Marine Corps Air Station El Toro
Installation Restoration Program

Public Information Materials

12/4/96
Restoration Advisory Board Meeting
held at Irvine City Hall
Irvine, CA

Materials/Handouts Include:

- RAB meeting agenda
- RAB meeting minutes - 9/25/96 RAB meeting
- Revised "blue sheet" (for 12/4/96 RAB meeting) MCAS El Toro RAB, Major Document Release & Review Dates
- MCAS El Toro Fact Sheet No. 7, December 1996
- Presentation - Defense Environmental Response Task Force (DERTF), Report to Congress on Base Realignment and Closure (BRAC) Cleanup Programs (executive summaries)
- Presentation - Draft Remedial Investigation Report, Operable Unit 3A; presentation handout attachment Executive Summary from the Draft Remedial Investigation Report, Operable Unit 3A Sites
- Presentation - Landfills Update, Operable Units 2B and 2C
- Agency Comments - Cal-EPA, Department of Toxic Substances
  - Draft Final Interim Remedial Investigation/Feasibility Study (RI/FS) Report for Site 18, Operable Unit 1, MCAS El Toro [comments dated October 11, 1996]
  - Draft Final Operable Unit 1 Interim Action Feasibility Study Report (IAFS), MCAS El Toro [Regional Water Quality Control Board comments dated October 8, 1996]
  - Draft Phase II Feasibility Study for Site 24, Operable Unit 2A, MCAS El Toro, [October 11, 1996]; [Regional Water Quality Control Board comments dated October 8, 1996]
  - Final Technical Memorandum Approval: Background and Reference Levels Remedial Investigation, MCAS El Toro [comments dated November 1, 1996]
  - Draft Phase II Feasibility Study Report for the Magazine Road Landfill, Site 2 Operable Unit 2B, MCAS El Toro [comments dated November 1, 1996]; [Regional Water Quality Control Board comments dated October 29, 1996]; [Integrated Waste Management Board comments dated September 30, 1996]
  - Draft Phase II Feasibility Study Report for the Communication Station Road Landfill, Site 17 Operable Unit 2B, MCAS El Toro [comments dated November 4, 1996]; [Regional Water Quality Control Board comments dated October 29, 1996]; [Integrated Waste Management Board comments dated September 30, 1996]

December 4, 1996 MCAS El Toro RAB Meeting

Materials/Handouts (Continued):

- Draft Final Phase II Remedial Investigation Report: Perimeter Road Landfill, Site 5, Operable Unit 2C, MCAS El Toro [comments dated November 4, 1996]
- Draft Final Phase II Remedial Investigation Report: The Original Landfill, Site 3, Operable Unit 2C, MCAS El Toro [comments dated November 4, 1996]
- Technical Memorandum on Background Levels of Inorganics; Responses to Comments on Final RI Reports for Draft Final RI Reports for Sites 3 and 5 [comments dated October 31, 1996]; [Integrated Waste Management Board comments dated October 18, 1996]
- MCAS El Toro Draft Community Reuse Plan [letter from DTSC to County of Orange, Environmental Management Agency, Environmental and Project Planning Division, dated October 28, 1996]; [Integrated Waste Management Board, Potential Reuse Issues Associated with Operable Unit 2C, Site 5, MCAS El Toro, comments dated September 30, 1996

- Agency Comments - U.S. Environmental Protection Agency
  - Draft Final Phase II Remedial Investigation Reports for Operable Unit 2B, Sites 2 and 17, MCAS El Toro [comments dated October 9, 1996 and November 8, 1996]
  - Draft Final Interim-Action Remedial Investigation/Feasibility Study Reports for Operable Unit 1, MCAS El Toro [comments dated October 10, 1996]
  - Draft Phase II Feasibility Study, Operable Unit 2A Report,MCAS El Toro [comments dated October 11, 1996; comments from EPA legal counsel dated October 15, 1996]
  - Draft Final Phase II Remedial Investigation Reports for Operable Unit 2C, Sites 3 and 5, MCAS El Toro [comments dated November 8, 1996]

MCAS El Toro
Restoration Advisory Board
Meeting

4 December 1996 6:30-9:00 PM
Irvine City Hall
Conference and Training Center
One Civic Center Plaza
Irvine

AGENDA

Welcome/Introductions/Agenda Review	Andy Piszkin U.S. Navy/Southwest Division - Serving as Marine Corps/Navy RAB Co-chair for this meeting
Old Business	Marcia Rudolph RAB Community Co-chair
Approval of 9/25/96 Minutes	
October 30 Subcommittee Meeting Report	
New Business	
Update on Draft Reuse Plan	Tom Mathews Orange County Environmental Management Agency
Defense Environmental Response Task Force (DERTF), Report to Congress on Base Realignment and Closure (BRAC) Cleanup Program	Jennifer Smith Cal-EPA, Dept. of Toxic Substances Control
Environmental Program Update - Operable Unit 3, Remedial Investigation (sites with surface soil contamination) - Landfills, Feasibility Studies	Bernie Lindsey U.S. Navy/Southwest Division
Regulatory Agency Comment Update	Glenn Kistner U.S. Environmental Protection Agency Tayseer Mahmoud Cal-EPA, Dept. of Toxic Substances Control
Meeting Summary	Andy Piszkin/Marcia Rudolph
Meeting Evaluation	
Future Topics and Meetings - Community Co-chair election	
Closing	Andy Piszkin

MARINE CORPS AIR STATION EL TORO

RESTORATION ADVISORY BOARD MEETING

SEPTEMBER 25, 1996

DRAFT MEETING MINUTES

A Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, September 25, 1996 at the Irvine City Hall. The meeting began at 6:35 p.m. These minutes summarize the discussions and presentations from the meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Joseph Joyce, Marine Corps/Navy RAB Co-chair, welcomed everyone to the meeting, reminded all present to sign in, and introduced Ms. Marcia Rudolph, Community RAB Co-chair. She introduced RAB member Tom Mathews, Orange County Environmental Management Agency, who led the group in the Pledge of Allegiance. All attendees introduced themselves. Mr. Joyce reviewed the meeting agenda.

OLD BUSINESS

Review and Approval of July 31, 1996 Meeting Minutes

The RAB minutes were approved without amendment.

August 28, 1996 RAB Subcommittee Meeting Report - Marcia Rudolph

Ms. Rudolph stated that the subcommittee meeting focused on the Operable Unit 1 (OU-1) Feasibility Study (FS). Andy Piszkin, Lead Remedial Project Manager, Southwest Division Naval Facilities Engineering Command, made a presentation covering this subject and answered numerous questions from RAB members. She thanked him for his informative presentation and participation. Ms. Rudolph informed RAB members that her comments on the Draft Interim Final OU-1 Remedial Investigation/Feasibility Study (RI/FS) Report were available on the sign-in table. RAB members also discussed the Environmental Impact Report (EIR) and Reuse Plan at MCAS El Toro. She informed RAB members that the deadlines for submitting comments on the OU-1 Report is October 8 and for the EIR it is October 15. Since the EIR is a reuse issue not formally associated with the RAB, she advised members that when commenting on the EIR, members should not identify themselves as RAB members.

Mr. Joyce reminded RAB members that the RAB meeting room is reserved from 6:30 p.m. to 9:00 p.m. for a subcommittee meeting on Wednesday, October 30, 1996.

NEW BUSINESS

Environmental Program Update - Early Actions at Station Landfills, Sites 2 and 17, Bernie Lindsey, Remedial Project Manager, Southwest Division Naval Facilities Engineering Command

The purpose of this presentation was to update RAB members of the early or interim actions that are underway at the Magazine Road Landfill (Site 2) and the Communication Station Landfill (Site 17). These actions are being done prior to the selection decisions for the final remedial actions. These actions will protect human health and the environment, minimize exposure to potential hazardous substances, and reduce potential migration of hazardous substances. Site 2 last operated from the late 1950s until 1980. Site 17 was in operation from 1981 to 1983. Wastes disposed of at these two landfills consisted of municipal and industrial wastes and construction debris. A series of 35-mm slides was presented to show progress being made on these early actions.

These actions comply with federal regulations, specifically the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). In addition, all Applicable, Relevant and Appropriate Requirements (ARARs) of various federal, state and local environmental regulations are being followed.

Early actions include: securing the landfill sites with fencing to prevent public access; repair of erosion areas and slopes within the landfills; surface runoff drainage improvements; removal of debris that have washed into the channel; and improvements to access roads. This work began in June 1996 and is targeted for completion in December 1997.

The fencing has been completed and more than 8,000 feet of chain-link fencing was installed. Erosion repair will involve removal of rip-rap that has been undermined by stream flow, and design and construction of new rip-rap slopes to stabilize erosion. The new slopes will be secured underground at the streambed so they will not be prone to erosion. Construction improvements to drainage channels will also be done to divert surface water runoff from the landfills. All debris removed from the streambed channel and during the slope improvements and channel repairs will be relocated at a staging area. Construction debris such as asphalt and concrete will be recycled, batteries and any hazardous materials collected will be sent to off-Station hazardous waste disposal facilities, and other nonhazardous materials will stay at the landfills. Access roads are being upgraded to allow construction traffic to move efficiently through the area. By establishing defined routes, this minimizes the impact on the habitat including coastal sage scrub and the California gnatcatcher.

Mr. Lindsey stated that much of the work being done for the early actions will be part of the final remedial action performed at the landfills. The Draft Feasibility Studies evaluate various "presumptive remedies" that involve capping of the landfills and performing other actions associated with installing a cap or cover. Specific information on the analysis of potential final solutions for these landfills is presented in the Draft Feasibility Studies for Sites 2 and 17 available at the MCAS El Toro Information Repository at the Heritage Park Regional Library in Irvine.

Tank 398 Fuel Recovery System and Tank Farm 2 Soil Cleanup - Andy Piszkin, Lead Remedial Project Manager, Southwest Division Naval Facilities Engineering Command

RAB members were provided with the latest information and shown 35-mm slides of these ongoing cleanup tasks. At the site of the former jet aircraft refueling Tank 398, slides showed the contaminated groundwater removal system, associated piping, and a soil vapor extraction (SVE) unit. Mr. Piszkin said that to date, over 6,000 gallons of free product (jet fuel floating on top of the subsurface water table) have been recovered at the Tank 398 site. This recovered fuel is recycled and used in Oregon as heating oil. The SVE unit was installed earlier this year and began operating in August. It consists of seven extraction wells that remove jet fuel vapors from the contaminated soil above the free product. Vapors are treated at the site in a thermal oxidation treatment unit that destroys contaminants.

At Tank Farm 2, eight large fuel tanks were removed in October 1995. Leaking tanks contaminated the soil at the tank farm. Fifteen SVE wells are being used to remove fuel vapors from the contaminated soil. An SVE treatment unit began operating in August 1996. Soil cleanup is expected to take several months to complete. *(For additional information on these two cleanup activities, see the presentation handouts.)*

Environmental Program Update - Operable Unit 1 (Regional Groundwater) and Operable Unit 2A (Volatile Organic Compound Source Area) - Andy Piszkin

Mr. Piszkin's presentation focused on the environmental investigations and development of potential remedial alternatives for addressing soil and groundwater contamination at the Volatile Organic Compound (VOC) Source Area (OU-2A) at MCAS El Toro and the plume of VOC-contaminated groundwater that is present in the Regional Groundwater (OU-1) west of the Station. Presentation topics included: Process Logic for the Investigations and Studies; Current Groundwater Conditions; Impacts; Feasibility Study Results (OU-1 and OU-2A); and Future Actions. *(The presentation handout provided further information on the topics covered.)*

In regard to process logic, Mr. Piszkin explained that determining risks associated with environmental contamination plays a key role in developing remedial alternatives. He

explained what he termed the "risk triangle." The triangle consists of three components: a toxin, a pathway, and a receptor. The objective is to eliminate or reduce to recognized and acceptable levels one or more of these components. Feasibility studies are conducted to develop and evaluate alternatives that will prevent exposure to, minimize migration of, and reduce levels of VOCs.

Mr. Piszkin briefly summarized current conditions in the regional groundwater and at the VOC Source Area. VOC contamination is present in the shallow groundwater unit on-Station in the VOC Source Area and in the principal aquifer off-Station. The key contaminant used for tracking and modeling purposes is trichloroethylene (TCE), a solvent formerly used at MCAS El Toro for aircraft refurbishing and cleaning and other related uses. In the shallow groundwater unit contamination is only found in the top 50 feet of the 100 feet deep unit. Contamination enters the principal aquifer from the shallow groundwater unit approximately at the Station boundary. TCE contamination is present in a groundwater plume that extends approximately 3 miles to the west from the VOC Source Area to Culver Drive in Irvine. He presented maps, illustrations, and cross sections to show RAB members the extent of the contaminant plume that are contained in the presentation handout.

Mr. Piszkin explained that an extensive network of monitoring and production wells is used to monitor VOC contamination and water quality. He also explained that contamination is not found in the entire depth or column of each well. At some depths no contamination is present, at others levels are low, and drinking water standards are not exceeded, and at other depths, concentrations of TCE detected exceed drinking water standards of 5 parts per billion.

