaminated groundwater in the principal aquifer emanating from MCAS El Toro. The Desalter Project, with no additional extraction wells, will represent one of the alternatives evaluated. The Desalter Project, including localized pumping from the areas of highest VOC concentrations within the shallow groundwater unit, will be evaluated during the OU-1 FS as an additional alternative. Additional data generated during the Phase II RI will allow a more detailed analysis of localized groundwater pumping within source areas during the OU-2 FS if needed.

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cc: C. Mitchell - MCAS El Toro
J. Hamill - U.S. EPA, Region 9
S. Tindall - Bechtel
J. Zarnock - Cal-EPA/DTSC
J. Broderick - CRWQCB, Santa Ana
File - PMO
File - CTO Notebook/PMO
File - CH2M HILL