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MCAS EL TORO
SSIC NO. 5090.3.A

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October 9, 1996

Dave Hodges, Remedial Project Manager
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Subject: Comments Regarding Proposal for Remediation by
Natural Attenuation of the MCAS El Toro Trichloroethylene (TCE) Plume

Dear Mr. Hodges:

Orange County Health Care Agency (OCHCA) has reviewed the report entitled, *Draft Final Operable Unit 1, Interim Action Feasibility Study Report of 9 August 1996* ("Report"). We would in particular like to address the proposal to consider passive remediation by natural attenuation as an alternative to active mitigation of the Marine Corps Air Station (MCAS) El Toro trichloroethylene (TCE) plume.

Based on the current understanding of the TCE plume and the aquifer systems, we believe that passive remediation does not provide adequate protection to the people of Orange County against potential future health risks. Remediation by natural attenuation has not been demonstrated to adequately mitigate threats to the Orange County groundwater supply for the reasons given below.

Review of the Problem

Past activities at MCAS El Toro created a large TCE plume that has already contaminated a considerable volume of the Orange County water supply, currently preventing full development of the Irvine Subbasin groundwater resource. More importantly, this plume is growing and migrating toward the Main Orange County Aquifers where it could threaten the water supply for a population of over 2 million people. At present, the drinking water Maximum Contaminant Limits (MCLs) can be met without treatment. If this groundwater becomes contaminated, then wellhead treatment would be required at considerable expense to the citizens of the County.

Efficiency of Remediation by Natural Attenuation at MCAS El Toro

According to the RI/FS, the major natural attenuation processes for TCE in groundwater are advection and dispersion (dilution), adsorption and biodegradation. While natural attenuation is generally recognized as a process that may eventually contain and shrink plumes, the efficacy of natural processes for the MCAS El Toro TCE plume is questionable at this time due to the following:

- The expanding plume indicates that natural attenuation has not yet contained the plume. Inputs of TCE from the source exceed rates of dilution and decay. Until the plume shows clear evidence of shrinking, it is difficult to understand how a case can be made for effective passive remediation, or how attenuation or decay rate constants could be estimated without an accurate TCE mass balance.
- The current understanding of biodegradation of halogenated organic compounds in the subsurface strongly indicates that natural biodegradation rates for these compounds are low. This suggests that the most important natural attenuation process is dilution (advection-dispersion), a process which, at this point, is not effectively limiting the TCE plume, and, in any case, could leave a large volume of the groundwater resource unusable into the distant future. Volume IX of the report estimates that, with the Shallow Groundwater Project, it will take 60 years for the water in the Irvine Principal Aquifer to be diluted and degraded to the level of the MCL. In light of current water use plans, this seems to be an unacceptably long period of time.

From a public health perspective, the biodegradation products of TCE are as toxic or are more toxic than TCE (MCL is 5 ug/l) itself. Known degradation products include isomers of dichloroethane (DCE) (MCL for cis-1,2-DCE is 6 ug/l) and the carcinogenic vinyl chloride (MCL is 0.5 ug/l). From this perspective, biodegradation could increase public health risk. Indeed, small concentrations of 1,2-DCE have already been detected in monitoring wells in the plume.

Effective containment of the plume should be defined as preventing the spread of TCE to the Main Basin, or to regions of the Irvine Subbasin that either the Orange County Water District (OCWD) or the Irvine Ranch Water District (IRWD) plan to use for municipal water supply. There is no convincing evidence that natural attenuation is currently containing the TCE plume, or necessarily will effectively contain the plume in the future. Indeed, empirical evidence indicates that natural attenuation is not effective in containing or shrinking the TCE plume. Moreover, the minimal biodegradation that has occurred so far suggests that more toxic breakdown products may be expected, which may present an increased health risk to the residents of Orange County.