Mr. Piszkin said that water extracted from irrigation wells for agricultural use at the edge of the plume at Culver Drive is a blend of contaminated water and clean water and concentrations do not exceed drinking water standards for TCE. He emphasized that no irrigation wells have been closed and that the plume does not impact drinking water wells that are more than 3 miles away from the irrigation wells. Studies indicate that the agricultural wells in the path of the plume may help pull contaminated groundwater from the Station but also help to contain it at the plume's edge. Computer models that predict the extent of the plume over the next 20 years show that, under existing conditions, the plume will not impact drinking water wells. From a technical standpoint, there are no impacts on the reuse options being evaluated.

Mr. Piszkin said that the VOC Source Area (OU-2A) is high priority since it is the cause of the plume. Alternatives that address this area focus on aggressive VOC contamination removal actions. Four alternatives have undergone detailed analysis in the Draft Feasibility Study Report. One of the alternatives, "No Action", is evaluated only for comparative purposes if no remedial actions are taken. The other three alternatives (Nos. 9, 10, 11) contain the same component for soil treatment, VOC source removal with soil evaporation extraction (SVE) to remove contaminants from the soil. Groundwater

cleanup options are designed to achieve a reduction in groundwater contamination. The alternatives are:

- Alternative 9: groundwater extraction from the shallow groundwater unit, treatment, and reinjection into the shallow groundwater unit; groundwater extraction form the principal aquifer, treatment, and reinjection to the principal aquifer; and SVE treatment for soil.
- Alternative 10: groundwater extraction from the shallow groundwater unit and the principal aquifer followed by discharge to the Orange County Water District's Irvine Desalter Project for treatment of VOCs; and SVE treatment for soil.
- Alternative 11: groundwater extraction from the shallow groundwater unit, treatment, and reinjection into the shallow groundwater unit; and SVE treatment for soil.

For the Regional Groundwater (OU-1), Mr. Piszkin discussed the six alternatives evaluated (including "No Action") in the OU-1 IAFS Report and Addendum. This report compared previously developed alternatives with new alternatives that include "natural attenuation" to remediate contaminated groundwater. Known collectively as natural attenuation, the natural processes of biodegradation, dilution, dispersion, and adsorption, have been shown to be effective as a method for achieving site remediation in large, dilute plumes of contaminated groundwater containing chlorinated solvents such as TCE.

He pointed out that including natural attenuation with other components to comprise a remedial alternative is in the process of being clarified by U.S. EPA. EPA documentation from a recent symposium further discusses this issue, "Symposium on Natural Attenuation of Chlorinated Organics in Groundwater", Hyatt Regency, Dallas, Texas, September 11-13, 1996; U.S. EPA document No. EPA/540/R-96/509, September 1996. For information on obtaining a photocopy of this document call Ms. Charly Wiemert, MCAS EL Toro, Environment and Safety Department at (714) 726-2840. *(See the handout list at the end of the minutes for information on the symposium paper and the natural attenuation fact sheet distributed at the RAB meeting.)*

In his presentation handout, Mr. Piszkin provided charts that summarize six remedial alternatives evaluated in the OU-1 (IAFS) Addendum. Two of the alternatives are joint Department of the Navy/Orange County Water District alternatives, three are Navy stand-alone alternatives, and the sixth is "No Action". For both the shallow groundwater unit and the principal aquifer, these charts show groundwater extraction rates, contamination removal rates, cleanup times to reach drinking water standards for TCE, and estimated costs developed for comparison purposes. He stated that Feasibility Study results indicate that alternatives incorporating natural attenuation as a component achieve fairly similar results to those incorporating pump and treat options. *(Note: For descriptions and details of these alternatives please see the "Draft Final OU-1 Interim Remedial Investigation/Feasibility Study Report Executive Summary", August 1996, at the MCAS EL Toro Information Repository.)*

Mr. Piszkin said the next steps involve continued review of the combined OU-1 and OU-2A Feasibility Study results, preparing Draft Proposed Plans for remedial actions for each OU, followed by preparing and submitting of draft Records of Decision (RODs). He discussed the schedule for these activities, however, it may be extended if more time is needed by the Navy and the Agencies for review and finalization of decisions and supporting documentation. Draft Proposed Plans are currently scheduled for completion in November 1996 for Agency and RAB review with formal public comment in March 1997. Draft RODs would be completed and submitted for Agency and RAB review in May 1997 with final decisions expected in September 1997.

Regulatory Agency Comment Update - Bonnie Arthur, U.S. Environmental Protection Agency, Project Manager

Ms. Arthur reported that regulatory agencies are currently reviewing Draft Final RI/FS Reports for OU-1, Draft Final RI Reports for OU-2A, 2B and 2C, and Draft FS Reports for OU-2A, 2B and 2C. She stated that this is a major undertaking and also involves coordinating with and addressing comments from the Orange County Water District regarding OU-1 and regional groundwater issues. She informed RAB members that none of the potential groundwater alternatives will completely clean up the principal aquifer but they will eventually get contamination levels down to drinking water standards.

She told the RAB she is moving onto a new project at EPA and that this was her last RAB meeting. She introduced Dave Hodges, U.S. EPA Project Manager, as her replacement. She encouraged RAB members to keep up the dialogue and to continue to provide community input and participation.

MEETING EVALUATION AND FUTURE TOPICS

RAB members stated that presentations were timely and consisted of good, well-presented information. They acknowledged that there was a lot more information to cover than the time allotted and that the subject matter sparked a lot of active participation and questions. Some RAB members preferred that questions and answers be held until the end of a presentation. Others felt immediate responses to questions were warranted because of the complexity of the issues. Suggestions to address this included taking questions when there is a break in direction of a presentation, have RAB members write questions down on a flip chart, and ask RAB members at the beginning of each meeting how they wish to proceed for that particular meeting.

Suggestions for future topics and presentations include: MCAS El Toro Draft Environmental Impact Report and Reuse Plan; Remedial Investigation for OU-3 sites; and a subcommittee report on OU-1 and OU-2A.

CLOSING ANNOUNCEMENTS/FUTURE MEETING DATES

- Mr. Joyce announced that during October letters will be sent to RAB members who have not been attending meetings and participating as required by the RAB's Mission Statement and Operating Procedures.
- Mr. Joyce informed RAB members that due to budget cutbacks, representatives from the California Department of Toxic Substances Control were not in attendance tonight and that only limited participation at future RAB meetings is expected.
- Mr. Joyce reminded members to adhere to the procedure for submitting comments on El Toro environmental documents stated in the Mission Statement and Operating Procedures (July 31, 1996 updated version, page 3, paragraph 7). RAB members are to provide comments to subcommittee chairs, who in turn provide them to Mr. Joyce. If this procedure is not followed there is no way to assure that comments will be acknowledged and addressed.
- Mr. Joyce also offered to conduct site tours for RAB members to show progress being made for the early actions at Sites 2 and 17.
- The next RAB meeting is scheduled for 6:30 to 9:00 p.m., Wednesday, December 4, 1996 at the Irvine City Hall, Conference and Training Center, One Civic Center Plaza, Irvine. This room is also reserved for 6:30 to 9:00 p.m., Wednesday, October 30, 1996, for a RAB subcommittee meeting.

The meeting was adjourned at 9:45 p.m.

Attachments:

-Sign-in sheets

Handouts provided at the meeting and available at the Information Repository:

- RAB meeting agenda
- RAB meeting minutes - 7/31/96 RAB meeting
- Revised "blue sheet" (for 9/25/96 RAB meeting) MCAS El Toro RAB. Major Document Release & Review Dates
- Presentation - Early Actions at Station Landfills, Sites 2 and 17
- Presentation - Tank 398 Fuel Recovery System and Tank Farm 2 Soil Cleanup
- Presentation - VOC Source Area and Regional Groundwater Program Update (discussed OU-1 and OU-2A Feasibility Study Reports)
- Natural Attenuation - "Introductory Talk: Where Are We Now With Public and Regulatory Agency Acceptance?" from the U.S. EPA Symposium on Natural Attenuation of Chlorinated Organics in Ground Water, Hyatt Regency, Dallas, Texas, September 11-13, 1996
- Fact Sheet - "Commonly Asked Questions Regarding The Use Of Natural Attenuation For Chlorinated Solvent Spills at Federal Facilities" (brochure developed by U.S. EPA, Air Force, Army, Navy, and Coast Guard

A copy of these minutes and the handouts provided at the RAB meeting are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the phone number is (714) 551-7151. Library hours are Monday through Thursday, 10 am to 9 pm; Friday and Saturday, 10 am to 5 pm; closed Sunday.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 25, 1996

RAB MEMBER SIGN-IN SHEET

Name	Signature	Name	Signature
Arthur, Bonnie	Bonnie Arthur	Lamourex, Susan	
Allen, Bob	Rep Kindel Schaffer	Landis, Lorrie	
Barney, Col. Joseph P. (ret)		Mahmoud, Tayseer	
Bennett, Dr. Charles	Charles Bennett	Matheis, Mary Aileen	Mary Aileen Matheis
Boehringer, Roger		Mathews, Thomas	Thomas B. Mathews
Brady Jr., Paul		McVicker, Robert R.	Robert R McVicker
Britton, George		Meier, Fred J.	Fred J. Meier
Cohn, Enid	Enid Cohn	Merryman, Robert	Rep. Kindel Schaffer
Cooper, Frank		Mountford, Dan	Dan Mountford
Crompton, Chris		Murphy, Don	Don Murphy
DaCorte, George F.		Olquin, A. Richard	
Halbert, Gary J.		Ritchie, Col. E.J.	Major Leonard for Col Ritchie
Hayes, Finola		Rudolph, Marcia - Co-chair	Marcia Rudolph
Herndon, Roy	*Substitute attended, Steve Carkin	Shayegan, Maria	Maria J. Shayegan
Huang, Chi		Sievers, Larry	
Hurley, Gregory		Sipp, Jr., Myron L.	
Hersh, Peter	*Attended, did not sign	Vasquez, Barbara	
Hurt, Dr. Paul R.		Vitale, Larry	
James, Novel B.		Werner, Jerry B.	Jerry Werner
Joyce, Joseph - Co-chair	Joseph Joyce	Westermeier, John F.	
Kalwani, Rita		Woodings, Bob	
Koenigsberg, Dr. Stephen S.		Zweifel, Donald E.	D. Zweifel

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 25, 1996

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME	*AFFILIATION*	*MAILING ADDRESS*	*PHONE FAX*	*INTERESTED IN RAB MEMBERSHIP?*
CRAIG CARLISLE	Bechtel	401 W. A St SD	687-8804	
CHARLES CALDWELL	SOUTHWEST DIV	1220 Pacific Hwy San Diego	551-6123	
John Dolegowski	CH2M HILL	2971 Bonanza, San Clemente, CA	work 429-2030 Fax 429-2050	
Steve Conklin	OCWD	10500 Ellis Ave Fountain Valley 92708	714/378-3211	
JOHN RIFILATO	GATEWAY	12104 Singleton La Mirada, CA 90638	310) 946-4904	
JERRY KIRCHGESSNER	NIVA	3486 EBOE IRVINE 92606	552-3548	
ANDY RISEKIN	NAVY	1220 PACIFIC HWY SAN DIEGO, CA 92132	619-532-2635 " " -2469	
Dale Owenby	Morrison Knudsen	One Market Steuart Tower Ste 400 San Francisco, CA 94105	415-442-7612	

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 25, 1996

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME	*AFFILIATION*	*MAILING ADDRESS*	*PHONE FAX*	*INTERESTED IN RAB MEMBERSHIP?*
Tom Young	Morrison Knudsen	17300 RED HILL #150 IRVINE CA 92614	752-8360 752-8361	
Charly Wiemert	MCAS El Toro	El Toro Marine Base	(714) 726-2840 Fax 6586	

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 25, 1996

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME	*AFFILIATION*	*MAILING ADDRESS*	*PHONE FAX*	*INTERESTED IN RAB MEMBERSHIP?*
Lynn Hornecker	Navy		(619) 532 3737 (619) 532 2469	
Yueh Chuang	Ogden	5510 Morehouse Dr. San Diego, CA. 92121	(619) 458-9044 (619) 458-0943	
Scott Kehe	NAVY	ROICC MCAS EL TORO	(714) 726-2506 (714) 726-2217	
Bill Sedlak	OHM	2031 Main St. Irvine 92614	714-263-1146 263-1147	N

