MEMORANDUM

Date: December 18, 1995

To: OU-1 Sub-Committee

M60050.002634
MCAS EL TORO
SSIC #5090.3

From: Peter Hersh, City of Irvine - Manager of Land Use Policy/Programs

SUBJECT: Evaluation of OU-1 IAFS

Purpose of IAFS: The Operable Unit 1 (OU-1) Interim-Action Feasibility Study Report (IAFS) evaluates 12 remedial alternatives to effectively contain and potentially remediate the groundwater contaminated by Volatile Organic Compounds (VOC's) originating from MCAS El Toro, in satisfaction of Feasibility Study (FS) requirements of the Comprehensive Environmental Response, Compensation, and Liability ACT (CERCLA) for an interim Record of Decision (ROD).

CFEST Modeling: A groundwater flow and trichloroethylene (TCE) transport over the next 20 years were numerically simulated using the Coupled Finite-Element Solute Transport (CFEST) model. CFEST was developed to support the OU-1 in evaluating interim remedial action measures for the regional groundwater VOC contamination in the Irvine Subbasin.

Although not a perfect representation of the groundwater system, CFEST purports to allow simulation of the basin wide groundwater flow with greater resolution and flexibility than other models and includes simulation of solute transport. It also has been tested against available recent water level and concentration data. In regards to CFEST's 20 year time period, it is understood as stated in the report that a simulation period greater than 20 years would be considered to overextend the current capacity for the model to predict natural and, particularly, anthropogenic changes in the hydrologic regime and chemical characteristics of the area. As the validity and reliability of the CFEST model does not extend beyond 20 years, implementation of a preferred alternative with on-going monitoring and commitment to further remediation, if necessary, can address any model inaccuracy.

Readability of Document: The report, consisting of two volumes is comprehensive and detailed. For the purpose of this evaluation, only portions of the IAFS including volumes VII (Sections e, h, i and j) and Volume VI (Introduction & Chapter 6) were reviewed. Organization of the report is fairly easy to follow with tables, graphs, figures, table of contents and tabs for guidance. However, in terms of general readability and understanding of the information compiled, the report is still difficult for a person without any background in groundwater remediation or hydrogeology.

It is important to ensure the readability of technical documents for the intelligent lay person serving on the Restoration Advisory Board (RAB). The Presidents Five Point Plan for base closure established the RAB's to provide an opportunity for meaningful participation in base remediation. Meaningful input can only be achieved if there is an adequate understanding of the document.

We recommend a user friendly "Executive Summary" section separate from the "Introduction" Chapter of Volume VI, explaining the background and evaluation of IAFS. The overall documents in these two volumes contain a plethora of information geared for the specialist or technical reader. Although it is important for the reader to be presented with all the, facts, appendices, and test results for the 12 remedial action alternatives, it is also critical that the information provided can be intelligently evaluated by policy makers who do not have a technical background.

Also, the tables and figures at the end of chapter six are numerous and contain a great deal of important information. Without extensive expertise in the field of groundwater remediation or active participation in this process from the beginning, it is difficult to assess the results and make a qualitative evaluation or conclusion. We recommend a summary map, compiling the results of groundwater modeling for each alternative: (groundwater flow, flow direction and capture zone mapping, particle tracking, and TCE transport) to better compare each of the 12 remedial alternatives and comprehend the effectiveness for each alternative.

Fiscal Evaluation: Cost estimates were prepared, including line item estimates for each of the 11 remedial alternatives other than Alternative 1-No Action. The report states that actual cost is expected to be no higher than 50 percent more than the estimate and no less than 30 percent below. The large margin of difference is primarily due to uncertain variables such as actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, the firm(s) selected for engineering, and other variables. This large margin makes it difficult to decide which alternative is most cost beneficial or reasonable to implement. Final commitment on the alternatives should be deferred until costs are more clearly defined.

Cost Benefit Analysis: It is agreed that the feasibility of remediating to zero levels or "background" is not cost beneficial nor practical. Per the information given, it would take 150 years and $123.6 million dollars to remediate to background levels. However, to remediate to Maximum Contaminant Levels (MCLs), which are 5.0 micrograms per liter (ug/L) for trichlorethylene and 1 ug/L for benzene, it would take 40 years and $54.3 million dollars. MCLs define an acceptable risk level and, therefore, the almost 70 additional million dollars to further reduce the risk has little added benefit.

Conclusion:

Alternative 6A: Based upon review of the 12 remedial alternatives, Alternative 6A appears to be an environmental and cost effective choice for groundwater remediation. The primary consideration for selecting Alternative 6A is the overall amount of TCE clean up, cost estimates and time spent.

Table 6-9 lists the results of TCE cleanup to MCL model simulation for each remedial alternative. Alternative 6A is shown to remove larger amounts of TCE mass at one of the lowest estimated cost in comparison to other alternatives. Although alternative 6A may not have the quickest average of years to clean up to MCL, a large amount of TCE mass (14,750 lbs) from the Shallow Groundwater Unit and the Principal Aquifer is removed at an economically feasible estimated cost of $34 million to $41 million.

This particular remediation effort includes the Irvine Desalter Program which does not include injection wells. All extracted groundwater is delivered to the IDP treatment facility. In other words, the water is pretreated on-Station and treated for VOC removal for further use at the IDP treatment system rather than being injected into the groundwater.

Thus, one stipulation of Alternative 6A is the reliance on agreements with other parties, such as Orange County Water District (OCWD). Per the IAFS, an agreement between Department of Navy (DON) and OCWD would be required for DON to rely on the VOC-related components of the IDP for CERLA response and for OCWD to modify its groundwater extraction plans to accept flow from MCAS EL Toro project wells in the shallow groundwater unit and the principal aquifer. Alternatives 6A were evaluated based on DON paying 0% and 50% of the IDP's shared VOC -related components.

Based upon the model simulation results and our evaluation of IAFS, the most value for the money expended for the remediation effort would be Alternative 6A MCAS El Toro Project and Partial IDP with Discharge to Use Only. However, if OCWD does not enter into an agreement with DON for the IDP development, Alternative 2A is the second preferred choice.

Alternative 2A: In terms of costs and effectiveness, alternative 2A is also an ideal second choice with an estimated of cost $54 million, which is approximately $10 million to $20 million greater than Alternative 6A. However, the approximate clean-up time to MCLs for the Shallow Groundwater Unit and Principal Aquifer will on the average take 10 years less than Alternative 2A. The approximate mass removed is relatively fewer than Alternative 6A by approximately 800 lbs (13,950 lbs).

The components of Alternative 2A include extracting groundwater, treating the groundwater from the Shallow Groundwater Unit using air stripping and liquid-phase granular activated carbon (LGAC), treating groundwater from the Principal Aquifer using air stripping and reinjecting the treated effluent. Alternative 2A does not rely on agreements with any other parties such as the OCWD.

cc: Joseph Joyce