Predictions Based on Mathematical Modeling

- Mathematical models that predict chemical concentrations with time and distance are recognized as useful management tools. However, it is also understood that chemical migration models have relatively high inherent uncertainty, especially when used to predict the movement of organic compounds in complex heterogeneous subsurface environments. The Groundwater Modeling Report in Volume VI, Appendix A, has been evaluated by Geoscience Support

Services, Inc., in their report, *Review of Ground Water Modeling Report and Potential Impacts of TCE Contamination: Interim Action Feasibility Study*, dated August 30, 1996. Geoscience concluded that the DON Model needs to be improved before it can be used with confidence as a groundwater management tool. These conclusions, along with other concerns, were presented to the U.S. Environmental Protection Agency (U.S. EPA) in the OCWD letter of September 3, 1996. The main criticisms of the DON model were: use of inappropriate boundary conditions that do not account for the strong hydraulic gradient between the Irvine Principal Aquifer and the Orange County Main Basin; use of longitudinal dispersion coefficients that are too low; use of retardation factors that are too high; and use of hydraulic conductivities that are too low to represent the preferential pathways of contaminants in a heterogeneous system. Moreover, the Geoscience model indicated that TCE would reach the Main Aquifer in 10 years, which, if accurate, would result in contamination of the water supply and associated potential for human exposure to TCE.

General consensus among scientists from the various agencies should be achieved before a model that predicts the future of the plume, or range of possible futures, is accepted as an accurate representation of future plume behavior.

Requirements for Passive Intrinsic Natural Remediation

The high quality groundwater of Orange County is an extremely important public resource. Decisions regarding the future of the Orange County aquifers should be made in a prudent and conservative manner. Proposals to leave massive volumes of contaminated water in place without attempts at active remediation should be made with a high degree of certainty. There is simply too much to lose if inaction now later proves to be a bad decision. In this light, requirements for a program of passive remediation by intrinsic natural processes at MCAS El Toro should include the following minimum requirements:

- Achievement of consensus agreement on the effectiveness of natural attenuation as a remedial action among all agency scientists working on the project. This agreement should extend to attenuation and degradation rate constants, as well as projections of future concentrations of both the TCE plume and associated toxic breakdown products.
- Development of chemical migration models that provide compelling demonstrations that toxic substances will not reach either the Main Aquifer or any regions of the Irvine Subbasin that the OCWD or the IRWD plan to develop. Models should be thoroughly characterized for uncertainty.
- Design and installation of a long-term monitoring network to empirically demonstrate the effectiveness of remediation by natural attenuation and ensure that groundwater currently used or planned for future use will not be affected. The monitoring locations, frequency and duration should be approved by all stakeholder agencies.
- Development of a contingency plan with guaranteed funding, to be implemented in the event that our best efforts in predicting the fate and transport of toxic contaminants are wrong, or that changes in groundwater withdrawal activities result in destabilization of formerly steady-state conditions. The plan, along with clear criteria for implementation of the plan, should be approved by all stakeholder agencies.

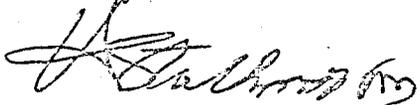
ditionally, the desire of the Orange County Board of Supervisors for thorough remediation of contamination from MCAS El Toro has been expressed in Board Resolution #92-310 of March 31, 1992 (attached). Of particular importance, the final two paragraphs of the Resolution state:

- "... Supports the continuing Marine Corps remediation work and hereby recommends expedited adoption by the federal government of additional groundwater cleanup measures including financial participation in the Orange County Water District Desalter Project."
- "... The Board hereby requests that the members of the Orange County Congressional delegation urge the Department of Defense and the EPA to give the highest priority to increasing near-term efforts at MCAS El Toro to: 1) clean up the groundwater pollutants on the base; 2) halt the sub-surface groundwater migration of said pollutants from the base; and 3) reimburse local agencies for expenditures incurred in migrating the impacts of pollutants originating from MCAS El Toro."