REVISED for 12/4/96 RAB Meeting *"BLUE SHEET"*

MCAS EL TORO RAB

MAJOR DOCUMENT RELEASE & REVIEW DATES

Upcoming Major Documents	*Anticipated Release Date*	*Review Comments Due*	*Subcommittee*
BRAC CLEANUP PLAN (BCP)			BCP
- Draft BCP 1997	1/10/97	1/24/97	
- Final	2/24/97		
GENERAL ENVIRONMENTAL			General Environmental
• **Tank 398 Free Product Removal**			
~~- Draft Report~~	~~1/11/95~~	~~2/10/95~~	
~~- Response to Comments~~		~~4/95~~	
- Quarterly Groundwater Monitoring Report	Spring 1997		
RCRA FACILITY ASSESSMENT (RFA) ADDENDUM			Compliance/RFA
~~- Draft Final Addendum Report~~	~~12/95~~	~~1/96~~	
- Final Addendum Report	4/96		
CERFA/ENVIRONMENTAL BASELINE SURVEY (EBS)			CERFA/EBS
~~- Draft Report~~	~~11/94~~	~~2/10/95~~	
- Final	4/1/95		
OPERABLE UNIT 1 (OU1) - GROUNDWATER			OU1
~~- Draft Final Remedial Investigation/Interim Action Feasibility Study (RI/IAFS) and Addendum~~	~~8/9/96~~	~~10/8/96~~	
OPERABLE UNIT 2 (OU2)			OU2
• Volatile Organic Compounds (VOCs) Source Area - OU-2A			
~~- Draft Remedial Investigation (RI) Report~~	~~2/20/96~~	~~4/22/96~~	
~~- Draft Feasibility Study (FS) Report~~	~~8/9/96~~	~~10/8/96~~	
- Draft RI Report Addendum Site 25	12/22/97	1/18/97	
• Landfills - Sites 2 and 17 - OU-2B			
~~- Draft Remedial Investigation (RI) Report~~	~~3/20/96~~	~~5/20/96~~	
~~- Draft Feasibility Study (FS) Report~~	~~9/6/96~~	~~11/5/96~~	
• Landfills - Sites 3 and 5 - OU-2C			
~~- Draft Remedial Investigation (RI) Report~~	~~4/19/96~~	~~6/19/96~~	
- Draft Feasibility Study (FS) Report	10/8/96	12/9/96	
OPERABLE UNIT 3 (OU3) - SOILS ONLY SITES			OU3
- Draft Remedial Investigation (RI) Report	11/19/96	1/20/97	
- Draft Feasibility Study (FS) Report	3/20/97	5/20/97	
COMMUNITY RELATIONS PLAN (Revised)			Community Relations
~~- Draft Revised CRP~~	~~12/95~~	~~1/96~~	
- Final Revised CRP	3/96		

UPDATE ON ENVIRONMENTAL RESTORATION PROGRAM AT MARINE CORPS AIR STATION EL TORO

Fact Sheet No. 7 **December 1996**

Environmental Investigation Reaches Completion

A comprehensive Remedial Investigation that focused on contamination from volatile organic compounds (VOCs) present in the regional groundwater west of Marine Corps Air Station (MCAS) El Toro and at Installation Restoration Program Site 24 has recently been completed. Site 24 is the the source of the VOC contamination. The investigation represents an integral step in the Marine Corps/Navy's efforts to clean up the Station and support eventual closure and reuse of the property.

The investigation was successful in identifying sources of chemical contamination, specifically VOCs, in the soil and groundwater at areas historically used for aircraft operations and maintenance. VOCs comprise a category of chemicals, mainly solvents, formerly used for aircraft refurbishing and maintenance at the Station. This chemical contamination is a result of waste disposal practices that were used prior to the development of strict environmental regulations in the mid-1970s.

This is the seventh in a series of communications issued during the environmental investigation and cleanup of Marine Corps Air Station (MCAS) El Toro. This fact sheet has been prepared to provide an update of the investigation that was conducted to evaluate chemicals found in regional groundwater. This investigation also determined which areas of the Station are sources of industrial wastes found in the regional groundwater and what health risks may be presented by these chemicals. Future fact sheets will provide specific details on cleanup alternatives for addressing this contamination, updates on environmental restoration progress, and will inform you of opportunities for public involvement.

The key findings of the investigation discussed in this fact sheet are:

- VOCs, primarily the solvent trichlorothylene (TCE), are present in soil and groundwater at Site 24 and are the source of groundwater contamination.
- TCE present in the groundwater forms a plume of contaminated groundwater that extends into the regional groundwater approximately three miles from the source (Site 24).
- TCE concentrations gradually dilute as the contamination moves farther away from the source, and most of the regional groundwater within the boundaries of the plume does not exceed federal and state drinking water standards for TCE.
- Risk assessment results show that the contamination does not present a current threat to human health or the environment because impacted groundwater is not used for domestic purposes.
- Water from irrigation wells used for agriculture is not impacted by the low TCE concentrations in the groundwater.
- Drinking water wells located approximately three miles from the irrigation wells are not affected.
- Current data show that, under existing conditions, the plume will not impact drinking water wells.

Foremost in this investigation process was a detailed analysis of information from soil and groundwater samples to determine the type and extent of potential chemical releases into the environment. The Marine Corps/Navy, U.S. Environmental Protection Agency, and the California Environmental Protection Agency's Department of Toxic Substances Control used this information to conduct health and environmental risk assessments and feasibility studies of potential remedial (cleanup) alternatives. Investigation results will also be used to assess any potential impacts in the future. The overall objective of the Marine Corps/Navy Installation Restoration Program (IRP) is to implement cleanup actions that prevent human exposure to chemicals, minimize the migration (movement) of contaminants, and reduce the levels of contaminants in the soil and groundwater.

To effectively manage the overall cleanup effort at MCAS El Toro, the Marine Corps/Navy organized the IRP sites into Operable Units or OUs. This regulatory term is given to areas where similar cleanup activities will be implemented. OU-1 addresses VOC contamination in the regional groundwater beyond the boundaries of MCAS El Toro. The source area for VOC contamination at Site 24 is part of OU-2A. (See *Installation Restoration Program Process* on page 5 for a summary of OUs at MCAS El Toro.)

Results from the OU-1 and OU-2A studies are documented in the: *Draft Final Operable Unit 1 Interim Remedial Investigation/Feasibility Study Report* (August 1996); the *Draft Final Remedial Investigation Report for the VOC Source Area, Site 24, Operable Unit 2A* (June 1996); and the *Draft Feasibility Study Report for the VOC Source Area, Site 24, Operable Unit 2A* (August 1996). These reports have been submitted to the regulatory agencies and the community-based Restoration Advisory Board for review. They are also available for public review at the Station's Information Repository listed on page 6.

What the Investigation Found

Background

Since 1985, portions of the groundwater beneath the Station and the City of Irvine have been known to contain various chemicals called volatile organic compounds (VOCs). A VOC is an organic, or carbon-containing compound that evaporates easily at room temperature and is commonly used in machinery and parts degreasing, paint stripping, and other industrial operations. At MCAS El Toro, historical activities have included more than 40 years of aircraft maintenance that used solvents, like trichloroethylene (also called TCE), and similar chemicals, that are categorized as VOCs.

Initial studies conducted by the Marine Corps/Navy and the Orange County Water District prior to the comprehensive Remedial Investigation suggested the chemicals were the result of past disposal and waste management policies that were accepted practices prior to the development of environmental regulations in the mid-1970s. Over the years, as the investigation results determined, solvents seeped down through the soil and into the groundwater. The exact sources of these chemicals are unknown but may have included the leakage of solvents from former degreaser pits, underground storage tanks, storm drains, and industrial wastewater lines, as well as runoff from aircraft washing and hazardous waste storage areas.

Investigation Focus

The early portion of the investigation tested soil and groundwater for a variety of wastes but only VOCs were detected. Thus, the main objective of the investigation was to identify specific areas where VOCs are present and determine the extent of this contamination. Information obtained was then used to assess potential risks to human health and the environment and to develop and evaluate cleanup alternatives for areas of contaminated groundwater and soil.

Extensive sampling of soil and groundwater was performed to collect data for characterizing VOCs. The investigation concentrated on Installation Restoration Program (IRP) Site 24, an area with suspected high levels of VOCs in the soil, and the regional groundwater study area beneath Irvine that is bounded by Harvard Avenue, Trabuco Road, and the San Diego Freeway (I-405). These areas are also referred to as Operable Units or OUs. OU-1 consists of the regional groundwater study area and OU-2A comprises Site 24 (see Figure 1 map on page 3).

Numerous soil gas, soil, and groundwater samples were collected and analyzed, indicating where chemicals are present. Groundwater samples were collected at different depths from newly constructed monitoring wells and other pre-existing wells inside and outside the Station boundary. Analysis of groundwater samples provided information needed for determining where and to what extent VOCs are present in groundwater.

For each sample, the measured concentration (or level) of the detected chemical was entered into a computerized database. These concentrations were later compared to federal and state levels considered acceptable for drinking water. The information was then mapped as chemical plumes in the groundwater and also used to determine potential risks to human health and the environment. Detailed maps and lists of the chemicals and their detected levels can be found in the OU-1 and OU-2A Remedial Investigation Reports listed on page 4.

VOCs Originate at Site 24

The Remedial Investigation determined that VOC contamination, primarily the industrial solvent TCE, is present in the soil and groundwater at Site 24. The site encompasses approximately 200 acres and contains two large aircraft hangars—Buildings 296 and 297—as well as several smaller structures used for aircraft and vehicle maintenance and repair. Data confirm that soil containing TCE is present below the aircraft hangars and extends vertically to the groundwater directly beneath the buildings. It is estimated that 6,000 pounds of TCE are contained in the soil in what is considered the primary VOC source area beneath aircraft hangar Buildings 296 and 297. Analysis of groundwater at Site 24 showed that TCE contamination originates in the area of the aircraft hangars. It is also estimated that there are about 1,700 pounds of TCE in the shallow groundwater beneath Site 24. From here, the solvent migrated through the soil into the groundwater below Site 24 and to where it was detected in the regional groundwater west of the Station.

Site 24 Affects Regional Groundwater

The TCE that originates beneath the aircraft hangar area at Site 24 serves as the chemical source and starting point for the contamination that is present in the regional groundwater. However, TCE contamination does not affect human health because water from the affected area does not serve as a source of drinking water. The TCE present forms a plume that is gradually diluted as it moves farther away from the source area. The plume extends approximately three miles west from the Station and blends gradually into the regional groundwater. (A plume is defined as a single area of groundwater contamination extending from a distinct source.) Other VOCs were found as well, but only within the main TCE plume. Figure 1 on page 3 shows the TCE plume that originates at Site 24 and extends to the regional groundwater.

Evaluation of the data focused on the extent to which the TCE plume exists in both shallower groundwater (80 to 110 feet below the ground surface) and in the deeper groundwater (200 to 450 feet deep) that makes up the area's principal aquifer. (An aquifer is an underground, water-bearing layer in rock, gravel, or sand that will yield a quantity of water.) Within the Station's boundaries, concentrations of TCE were generally limited to shallow groundwater, with the highest concentrations found beneath Site 24. In shallow groundwater outside the Station, water quality in most cases is better than the federal and state drinking water standard that allows up to five parts per billion (ppb) of TCE. In the principal aquifer (deep aquifer), TCE concentrations ranged from barely detectable to above the limit allowed for drinking water. However, at the western edge of the plume beneath Culver Drive, about three miles west of the Station, in regard to TCE, water quality is better than the standards

or drinking water. Figure 2 on page 4 ıows how TCE migrates from Site 24 into both the shallow groundwater and the principal aquifer.

The portion of the principal aquifer that lies within the OU-1 regional groundwater study area is used as a production aquifer for irrigation and reclaimed water supplies by both the Irvine Ranch and the Orange County water districts. As required by regulatory agencies, the federal drinking water standard is used to compare water quality at these locations, even though the water extracted from this portion of the aquifer is not used for domestic purposes.

Water extracted from irrigation wells for agricultural use at the edge of the plume near Culver Drive is a blend of contaminated water and clean water that complies with the federal drinking water standards for TCE. No irrigation wells have been closed and the plume does not impact drinking water wells located approximately three miles away from the irrigation wells. Investigation results indicate that the ·gricultural wells near the Station boundary may contribute to ıe migration of the plume by drawing contaminated groundwater from MCAS El Toro. Agricultural wells further to the west contain the chemicals at the plume's western edge. Current data show that, under existing conditions, the plume will not impact drinking water wells.

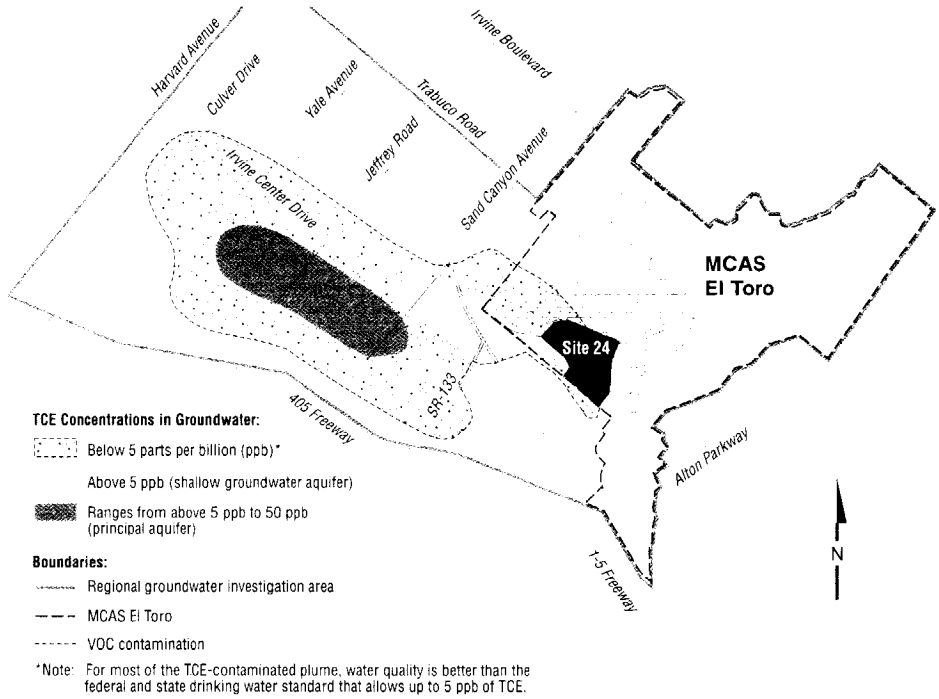

Figure 1 Site Map

Human Health and Ecological Risk Assessments

Human health and ecological risk assessments conducted for Site 24 and the regional groundwater study area confirm that VOCs in soil and groundwater currently pose no threat to human health and the environment. The assessments also helped evaluate what impact these chemicals might have on future property uses.

Conservative assumptions, combined with the actual field data, were used in the risk assessment to provide a factor of safety in the risk being calculated. For example, the assessment assumes that people are living on the site and that exposure occurs 24 hours a day, 350 days a year, for a 30-year period. In this way, the conditions used to calculate the exposure conservatively estimate the potential risks. For both Site 24 and the regional groundwater area, risks were evaluated for both cancer-causing (carcinogenic) and non-cancer-causing (noncarcinogenic) chemicals. At the same time, an ecological risk assessment was conducted to evaluate the potential effects of these chemicals on]ants and animals.

What the Risk Assessments Concluded

The risk assessments concluded that no significant risk to human health exists at this time because the impacted groundwater is not presently being used for domestic purposes. The U.S. Environmental Protection Agency and the California Environmental Protection Agency's Department of Toxic Substances Control and Regional Water Quality Control Board concur with the Marine Corps/Navy that use of the impacted water, when extracted and used for irrigation, poses no significant risk to human health or the environment. The small amount of VOCs that may be present readily evaporate into the air during irrigation and are not absorbed by the crops. Agricultural workers are also not affected.

The assessments also concluded that the continued release of VOCs from subsurface soil to groundwater only presents a potential risk to human health if the groundwater is being used entirely for drinking purposes, a scenario that currently does not occur. Wells at Site 24 are not used for domestic or agricultural purposes but only to monitor groundwater conditions. VOC concentrations in the shallow soil (upper 10 feet) are low and exposure through inhalation, ingestion, or contact with the skin does not pose any significant risk to human health. Most of the soil in this area is under the paved tarmac and parking areas.

The Marine Corps/Navy continues to monitor groundwater conditions at Site 24 and in the regional groundwater area to identify if conditions change. Detailed information on the risk assessments is presented in the OU-1 and OU-2A Remedial Investigation Reports (see page 4).

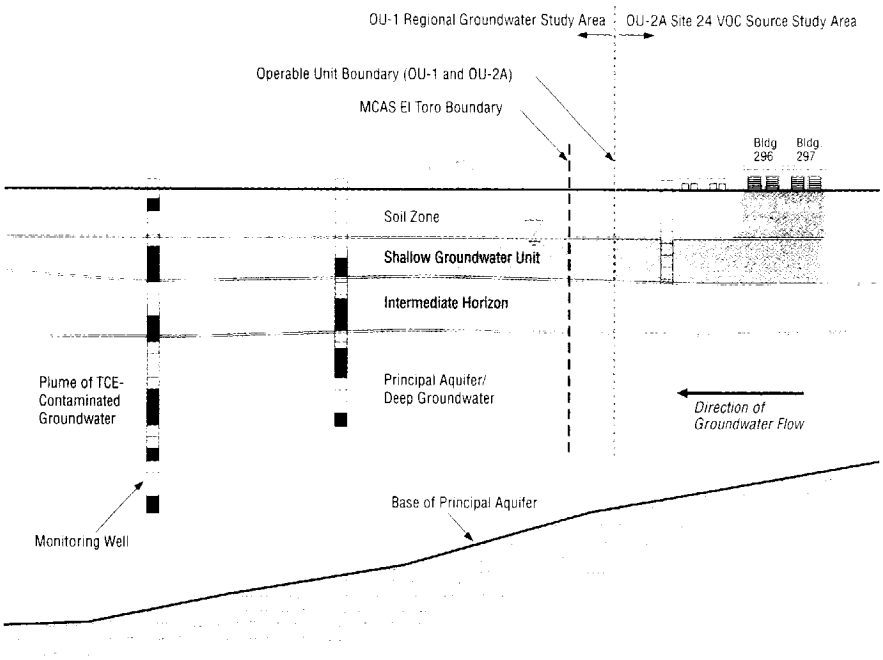

Figure 2 Subsurface Contamination

A Look at Some Cleanup Alternatives

Feasibility Studies have been conducted to develop and evaluate alternatives for controlling and cleaning up the VOCs in both the regional groundwater and beneath Site 24. Possible remedial alternatives were compared and evaluated for such factors as protection of public health and the environment, technical feasibility, and cost. Initial drafts of the Feasibility Study Reports were provided to the regulatory agencies and to the Restoration Advisory Board during the summer of 1996 for review and comment.

Site 24 Cleanup Alternatives

Detailed evaluations were performed for six remedial alternatives. Each of the alternatives addressed the cleanup of VOC contamination in the soil, in shallow groundwater, and in the deep principal aquifer directly beneath Site 24 and—to some extent—in the nearby vicinity. Generally, each alternative was developed to extract and treat contaminated groundwater from the shallow area to limit further migration of chemicals into the principal aquifer. Some of the alternatives include the reinjection of the treated water back into the shallow groundwater. All the alternatives would also use soil vapor extraction technology or other methods to remove TCE from contaminated soil above the shallow groundwater.

Regional Groundwater Alternatives

A draft Interim-Action Feasibility Study (IAFS) that originally examined 12 potential alternatives for controlling and cleaning up regional groundwater contamination was completed in 1995. The draft IAFS itself is described as "interim" since it only focuses on VOC contamination in regional groundwater. However, any alternatives that are eventually adopted by the Marine Corps/Navy for implementation are intended to be final actions. Included among the alternatives singled out for a closer look were groundwater extraction, treatment of VOCs, and groundwater reinjection. After review of and comment on the draft IAFS by the regulatory agencies, three new alternatives were developed, evaluated, and included in the Addendum to the draft final IAFS. The new alternatives incorporate some "natural attenuation" to remediate groundwater. The natural processes of biodegradation, dilution, dispersion, and adsorption, known collectively as natural attenuation, have been shown to be effective in cleaning up large, diluted plumes of contaminated groundwater containing solvents such as TCE. The regulatory agencies recently submitted review comments on the new Feasibility Study alternatives.

Next Step: Proposed Plans and Public Comment

The next step in the environmental restoration process involves the development of Proposed Plans that summarize the narrowed-down field of cleanup alternatives, and present the Marine Corps/Navy's preferred alternative for the regional groundwater (OU-1) and for Site 24 (OU-2A). The Proposed Plans, provided in fact sheet format, will present to the public how the alternatives rate when evaluated against the U.S. Environmental Protection Agency' criteria for environmental cleanup. Summaries of the specific cleanup technologies considered in the Feasibility Studies are also included in the Proposed Plans.

In the selection of any final cleanup remedy, public comment will be considered in the decision-making process. Because of this, the Proposed Plans for OU-1 and OU-2A, along with the draft final Remedial Investigation and Feasibility Study Reports, will be made available for review during a public comment period scheduled for summer of 1997. After the consideration of public comments on the proposed alternatives, the Marine Corps/Navy will issue Records of Decision that formally document the remedial actions planned for these areas. A response to all significant public comments (called a Responsiveness Summary) will be included in the Records of Decision.

An Opportunity to See Project Documents

The Remedial Investigation Reports (which include the risk assessments) and Feasibility Study Reports are available for public review at the Station's Information Repository (see page 6). For the regional groundwater (OU-1) and the VOC source area at Site 24 (OU-2A), the key documents include:

- *Draft Final Remedial Investigation/Interim-Action Feasibility Study Report and Associated Addendum for Operable Unit 1* (August 1996).
- *Draft Final Remedial Investigation Report for the VOC Source Area, Site 24, Operable Unit 2A* (June 1996).
- *Draft Feasibility Study Report for the VOC Source Area, Site 24, Operable Unit 2A* (August 1996).

Installation Restoration Program Helps Drive Cleanup Activity

At MCAS El Toro, and at other military installations in the United States, the Department of Defense is cleaning up its hazardous waste sites according to the Installation Restoration Program (IRP). Designed to protect public health and the environment, this program provides a structure for the Marine Corps/Navy to identify, investigate, and clean up petroleum fuels, metals, and a variety of chemicals that resulted from past operations that were at one time acceptable practice. This step-by-step process is shown below.

Environmental regulatory agencies, such as the U.S. Environmental Protection Agency and the California Environmental Protection Agency's Department of Toxic Substances Control and Regional Water Quality Control Board, are actively working with the Marine Corps/Navy to review all investigation results and proposed cleanup plans and assure that rigorous state and federal cleanup standards are met.

To manage the overall cleanup effort at MCAS El Toro, the Marine Corps/Navy organized its IRP sites into "Operable Units" or "OUs." This term is used to group together sites at a facility that share common characteristics and therefore may be studied and cleaned up together. Descriptions of the OUs at MCAS El Toro are presented below.

- **OU-1** addresses regional groundwater contamination including a trichloroethylene (TCE) plume in groundwater that extends three miles west of the Station.
- **OU-2A** includes sites with soil contamination that are potential sources of regional groundwater contamination, specifically Site 24, the source area for volatile organic compound (VOC) contamination in the regional groundwater. OU-2A also includes Site 25, which consists of the four major drainage channels at the Station.
- **OU-2B** and **OU-2C** are landfill sites that contain a variety of waste materials. Control remedies that are applied at municipal landfills are being considered for these sites.
- **OU-3** includes the remaining sites with surface soil contamination, the majority of which have no anticipated impact on groundwater.

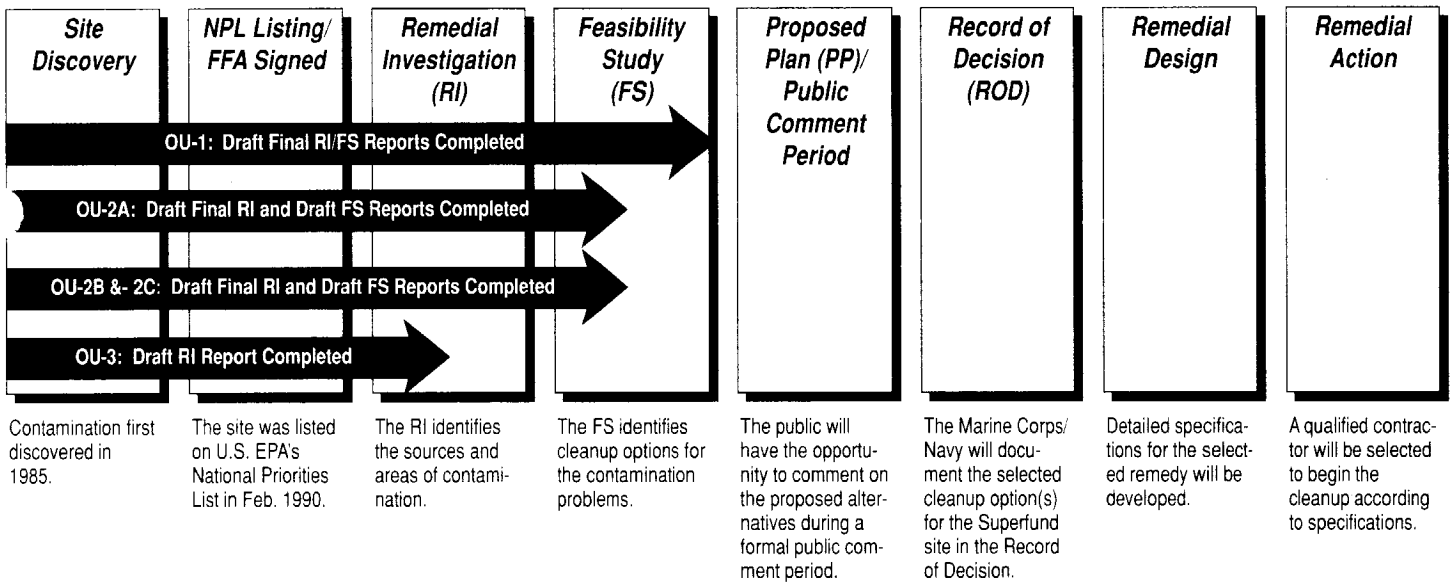

Figure 3 MCAS El Toro – Installation Restoration Program Process

Local Advisory Board Paves Way for Public Participation

With complete closure of MCAS El Toro scheduled for July 1999, the public is playing a vital role in the environmental cleanup program. Through the community-based Restoration Advisory Board (RAB), members of the public meet regularly and participate in reviewing and commenting on investigation reports and feasibility studies. The RAB has been active since April 1994, bringing together a cross section of community interests to discuss cleanup issues. Board members also participate on various subcommittees that focus on reviewing specific reports.