As a final consideration, it may be worthwhile to consider the incongruity between past and present efforts to protect groundwater, and a decision to take little or no action to mitigate the MCAS El Toro TCE plume. A decision to leave the MCAS El Toro TCE plume in place would initiate a radical change in public policy away from aquifer source protection; to be replaced by a program that informs the public that they should anticipate contamination of their drinking water supply. We do not feel this shift in policy, if taken, would be in the best interests of the citizens of Orange County, and we urge you to focus on active remedial options for effective mitigation of TCE contaminants.

Thank you for your consideration. If you have any technical questions, please call Karen Hodel, Program Manager, Hazardous Materials Mitigation Section, at (714) 667-2022.

Sincerely,



Hugh F. Stallworth, M.D.,
Director of Public Health/Health Officer

Attachment

cc: Steven K. Wong, MPH, REHS, Assistant Director, Environmental Health Division
Karen Hodel, R.G., Program Manager, Environmental Health Division
Roy Herndon, Orange County Water District
Mike Wellborn, Orange County Water Task Force
John Scandura, Chief, Office of Military Facilities, DTSC
Joseph Joyce, BRAC Environmental Coordinator, MCAS El Toro

RESOLUTION OF THE BOARD OF SUPERVISORS
OF ORANGE COUNTY CALIFORNIA
March 31, 1992

On motion of Wieder, duly seconded and carried, the following Resolution was adopted:

WHEREAS, the County of Orange has an adopted General Plan which includes a Resources Element Water Component identifying water sources and utilization in the County; and

WHEREAS, this Board of Supervisors has formed the Orange County Water Task Force to advise this Board on water matters affecting Orange County; and

WHEREAS, the State of California has experienced a severe drought over five years impacting the financial and environmental character of urban and rural communities alike; and

WHEREAS, the County of Orange and the people of Orange County are consumers of groundwater, in part, supplied from groundwater basins that are affected by pollutants originating from MCAS El Toro, a problem which was first identified in 1985; and

WHEREAS, the loss of any groundwater supplies to pollution could remove a significant source of water in Orange County and could result in further economic and environmental impacts to the people and commerce of Orange County; and

WHEREAS, the U.S. Marine Corps has commenced comprehensive efforts to initiate the cleanup process, including preliminary site characterization and groundwater remediation, involving expenditure and obligation of more than \$22 million dollars through fiscal year 1992, with plans to devote an additional \$20 million dollars in Fiscal Year 1993; and

WHEREAS, the people of Orange County through their local water agencies have invested nearly \$2 million dollars to evaluate and commence treatment of contaminated groundwater; and

WHEREAS, the MCAS El Toro site has been placed by the Environmental Protection Agency (EPA) on the National Priorities List, which increases funding priority under the Defense Environmental Restoration Account (DERA); and

WHEREAS, the Orange County Water Task Force voted at its meeting on March 12, 1992 in favor of recommending to the Board of Supervisors a resolution noting the existing groundwater contamination at MCAS El Toro, the on-going efforts to correct this problem and action items to support increased participation on the part of the federal government.

Resolution-No. 92-310
Department of Defense and Environ-
mental Protection Agency -- Increase
of Ground Water Cleanup at Marine
Corps Air Station El Toro

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NOW, THEREFORE, BE IT RESOLVED that this Board of Supervisors supports the continuing Marine Corps remediation work and hereby recommends expedited adoption by the federal government of additional groundwater cleanup measures including financial participation in the Orange County Water District Desalter Project.

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5 BE IT FURTHER RESOLVED that this Board hereby requests that the members of the Orange County Congressional delegation urge the Department of Defense and the EPA to give the highest priority to increasing near-term efforts at MCAS El Toro to: 1) clean up the groundwater pollutants on the base; 2) halt the sub-surface groundwater migration of said pollutants from the base; and 3) reimburse local agencies for expenditures incurred in mitigating the impacts of pollutants originating from MCAS El Toro.
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