Interested neighbors to MCAS El Toro and other members of the public are encouraged to attend RAB meetings and learn more about the environmental restoration efforts at the Station. The next board meeting is scheduled for January 30, 1997, from 6:30 to 9:00 p.m., at the Irvine City Hall Conference and Training Center. For more information regarding RAB meetings and public participation activities, see ***Where To Get More Information* on page 6.**

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to: Commanding General, AC/S, Environment, (1AU), Attn: Ms. Charly Wiemert, IRP Department, MCAS El Toro, P.O. Box 95001, Santa Ana, CA 92709-5001.

❒ Add me to the MCAS El Toro Installation Restoration Program mailing list.

❒ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Where to Get More Information

Copies of Remedial Investigation and Feasibility Study Reports, other key documents, and additional information relating to environmental cleanup activities at MCAS El Toro are available for public review at this information repository: **Heritage Park Regional Library, 14361 Yale Avenue, Irvine, California 92714; (714) 551-7151 (please call for current operating hours)**.

If you have questions regarding the environmental program at MCAS El Toro or would like additional information, please contact:

Mr. Joseph Joyce
BRAC Environmental Coord.
Commanding General
AC/S, Environment (1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001
(714) 726-3470

1st Lt. Matthew Morgan
BRAC Public Affairs Officer
Marine Corps Air Bases,
Western Area (1AS)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001
(714) 726-3853

Mr. Fraser Felter
Community Involvement Coord.
Office of Hazardous
Waste Management
U.S. EPA
75 Hawthorne St. (H-1-1)
San Francisco, CA 94105
(800) 231-3075

Ms. Marsha Mingay
Public Participation Coord.
Cal-EPA
Department of Toxic
Substances Control
245 West Broadway, Suite 350
Long Beach, CA 90802-4444
(310) 590-4881

Commanding General
Attn: Mr. Joseph Joyce
BRAC Environmental Coordinator
AC/S, Environment (1AU)
MCAS El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001

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EXECUTIVE SUMMARY

This report describes the activities of the Defense Environmental Response Task Force (DERTF) during fiscal year (FY) 1994. Those activities focused on three meetings held by the DERTF in San Francisco, California, January 26, 1994; in Austin, Texas, June 9-10, 1994; and in Philadelphia, Pennsylvania, September 28-30, 1994. To support its activities, the DERTF established five working groups: Fast-Track Cleanup Implementation, Environmental Baseline Survey, Leasing, Future Land Use, and Environmental Justice.

The goal of the DERTF is to examine environmental issues associated with the cleanup and reuse of closing military installations and to identify and recommend ways to expedite and improve environmental response actions at military installations throughout the nation that are scheduled to be closed. The success of the President's five-part program to revitalize communities affected by closure of installations, and particularly the successful implementation of the fast-track cleanup portion of that program, greatly depends on the partnerships that have been built, not only within the federal government, but also with states, communities, and the public.

The DERTF, which consists of representatives of federal and state agencies and public interest groups, mirrors the partnerships that are being developed among the Department of Defense (DoD) and federal and state environmental regulators; public interest groups; and local communities, including local reuse committees.

The DERTF recognizes that, during FY 1994, DoD, the Environmental Protection Agency (EPA), state regulators, and local communities have made significant progress. Major accomplishments during FY 1994 include:

- Formation of base realignment and closure (BRAC) cleanup teams (BCT) at all major installations scheduled for closure
- Conduct of three training conferences for members of BCTs

- Identification of uncontaminated parcels, with regulatory concurrence, as mandated by the Community Environmental Response Facilitation Act (CERFA)
- Conduct of bottom-up review of environmental restoration activities for closing installations and preparation of 77 BRAC cleanup plans for closing installations
- Establishment of restoration advisory boards (RAB) at closing installations and provision of seven RAB training workshops in various areas of the country
- Determination, by consensus, of the suitability of property for transfer or lease to reuse entities

Based on the efforts of the working groups and discussion at DERTF meetings, the major recommendations adopted by the DERTF are:

- DoD should submit draft environmental baseline surveys (EBS) and obtain concurrence from EPA and state agencies on properties identified under CERFA as uncontaminated, as required by statutory deadlines
- DoD, EPA, and state regulatory agencies should develop a retention program for BRAC environmental coordinators (BEC) and other members of the BCT
- EPA and DoD should develop and explore generic remedies that apply to cleanup problems that commonly occur at military installations
- DoD, EPA, the Department of Justice, and the General Services Administration (as appropriate) should ensure that programs within those agencies that involve similar objectives and activities with respect to environmental justice are consolidated or coordinated

Additional recommendations adopted by the DERTF are presented in this report. The status of those recommendations is summarized in Appendix B.

Two issues that the DERTF believes are significant that will be evaluated in the coming year are:

- Potential effects at BRAC installations of Superfund reauthorization
- Contribution to the reuse process of uncontaminated parcel identification required by CERFA

The DERTF assigned the following actions or specific activities to the working groups:

- The Fast-Track Cleanup Implementation Working Group will:
  - Examine the roles and responsibilities of the BCT
  - Continue to collect information on activities and progress of RABs
  - Study and identify alternative approaches to planning for cleanup in the absence of a reuse plan

- The Future Land Use Working Group will:
  - Examine impact of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h)(3) on reuse and develop recommendations for possible legislative changes to allow transfer by deed at an earlier point in the environmental restoration process, so long as there is no increased threat to human health or the environment
  - Investigate how remedy selection and future land use are addressed under reauthorization of Superfund, and develop recommendations with respect to the implementation of any future land use provisions
  - Continue to evaluate reuse and selection of remedies
  - Evaluate the practicability of institutional controls as enforcement mechanisms
  - Evaluate the effect of future response liability on future land use
  - Continue to assess the compatibility of cleanup options with alternatives for reuse

- The Environmental Baseline Survey Working Group will:
  - Continue to work on the *Fast Track to Finding of Suitability to Lease (FOST)* pamphlet
  - Report the status of implementation of the *Fast Track to FOST* at the next meeting of the DERTF

The DERTF also will examine the recommendations of the California Military Base Reuse Task Force established in 1993, and determine their applicability to environmental cleanup at closing installations nationwide.

Some additional matters that the DERTF proposes to evaluate in the coming year are:

- Funding
- Environmental hazards, such as lead-based paint, asbestos, and radon, that are not regulated under CERCLA
- Measures of effectiveness for BRAC cleanups
- Natural and cultural resources at BRAC installations

Chapter 7 of this report presents additional information on actions to be undertaken by the DERTF in the coming year. The DERTF will continue to hold public meetings throughout the United States to explore these issues and to provide an opportunity for public comment and participation. The deliberations and recommendations of the DERTF will assist DoD in expediting cleanup at closing installations.

EXECUTIVE SUMMARY

This report of the Defense Environmental Response Task Force (DERTF) to the U.S. Congress, describes the activities of the DERTF during fiscal year (FY) 1995. The DERTF is charged with recommending ways to expedite and improve environmental response actions at military installations that are being closed, monitoring the progress of affected federal and state agencies in implementing the recommendations of the DERTF, and submitting an annual report to Congress.

Accomplishing the cleanup goals at Department of Defense (DoD) installations is crucial to ensuring timely economic redevelopment that will be sustainable in the long term, alleviating the negative effects of the Base Realignment and Closure (BRAC) program on surrounding communities. The actions, products, and recommendations of the DERTF are designed to help expedite or improve the cleanup process. After examining numerous areas of concern, the DERTF determined the following three issues to be crucial at closing installations: implementation of fast-track cleanup, consideration of future land use in the remedy selection process, and public participation in the decision-making processes related to cleanup and reuse. An essential element to success common to all three of these areas is the continuation of adequate funding for the BRAC environmental program.

Throughout FY 1995, the DERTF considered other topics, such as natural and cultural resources and the applicability of recommendations developed by the California Military Base Reuse Task Force (CMBRTF) to base closures and cleanups nationwide. A number of presentations were made at meetings of the DERTF, many of which were requested by members of the task force or produced by the working groups established under the DERTF. Such efforts contributed to the development of the conclusions and recommendations presented in this report.

LIST OF MEMBERS AND ALTERNATES

1. Secretary of Defense	Ms. Sherri W. Goodman Deputy Under Secretary of Defense (Environmental Security) Department of Defense Alternate: Ms. Patricia A. Rivers, Executive Director
2. The Attorney General	Ms. Elizabeth Osenbaugh Counselor for State and Local Environmental Affairs Department of Justice Alternate: Mr. J. Steven Rogers
3. The Administrator of the General Services Administration Public Building Service	Mr. Brian K. Polly (March 1995 - September 1995) Assistant Commissioner Mr. P. Daniel Smith (October 1994 - April 1995) U.S. General Services Administration Alternate: Mr. P. Daniel Smith (August 1995 - September 1995) Mr. John Q. Martin (October 1994 - August 1995)
4. The Administrator of the Environmental Protection Agency	Mr. Elliott P. Laws Assistant Administrator Office of Solid Waste and Emergency Response U.S. Environmental Protection Agency Alternate: Mr. Timothy Fields
5. The Chief of Engineers, Department of the Army	Major General Albert J. Genetti, Jr. (June 1995-September 1995) Major General Pat M. Stevens IV (October 1994 - May 1995) Director of Military Programs U.S. Army Corps of Engineers Alternate: Mr. Cary Jones
6. State environmental protection agency, appointed by the National Governors' Association	Mr. James M. Strock (nominated) Secretary for Environmental Protection California Environmental Protection Agency Alternate: Mr. David Wang

LIST OF MEMBERS AND ALTERNATES, continued

7. State attorney general's office appointed by the National Association of Attorneys General	Mr. Dan Morales (nominated) Attorney General State of Texas Alternate: Mr. Samuel Goodhope
8. Representative of a public-interest environmental organization, appointed by the Speaker of the House of Representatives	Mr. William D. (Don) Gray The Environmental and Energy Study Institute
9. Representative of the Urban Land Institute, appointed by the Speaker of the House of Representatives and the Majority Leader of the Senate	Mr. Paul O. Reimer Reimer Associates

DRAFT REMEDIAL INVESTIGATION REPORT

OPERABLE UNIT 3A

MCAS EL TORO
Andy Piszkin, Remedial Project Manager

OPERABLE UNIT (OU) 3A

- Operable Unit 3A consists of 14 sites
- Primarily due to surface releases (spills) and shallow soil contamination
- Former site activities include sludge drying, oil changing, transformer storage, and fuel storage
- Variety of chemicals: fuels, waste oil, metals, solvents

Introduction

- Implemented approved Work Plan
- Followed EPA Data Quality Objective (DQO) Process
- Prepared Draft Remedial Investigation (RI) Report

Topics of Discussion

- Report Organization/Structure
- Site Characterization (Investigations)
- Contaminant Fate and Transport
- Risk Assessment
- Conclusions and Recommendations
- Next Steps

Report Organization/Structure

- Executive Summary
- Main
  - » Information applicable to all sites
  - » Sections 1 through 8
- Attachments
  - » Attachments A - N (14 sites)
  - » Site specific information
  - » Sections 1 through 8
- Appendices

Site Characterization

- Identified what chemicals are present and their concentrations
- Evaluated how far the releases extend
- Determined potential migration pathways
- Collected data needed to assess risk
- Agencies approved amount of sampling

Contaminant Fate and Transport (F&T)

- Determined physical characteristics of the sites
  - » Paved or unpaved
  - » Surface drainages
- Identified potential chemical transport pathways
  (How might the chemicals move)
  - » Volatilization and dust
  - » Surface water transport
  - » Leaching from soil

Risk Assessment

- Conservative assumptions
- Used sampling results
- Evaluated two scenarios: industrial and residential
- Calculated Excess Lifetime Cancer Risk
- Calculated Noncancer Risk (Hazard Index)

Conclusions and Recommendations

- Met Data Quality Objectives (DQOs)
- Contamination is limited to shallow soil at most sites
- Groundwater is impacted at only one site (Site 16)
- Remedial Action is recommended for Sites 12, 16, and 21

Next Steps

- Agency review of Draft RI Report
- Finalize RI Report
- Conduct Feasibility Study (FS) to evaluate clean-up alternatives
- Remediate sites

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

DRAFT PHASE II REMEDIAL INVESTIGATION REPORT OU-3A SITES MARINE CORPS AIR STATION EL TORO, CALIFORNIA

CTO-0079/0220

November 1996

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

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CERTIFIED
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GEOLOGIST
STATE OF CALIFORNIA

Signature: Craig L. Carlisle
Craig L. Carlisle, CTO Leader

Date: 11/12/96

EXECUTIVE SUMMARY

This report presents the results of the Remedial Investigation (RI) conducted at the operable unit (OU)-3A sites at the Marine Corps Air Station (MCAS) El Toro in Orange County, California. The investigation was conducted on behalf of the Department of the Navy, Southwest Division Naval Facilities Engineering Command. It was performed in accordance with the Navy Installation Restoration Program under the Comprehensive Long-Term Environmental Action Navy II Program, contract No. N68711-92-D-4670.

BACKGROUND

MCAS El Toro lies in a semiurban agricultural area in southern California, approximately 8 miles southeast of the city of Santa Ana and 12 miles northeast of the city of Laguna Beach. Land northwest of the Station is used for agricultural purposes. The land to the south and northeast is used mainly for commercial, light-industrial, and residential purposes. Surrounding residential areas are the cities of Lake Forest, Irvine, and Laguna Hills.

MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet-operation training facility. In 1950, the Station was selected for development as a master jet station and permanent center for Marine Corps aviation on the west coast. The Station mission has involved the operation and maintenance of military aircraft and ground-support equipment. Historical activities on the Station include aircraft maintenance and repair. These activities have generated waste oils, solvents, paint residues, hydraulic fluid, used batteries, and other wastes (MCAS El Toro 1991).

The OU-3A sites (Installation Restoration Program Sites 4, 6, 8, 9 through 13, 15, 16, 19 through 22) are located throughout the Station (Figure ES-1). The sites consist of former drop tank drainage areas, crash crew training pits, a former wastewater-treatment facility and associated sludge-drying beds, a Defense Reutilization and Marketing Office storage yard, and other industrial facilities supporting the operation and maintenance of military aircraft and ground-support equipment at the Station (Table ES-1). Most of these sites are not currently active, and the operations that contaminated the sites have ceased.

PREVIOUS INVESTIGATIONS

A significant amount of data collection and interpretation has already been completed as the result of previous investigations at the OU-3A sites. The Phase I RI analyzed samples from shallow soil, subsurface soil, and groundwater and identified numerous chemicals of potential concern (COPCs) in each of these media.

REMEDIAL INVESTIGATION SCOPE

The overall goal of the RI for the OU-3A sites was to collect sufficient data to determine the nature and extent of contamination and conduct a human-health risk assessment at the individual sites or site units. The data collected were also used to support decisions regarding the need for and scope of future remediation at the OU-3A sites. Specific goals

were expressed in the form of data quality objectives (DQOs) developed to assure that adequate information was collected to successfully support these decisions. The DQOs were designed to address the following questions.

- Do COPCs in shallow soil (less than 10 feet below ground surface [bgs]) within each unit exceed established background concentrations and preliminary remediation goals, and/or do they present an unacceptable risk to human health or the environment?
- Has the extent of impacted soil been defined for the shallow-soil interval?
- Does the impacted soil extend greater than 10 feet bgs?
- Do the media being evaluated for a response action qualify for early action?

To complete the characterization efficiently, data and results from previous investigations are incorporated into this RI.

STUDY AREA INVESTIGATION

The soil investigations at OU-3A sites were designed so that when Phase I and II RI data were evaluated together, an estimate of the nature and extent of COPCs and human-health risk assessment could be conducted at each site unit. The basis and approach for the number of boring locations and associated samples collected at these locations is outlined below and presented in the final Work Plan Phase II RI/FS (BNI 1995a).

Historical site activities, previous site investigation results, and regulatory comments were used to formulate the Phase II RI/Feasibility Study (FS) sampling approach. Human-health risk and extent of contamination were the primary objectives of the Phase II RI/FS. The three-tiered sampling approach used to address these objectives at the OU-3A sites is summarized below.

- The Tier 1 sampling approach consisted of collecting shallow-soil samples (less than 10 feet bgs) from a specific number of sampling locations within the unit so an assessment of human-health risk could completed for the unit.
- The Tier 2 sampling approach also focused on shallow soil; however, the primary objective was to refine the horizontal extent of shallow soil that has been impacted by site activities.
- The Tier 3 sampling approach was designed to estimate the horizontal and vertical extent of impacted deep subsurface soil (greater than 10 feet bgs). Groundwater was also investigated if potential impacts to groundwater were believed possible.

To provide resource-effective soil sampling, four different sampling designs were used during the Phase II RI. Each OU-3A site had a site-specific sampling program that used one or more of the four sampling designs that are summarized below (BNI 1995a).

- Judgmental Sampling: Sample locations were selected using professional judgment and experience; no statistical analysis was involved.

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SOURCE: AERIAL PHOTOBANK
SAN DIEGO, CALIFORNIA
MARCH 1995

OU-3A Remedial Investigation Report

Figure ES-1

MCAS El Toro Aerial Photograph

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date: 9/11/96
File No:
Job No: 22214-073
Rev No: A

Table ES-1
Installation Restoration Program Operable Unit-3A Site Characteristics

Site	Site Name	Approximate Site Area (square feet)	Approximate Depth to Groundwater (feet bgs[a])	Waste Type	Constituents Identified During Phase I and II Investigations	Units of Site Investigated During Phase II RI
4	Ferrocene Spill Area	5,000	225 – 240	Ferrocene with hydrocarbon carrier, miscellaneous fuels, waste oil	VOCs[b], SVOCs[c], TPH[d], pesticides, metals[e]	None (site not investigated as part of Phase II RI/FS)
6	Drop Tank Area No. 1	42,000	140 – 150	JP-5[f], lube oil, waste oil, possibly solvents	VOCs, SVOCs, metals	Units 1, 2, and 3 (entire site)
8	DRMO[g] Storage Area	290,000	120 – 125	PCB[h] oil, fuels, solvents, lube oil	VOCs, SVOCs, TPH, metals, pesticides, PCBs,	Units 1, 2, 3, 4, and 5 (entire site)
9	Crash Crew Pit No. 1	14,800	120 – 125	JP-5, other aviation fuels, waste oil, hydraulic fluid	VOCs, SVOCs, TPH, metals	Units 1 and 2 (entire site)
10	Petroleum Disposal Area	960,000	110 – 120	Waste oil, antifreeze, hydraulic/transmission fluids, solvents	VOCs, SVOCs, TPH, metals	Units 1, 2, 3, and 4 (entire site)
11	Transformer Storage Area	1,025	120	PCB oil	Pesticides, PCBs	Units 1, 2, and 3 (entire site)
12	Sludge Drying Beds	107,000	95 – 105	Municipal waste, sludges, plating shop liquid waste	VOCs, SVOCs, TPH, metals, pesticides, herbicides	Units 1, 2, 3, and 4 (entire site)
13	Oil Change Area	30,000	135 – 140	Waste oil, solvents	VOCs, metals, pesticides	None (site not investigated as part of Phase II RI/FS)
15	Suspended Fuel Tanks	2,915	125 – 130	Diesel fuel and possibly waste oil solvents	VOCs, TPH, metals	Unit 2
16	Crash Crew Pit No. 2	57,100	165 – 185	JP-5, other aviation fuels, waste oil, hydraulic fluid	VOCs, SVOCs, TPH, metals	Units 1, 2, and 3 (entire site)
19	Aircraft Expeditionary Refueling Site	180,000	150 – 160	JP-5, other aviation fuels	VOCs, SVOCs, TPH, metals	Units 3 and 4

(table continues)

Table ES-1 (continued)

Site	Site Name	Approximate Site Area (square feet)	Approximate Depth to Groundwater (feet bgs[a])	Waste Type	Constituents Identified During Phase I and II Investigations	Units of Site Investigated During Phase II RI
20	Hobby Shop	15,600	185 – 190	Waste oil, solvents, kerosene	VOCs, SVOCs, TPH, metals, pesticides	Units 1 and 4
21	Materials Management Group	13,500	95	Waste oil, paint, solvents, herbicides, pesticides, PCB oil	VOCs, SVOCs, TPH, metals, pesticides, herbicides	Unit 1 (entire site)
22	Tactical Air Fuel Dispensing System	75,000	110 – 120	JP-5, other aviation fuels, pesticides	VOCs, SVOCs, TPH, pesticides, metals	Units 1 and 2 (entire site)

Notes:

[a] bgs – below ground surface
[b] VOC – volatile organic compound
[c] SVOC – semivolatile organic compound
[d] TPH – total petroleum hydrocarbons
[e] metals – indicated where any target analyte list metal concentration exceeded background level as established during Phase II RI
[f] JP-5 – jet propulsion fuel, grade 5
[g] DRMO – Defense Reutilization and Marketing Office
[h] PCB – polychlorinated biphenyl

- Stratified Random Sampling: Sample locations were randomly located within the area being investigated.
- Systematic Random Sampling Along an Axis: Sample locations were randomly located in a linear pattern to match the area investigated (i.e., drainage ditch).
- Areal Random Sampling Based on a Grid: Sample locations were randomly located within equal-area square grids that were randomly located over the site so that they covered the entire site without over lapping each other.

SUMMARY OF RESULTS OF REMEDIAL INVESTIGATION

The findings of the Phase I and II RI for the OU-3A sites are summarized briefly below, including physical site characteristics, nature and extent of contamination, potential fate-and-transport mechanisms, the human-health risk assessments, and conclusions.

Physical Site Characteristics

An understanding of the surface features, meteorology, climatology, geology, and hydrogeology of the OU-3A sites is important because these characteristics help define the mobility of contaminants and the primary contaminant-migration pathways that pose the greatest potential to impact the environment.

The area of MCAS El Toro that contains the OU-3A sites is located on a broad alluvial valley the Tustin Plain. OU-3A site elevations range from approximately 240 to 420 feet above mean sea level and are located adjacent to the runways and other industrialized areas of the station. The topography at each of the OU-3A sites is relatively flat. None of the OU-3A sites contain any significant ecological habitat, and several sites are partially or entirely covered by asphalt or concrete.

The climate of the area is characterized by moderate-to-warm temperature and relatively low humidity. Rainfall amounts are usually low and generally occur during the winter. Most of the OU-3A sites are covered by asphalt, concrete, or hard-packed soil that is partially vegetated. These conditions, coupled with the moderate permeability of the soil, are not conducive to leaching of contaminants to groundwater. Surface runoff from infrequent storm events can collect on the flat areas, resulting in localized ponding and some infiltration at sites not completely covered by pavement. However, with the exception of Site 12 (immediately adjacent to an exposed portion of Bee Canyon Wash), the OU-3A sites are not adjacent to the exposed portions of any of the major drainages that direct surface runoff away from the Station.

Nature and Extent of Contamination

Extensive soil sampling was performed at the OU-3A sites to characterize the nature and extent of contamination. Several types of COPCs were found. The classes of contaminants identified in soil during the Phase I and II RIs at each OU-3A site are presented in Table ES-1 and are briefly discussed in the following paragraphs. At one site (Site 16, Attachment J) groundwater sampling was also conducted. The Phase II RI

showed that volatile organic compounds (VOCs) in soil were present down to the groundwater. Therefore, as established in the DQOs presented in the final Work Plan Phase II RI/FS MCAS El Toro, groundwater sampling was conducted at this site.

VOCs, semivolatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), dioxins, and target analyte list metals were reported in surface- (0 to 2 feet bgs), shallow- (0 to 10 feet bgs), and deeper subsurface- (greater than 10 feet bgs) soil samples at the OU-3A sites. Groundwater samples from Site 16 contained detectable concentrations of several VOCs.

Except for Site 16, where VOCs and fuels were identified below 10 feet bgs, most of the contamination identified at the OU-3A sites is present within the shallow-soil interval (0 to 10 feet bgs). Elevated concentrations (greater than 100 micrograms per kilogram [µg/kg]) of the VOCs, SVOCs/polynuclear aromatic hydrocarbons, pesticides, PCBs, and target analyte list metals were present in most OU-3A sites to a depth of approximately 5 feet bgs. Except for target analyte list metals, these chemicals generally diminished to trace (less than 10 µg/kg) concentrations below a depth of approximately 5 feet bgs.

Potential Fate-and-Transport Mechanisms

Organic contaminants at OU-3A sites can be transformed by several potential mechanisms as follows: biological; chemical; and photolytic.

Of these possible transformation mechanisms, biological mediation is predominant. Rates of biological transformation of the organic contaminants at the OU-3A sites are much more rapid than the rates of chemical transformation. Photolytic transformation is only relevant in surface soil or fugitive dust exposed to sunlight. Although biological transformation is the primary fate mechanisms most organic contaminants at OU-3A sites resist biotransformation and will remain in soil for years.

Contaminants can migrate from OU-3A sites through several potential mechanisms, or pathways, as follows.

- VOCs and contaminated fugitive dust may be transported in air.
- Contaminated soil may be transported by surface water from precipitation.
- Contaminants in shallow soil may leach through the vadose zone into groundwater.
- Contaminants may be transported by groundwater.

Of these possible migration mechanisms, fugitive dust and surface-water transport of COPCs are the primary transport pathways mobilizing COPCs at the OU-3A sites. The following discussion describes the pathways as they pertain to the OU-3A sites.

- Volatilization and fugitive dust. VOCs are present in shallow soil at very low concentrations, and volatilization is not expected. Asphalt/concrete covering

- also serves to minimize volatilization of COPCs in shallow soil and prevent generation of fugitive dust. At sites that lack vegetation or asphalt/concrete pavement, fugitive dust is a potential transport mechanism. In this case it was necessary to look further at types of contaminants present and their concentrations. The human-health risk assessment was performed assuming no surface covering at any of the sites.

- Surface-water transport. Surface-water runoff is infrequent at the Station. Low average rainfall, moderate soil permeability, and high evaporation rates minimize significant surface-water runoff, except during infrequent heavy storms. Several washes flow through the Station en route to San Diego Creek. These washes are normally dry, but they can contain surface water as a result of infrequent storm events. Runoff from the OU-3A sites could eventually empty into these drainage channels. Stationwide storm sewer systems and engineered surface drainages collect and conduct runoff to these washes, thereby preventing standing-water conditions except in limited areas. The storm sewer systems and engineered surface drainages are present near a majority of the OU-3A sites; however, they are not present within the boundary of most of the sites.

- Vadose zone leaching. Chemicals in vadose zone soil can be leached downward to groundwater by percolating infiltration. Transport of COPCs by this pathway is minimized by the Station's low average infiltration rate (less than 5 inches per year) (BNI 1996a). Vadose zone leaching is further limited by the chemical characteristics of most of the COPCs which cause them to be tightly bound to the soil and resistant to leaching. Vadose zone leaching is only apparent at Site 16, where an artificially high annual infiltration rate coupled with highly mobile COPCs have allowed halogenated VOCs to reach groundwater.

- Groundwater transport. Chemicals dissolved in groundwater move along with the bulk flow of groundwater by a process know as advection. At Site 16, only halogenated VOCs have reached the groundwater. Groundwater transport is affected by the groundwater flow velocity, properties of the porous medium, and the organic carbon-partitioning coefficient of the solute. At Site 16 contaminants in groundwater have moved off-site.

Human-Health Risk Assessment

A baseline human-health risk assessment was performed as part of the RI to assess potential impacts from contaminants at the OU-3A sites on human health if no remedial actions were taken. The baseline human-health risk assessment documents the hazards and provides the information necessary to make risk management decisions concerning the necessity for remedial actions.

The human-health risk assessment evaluated two scenarios.

- Industrial scenario. Industrial workers exposed to the surface soil (0 to 2 feet bgs) at areas of potential concern.

- Residential scenario. Children and adult residents exposed to shallow soil (0 to 10 feet bgs) at areas of potential concern.

Office/industrial workers at areas of potential concern could be exposed to COPCs in soil via the following exposure pathways:

- ingestion of surface soil,
- dermal contact with surface soil, and
- inhalation of vapors and particulates that have been released from surface soil.

Children and adult residents at areas of potential concern could be exposed to COPCs in the soil via the following exposure pathways:

- ingestion of shallow soil,
- dermal contact with shallow soil, and
- inhalation of vapors and particulates that have been released from shallow soil.

Children and adults living at Site 16 were assumed to use water for domestic purposes from a private well screened in the principal aquifer. Exposure to COPCs in the groundwater was evaluated via the following pathways:

- ingestion of groundwater,
- dermal contact with groundwater, and
- inhalation of volatiles from groundwater during household water use.

Exposure conditions used in the estimation of risk are chosen to represent what is known as "reasonable maximum exposure." Use of these exposure conditions tend to overestimate risk. This effort to overestimate risk is deliberate; it provides risk managers with a margin of safety when making cleanup decisions.

Data collected during the Phase I and Phase II RIs were combined, as appropriate, to conduct the baseline human-health risk assessment. Before COPCs were selected for inclusion into the risk assessment, all chemical analytical data obtained during the Phase II RI field activities were validated to satisfy Level IV (formerly Naval Energy and Environmental Support Activity Level D) requirements. Phase I data were used "as is" (they were not revalidated).

Following the validation process, COPCs were selected based on appropriate United States Environmental Protection Agency (U.S. EPA) guidance. The data-evaluation process begins with the listing of all chemicals positively identified in soil and groundwater samples. If the COPCs in the soil are depth related, each list is limited to chemicals found within the depth of concern. The procedure eliminates the chemicals that are unlikely to pose a risk to human health, including:

- naturally occurring inorganic chemicals (metals) for which the concentrations are within the range considered normal for MCAS El Toro; and
- essential nutritional elements of very low toxicity (i.e., calcium, iron, magnesium, potassium, or sodium) present at low concentrations.

Surface-soil data (0 to 2 feet bgs) and shallow-soil data (0 to 10 feet bgs), considered to be best data for evaluating exposures at the OU-3A sites, were used in selecting COPCs in the baseline human-health risk assessment. Both Phase I and II RI data were used to identify the COPCs in soil.

To aid in the risk assessment identification and definition of important source areas at each of the OU-3A sites, several of the site units within a site were grouped, as appropriate, into areas of potential concern. This association was based on the location of the site units relative to each other, the nature and magnitude of the chemical contaminants at contiguous units, and the physiographic characteristics of the various units. At each of the OU-3A sites, resulting areas of potential concern consisted of the following.

- Site 4, Ferrocene Spill Area
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 6, Drop Tank Drainage Area No. 1
  - Units 1 through 3, grouped into an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 8, Defense Reutilization and Marketing Office Storage Yard
  - Units 1 and 4, grouped into an area of potential concern
  - Units 2 and 3, grouped into an area of potential concern
  - Unit 5, addressed individually as an area of potential concern
- Site 9, Crash Crew Pit No. 1
  - Units 1 and 2, grouped into an area of potential concern
- Site 10, Petroleum Disposal Area
  - Units 1 through 3, grouped into an area of potential concern
  - Unit 4, addressed individually as an area of potential concern
- Site 11, Transformer Storage Area
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern
  - Unit 3, addressed individually as an area of potential concern
- Site 12, Sludge Drying Beds
  - Unit 1, addressed individually as an area of potential concern
  - Units 2 and 4, grouped into an area of potential concern

  - Unit 3, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 13
  - Units 1 and 2 grouped into an area of potential concern
- Site 15, Suspended Fuel Tanks
  - Unit 2, addressed individually as an area of potential concern
- Site 16, Crash Crew Pit No. 2
  - Units 1 and 2, grouped into an area of potential concern
  - Unit 3, addressed individually as an area of potential concern
  - Groundwater addressed individually as an area of potential concern
- Site 19, Aircraft Expeditionary Refueling Site
  - Units 2, 3, and 4, grouped into an area of potential concern
- Site 20, Hobby Shop
  - Unit 1, addressed individually as an area of potential concern
  - Unit 4, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 21, Materials Management Shop
  - Unit 1, addressed individually as an area of potential concern
  - catch basin addressed individually as an area of potential concern
- Site 22, Tactical Air Fueling Dispensing System
  - Unit 1, addressed individually as an area of potential concern
  - Unit 2, addressed individually as an area of potential concern

The analyses presented in the human-health risk assessment estimate the potential on-site risk associated with these areas of potential concern (i.e., site units or site unit groups) so that remedial actions, if needed, can be developed for relatively localized remediation targets.

Risk estimates for the identified receptors were calculated based on exposure to soil and sediments (e.g., inhalation, ingestion, dermal) and gases (e.g., inhalation). At Site 16, it was assumed that the resident could also be exposed to groundwater from an on-site well.

The human-health risk assessment conclusions are presented on Table ES-2. Carcinogenic risks from soil in the residential and industrial scenarios ranged from approximately 2.0×10^{-4} (residential scenario for catch basin at Site 21) to 1.0×10^{-8} (industrial scenario for Unit 1 at Site 20). Noncarcinogenic risks (hazard indices) for the residential and industrial scenarios ranged from 0.0036 (industrial scenario for Unit 3 at

Table ES-2
OU[a]-3A Sites – Phase II RI[b] Results and Recommendations

Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	PHASE II RI RISK ASSESSMENT							Recommendations
				Excess Lifetime Cancer Risk				Noncancer Risk (Hazard Index)			
				Residential Scenario (0 to 10 feet bgs)[c][d] U.S. EPA[e]/ Cal EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	
4	Ferrocene Spill Area	1	Yes[i]	1.9E-5[j]	arsenic (99%)	5.7E-6	arsenic (99%)	1.4	manganese (44%)	0.049	—	No Further Action
		2	Yes	3.0E-5/3.6E-5	arsenic (67%/56%) benzo(a)pyrene (23%/31%) dieldrin (6%/5%) benzo(k)fluoranthene (–/4%)	1.4E-5/1.8E-5	arsenic (57%/44%) benzo(a)pyrene (32%/41%) dieldrin (7%/6%)	0.75	—	0.12	—	No Further Action Recommended
		Catch Basin	Yes	1.9E-7/5.8E-7	—	3.0E-8/9.1E-8	—	0.31	—	0.021	—	No Further Action Recommended
6	Drop Tank Area No. 1	1, 2, 3[k]	Yes	1.9E-5/2.0E-5	arsenic (68%/65%) beryllium (23%/22%) benzo(a)pyrene (6%/9%)	1.3E-5/1.7E-5	benzo(a)pyrene (44%/55%) arsenic (28%/21%) dibenz(a,h)anthracene (12%/9%)	1.4	manganese (41%)	0.11	—	No Further Action Recommended
		Catch Basin	Yes	3.1E-8	—	1.6E-8	—	0.084	—	0.0072	—	No Further Action Recommended
8	Defense Reutilization and Marketing Office Storage Area	1, 4	Yes	1.7E-5/2.0E-5	Aroclor 1248 (57%/49%) benzo(a)pyrene (27%/38%)	1.3E-5/1.5E-5	Aroclor 1248 (49%/43%) benzo(a)pyrene (24%/33%) Aroclor 1260 (16%/14%)	0.79	—	0.21	—	No Further Action Recommended
		2, 3	Yes	4.1E-5	Aroclor 1254 (32%) arsenic (27%) Aroclor 1248 (19%) Aroclor 1260 (17%)	4.4E-6/4.5E-6	arsenic (82%/80%)	2.3	Aroclor 1254 (28%) manganese (22%) Aroclor 1248 (17%) Aroclor 1260 (15%) arsenic (8%)	0.074	—	No Further Action Recommended
		5	Yes	1.0E-4	indeno(1,2,3-c,d)pyrene (96%) benzo(b)fluoranthene (7%) Aroclor 1260 (2%)	7.3E-5	indeno(1,2,3-c,d)pyrene (86%) benzo(b)fluoranthene (6%) arsenic (6%)	1.1	manganese (55%)	0.13	—	No Further Action Recommended
9	Crash Crew Pit No. 1	1, 2	Yes	1.7E-5	arsenic (82%) benzo(a)pyrene (–/6%)	1.1E-5/1.3E-5	arsenic (50%/42%) benzo(a)pyrene (30%/42%)	1.4	manganese (45%)	0.11	—	No Further Action Recommended
10	Petroleum Disposal Area	1, 2, 3	Yes	1.3E-5	arsenic (92%)	1.3E-5/1.8E-5	benzo(a)pyrene (55%/67%) arsenic (26%/19%)	1.2	manganese (50%)	0.049	—	No Further Action Recommended
		4	Yes	3.2E-5	arsenic (75%) beryllium (23%)	5.8E-6	arsenic (98%)	2.2	manganese (42%) aluminum (24%)	0.036	—	No Further Action Recommended
11	Transformer Storage Area	1	Yes	9.1E-5	Aroclor 1260 (99%)	6.0E-5	Aroclor 1260 (99%)	4.5	Aroclor 1260 (99%)	1.1	Aroclor 1260 (99%)	No Further Action Recommended
		2	Yes	5.9E-6	Aroclor 1260 (99%)	4.5E-5	Aroclor 1260 (99%)	0.30	—	0.82	—	No Further Action Recommended
		3	Yes	3.0E-7	—	1.7E-7	—	0.017	—	0.0036	—	No Further Action Recommended

(table continues)

Table ES-2 (continued)

Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	PHASE II RI RISK ASSESSMENT								Recommendations
				Excess Lifetime Cancer Risk				Noncancer Risk (Hazard Index)				
				Residential Scenario (0 to 10 feet bgs[c])[d] U.S. EPA[e]/ Cal EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	
12	Sludge Drying Beds	1	Yes	6.0E-5/7.6E-5	benzo(a)pyrene (35%/45%) arsenic (22%/17%) dibenz(a,h)anthracene (15%/12%) Aroclor 1254 (15%/12%) benzo(k)fluoranthene (–/4%) benzo(b)fluoranthene (4%/3%) benz(a)anthracene (4%/3%) indeno(1,2,3-c,d)pyrene (2%/2%)	3.7E-5/4.8E-5	benzo(a)pyrene (38%/46%) dibenz(a,h)anthracene (16%/13%) Aroclor 1254 (16%/13%) arsenic (16%/12%) benzo(k)fluoranthene (–/4%) benzo(b)fluoranthene (5%/4%) benz(a)anthracene (4%/3%)	4.6	MCPP[l] (52%) manganese (14%) Aroclor 1254 (10%) MCPA[m] (6%)	0.82	—	No Further Action Recommended
		2, 4	Yes	2.8E-5	arsenic (71%) beryllium (13%) dibenz(a,h)anthracene (5%) benzo(a)pyrene (–/4%)	1.5E-5/1.7E-5	arsenic (36%/32%) dibenz(a,h)anthracene (26%/23%) benzo(a)pyrene (11%/16%) Aroclor 1260 (10%/9%)	2.1	manganese (34%) MCPA (18%) arsenic (16%)	0.26	—	No Further Action Recommended
		3	Yes	4.5E-5/5.1E-5	arsenic (31%/27%) dibenz(a,h)anthracene (15%/13%) benzo(a)pyrene (14%/22%) dieldrin (12%/11%) DDT[o] (9%/8%) benzo(b)fluoranthene (6%/6%) Aroclor 1260 (6%/5%) benzo(k)fluoranthene (–/4%) Aroclor 1254 (4%/3%)	8.8E-5/9.3E-5	Aroclor 1254 (61%/58%) Aroclor 1260 (16%/15%) arsenic (5%/5%) benzo(a)pyrene (5%/8%) dieldrin (4%/3%) dibenz(a,h)anthracene (3%/3%) DDT (3%/3%) benzo(b)fluoranthene (2%/2%) benzo(k)fluoranthene (–/2%)	5.9	MCPP (66%) manganese (12%) aluminum (5%)	2.3	Aroclor 1254 (49%) MCPP (36%) Aroclor 1260 (11%)	Further Action Recommended[n]
		Catch Basin	Yes	9.9E-7	—	5.7E-7	—	0.18	—	0.02	—	No Further Action Recommended
13	Oil Change Area	1, 2	Yes	1.8E-5/2.3E-5	arsenic (53%/42%) benzo(a)pyrene (36%/48%)	5.3E-6/8.8E-6	benzo(a)pyrene (81%/80%)	1.1	manganese (53%)	0.012	—	No Further Action Recommended
15	Suspended Fuel Tank Area	2	Yes	4.2E-6/5.1E-6	dibenz(a,h)anthracene (40%/33%) benzo(a)pyrene (29%/37%) Aroclor 1260 (24%/20%)	1.1E-5/1.2E-5	arsenic (70%/64%) dibenz(a,h)anthracene (10%/9%) benzo(a)pyrene (–/11%)	1.1	manganese (54%)	0.12	—	No Further Action Recommended
16	Crash Crew Pit No. 2	1, 2	Yes	1.7E-6/2.0E-6	dibenz(a,h)anthracene (38%/33%) benzo(a)pyrene (18%/26%) vinyl chloride (18%/15%) indeno(1,2,3-c,d)pyrene (13%/11%)	1.4E-6/1.7E-6	dibenz(a,h)anthracene (41%/34%) benzo(a)pyrene (38%/51%) indeno(1,2,3-c,d)pyrene (12%/10%)	0.077	—	0.0068	—	Further Action Recommended
		3	Yes	1.9E-5/2.0E-5	arsenic (68%/65%) dibenz(a,h)anthracene (19%/19%) beryllium (11%/11%)	6.7E-6/6.9E-6	arsenic (55%/54%) dibenz(a,h)anthracene (36%/35%)	1.3	manganese (50%)	0.11	—	No Further Action Recommended
		Groundwater	Yes	8.0E-5	trichloroethene (99%)	NA[p]	NA	8.4	trichloroethene (99%)	NA	NA	Further Action Recommended[q]
19	Aircraft Expeditionary Refueling Site	2, 3, 4	Yes	1.3E-5	arsenic (85%) dibenz(a,h)anthracene (8%)	3.9E-6/4.1E-6	arsenic (92%/88%)	0.95	manganese (60%)	0.036	—	No Further Action Recommended

(table continues)

Table ES-2 (continued)

Site Number	Site Name	Unit Number	Has Nature and Extent of Contamination Been Defined?	PHASE II RI RISK ASSESSMENT: Excess Lifetime Cancer Risk — Residential Scenario (0 to 10 feet bgs[c])[d] U.S. EPA[e]/ Cal EPA[f]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs) U.S. EPA/ Cal-EPA	Industrial Scenario Risk Drivers[g]	Noncancer Risk (Hazard Index) — Residential Scenario (0 to 10 feet bgs)[h]	Residential Scenario Risk Drivers[g]	Industrial Scenario (0 to 2 feet bgs)	Industrial Scenario Risk Drivers[g]	Recommendations
20	Hobby Shop	1	Yes	1.5E-5	arsenic (93%)	1.3E-8/4.0E-8	—	1.3	manganese (45%)	0.086	—	No Further Action Recommended
		4	Yes	3.4E-6/3.5E-6	Aroclor 1254 (88%/86%)	2.2E-6	Aroclor 1254 (91%)	0.61	—	0.043	—	No Further Action Recommended
		Catch Basin	Yes	4.7E-6/6.0E-6	bis(2-ethylhexl)phthalate (83%/65%) cadmium (–/30%)	2.4E-6/2.6E-6	bis(2-ethylhexl)phthalate (96%/88%)	1.2	cadmium (45%)	0.098	—	No Further Action Recommended
21	Materials Management Group	1	Yes	2.5E-5	arsenic (88%) Aroclor 1260 (8%)	1.1E-5	arsenic (91%)	2.0	manganese (33%) MCPP (21%) arsenic (19%)	0.15	—	Further Action Recommended
		Catch Basin	Yes	1.3E-4/1.8E-4	benzo(a)pyrene (48%/56%) dibenz(a,h)anthracene (14%/10%) arsenic (25%/18%) benzo(k)fluoranthene (–/5%) benzo(b)fluoranthene (5%/4%) benz(a)anthracene (4%/3%) indeno(1,2,3-c,d)pyrene (3%/2%) chrysene (–/1%)	7.5E-5/1.1E-4	benzo(a)pyrene (55%/61%) dibenz(a,h)anthracene (16%/11%) arsenic (15%/10%) benzo(k)fluoranthene (–/6%) benzo(b)fluoranthene (6%/4%) benz(a)anthracene (5%/3%) indeno(1,2,3-c,d)pyrene (3%/2%) chrysene (–/1%)	0.91	arsenic(60%)	0.11	—	Further Action Recommended[r]
22	Tactical Air Fuel Dispensing System	1	Yes	2.7E-5/3.5E-5	arsenic (52%/40%) benzo(a)pyrene (37%/46%) benzo(k)fluoranthene (–/3%) benz(a)anthracene (4%/3%) benzo(b)fluoranthene (4%/3%)	1.4E-5/1.9E-5	benzo(a)pyrene (46%/58%) arsenic (36%/26%)	0.52	—	0.048	—	No Further Action Recommended
		2	Yes	2.3E-8/9.8E-8	—	4.7E-6	arsenic (100%)	1.2	manganese (59%)	0.031	—	No Further Action Recommended

Notes:

[a] OU – operable unit
[b] RI – Remedial Investigation
[c] bgs – below ground surface
[d] cancer risk results shown are for the hypothetical residential adult; adult cancer risk results are higher than the child cancer risk
[e] U.S. EPA – United States Environmental Protection Agency
[f] Cal-EPA – State of California Environmental Protection Agency
[g] as determined by human-health risk assessment, number in parentheses is percentage of risk the risk driver accounts for (U.S. EPA/Cal-EPA)
[h] systemic toxicity results shown are for the hypothetical resident child; child noncancer risks are higher than the adult cancer risk
[i] as agreed by the Base Realignment and Closure Cleanup Team
[j] risk listed once when U.S. EPA derived risks equal state derived risks
[k] multiple units listed under Unit Number column are addressed as one area of concern
[l] MCPP – (2-(2-methyl-4-chlorophenoxy)-propionic acid
[m] MCPA – (2-methyl-4-chlorophenoxyacetic) acid
[n] DDT – dichlorodiphenyltrichloroethane
[o] Remedial Action Objectives (RAOs) for the recommended remedial action at Unit 3 of Site 12 include: reduce or eliminate exposure to contaminated soil from Unit 3 (Drainage Ditch); and reduce or eliminate the likelihood of contaminated soil from Unit 3 being transported off-site.
[p] NA – not applicable
[q] RAOs for the recommended remedial action at Site 16 include: performing pilot tests to evaluate the applicability of soil vapor extraction and air sparging to remove volatile organic compounds at the site; performing pilot tests to evaluate the feasibility of groundwater extraction and reinjection; and refining groundwater monitoring well network to enhance monitoring of contaminated groundwater moving off-site.
[r] RAOs for the recommended remedial action at the catch basin at Site 21 include: reduce or eliminate exposure to contaminated sediment in the catch basin; and reduce or eliminate the likelihood of contaminated sediment in the catch basin being transported off-site.

Site 11) to 5.9 (residential scenario for Unit 3 at Site 12). Also listed on Table ES-2 are the risk drivers associated with each area of concern at the OU-3A sites.

A habitat assessment was performed for the OU-3A sites in May 1995. The results of this assessment indicated an absence of significant plant and wildlife habitat at the OU-3A sites. Therefore, an ecological risk assessment was not performed as part of the Phase II RI/FS for the OU-3A sites. The specific results of the habitat assessment are presented in Appendix L.

The results of the risk assessment were used together with the other information obtained during the Phase II RI to evaluate whether any further action was necessary at an area of concern at each of the OU-3A sites.

CONCLUSIONS

The Phase II RI was conducted using the seven-step U.S. EPA DQO process (U.S. EPA 1993). Using this process, four site-specific DQOs were developed for the OU-3A sites. The Phase II RI has successfully met these DQOs as summarized in the site-specific attachments and discussed below. Although DQOs are site-specific, they have been answered below in generalized manner for the OU-3A sites. Table ES-2 presents the results of the site-specific investigations performed for the Phase II RI.

1. *Do contaminants in shallow soil (less than 10 feet bgs) within each unit exceed established background concentrations and preliminary remediation goals, and/or do they present an unacceptable risk to human health or the environment?*

   No. Target analyte list metals above their respective background concentrations, VOCs, SVOCs, PCBs, and pesticides in shallow soil at the OU-3A sites do not appear to pose an unacceptable risk to a potential on-site resident (or on-site industrial worker) at most of the OU-3A sites, based upon the reported range of concentrations in shallow soil and the calculated risk values.

2. *Has the nature of the impacted soil been defined for the shallow-soil interval?*

   Yes. The nature and extent of contaminants has been defined in shallow soil. The Base Realignment and Closure Cleanup Team (BCT) agreed that the nature and extent of shallow-soil contamination associated with COPCs at all the OU-3A sites has been defined in a sufficient manner to reach a decision for future actions.

3. *Does the impacted soil extend below a depth of 10 feet bgs?*

   No. In general, impacted soil does not extend below 10 feet bgs at OU-3A sites. At most OU-3A sites, the BCT agreed that sampling below depths of 10 feet bgs was not necessary. At Sites 8, 12, and 16, soil sampling was performed below 10 feet bgs. At all of three of these sites, the BCT agreed that the sampling performed was sufficient to define the nature and extent of contamination below 10 feet bgs. The analytical data, site conditions, and the fate-and-transport analysis suggest that the COPCs do not pose a threat to groundwater at any of the OU-3A sites except Site 16.

4. *Do the media being evaluated for a response action qualify for early action?*

No. None of the contaminants identified at the OU-3A sites pose an imminent risk to human health or the environment; they are stable in the physical system and are not expected to migrate from the site. Contaminated groundwater at Site 16 has moved off-site, but the vertical and horizontal extent of migration is very limited. At the present time, because this site is located in the middle of the runways at the Station, it is unlikely a well will be constructed at this site and used for domestic purposes. Therefore, it appears that this groundwater is not an imminent risk to human health or the environment.

RECOMMENDED ACTIONS

The data collected during the Phase I and II RIs were sufficient to characterize the nature and extent of contamination, perform a human-health risk assessment, and support decisions on the necessity for remedial actions at the OU-3A sites. Based on the results of the Phase I and II RIs, Comprehensive Environmental Response Compensation Liability Act (CERCLA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and applicable and relevant and appropriate requirements, remedial action is recommended to address contaminants in soil and sediment at Sites 12 and 21 and at soil and groundwater at Site 16. No remedial action is recommended for the remainder of the OU-3A sites. Recommended actions for the OU-3A sites are presented in Table ES-2. Site specific attachments present data limitations and Remedial Action Objectives (RAOs) for each of the OU-3A sites.

LANDFILLS UPDATE

OPERABLE UNIT 2B/C

MCAS EL TORO
Bernie Lindsey, Remedial Project Manager

ISSUES

- Feasibility Studies
- Classification
- Consolidation
- State Agency Concurrence

FEASIBILITY STUDIES

- Completed Fall 1996
- Responding To Comments
- ARARs Clarification
- Cover/Consolidation Design

CLASSIFICATION

- Municipal Solid Waste
- Military Specific Wastes

CONSOLIDATION

- Possibly Reduce Number of Landfills
- Reduce Footprint of Landfills
- Transfer Waste
- ARARs Clarification

STATE AGENCY CONCURRENCE

- Potentially Conflicting Comments
- Ramification of Consolidating Landfills
- Non-Prescriptive Cover Design

October 11, 1996

Cal/EPA

Department of Toxic Substances Control

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

Pete Wils Govern

James M. Stro Secretary j Environmen Protecti

Mr. Joseph Joyce
BRAC Environmental Coordinator
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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 tha 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

October 11, 1996

Cal/EPA

Department of Toxic Substances Control

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

Pete Wilso Governo

James M. Stroo Secretary fo Environmento Protectio

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

COMMENTS ON DRAFT PHASE II FEASIBILITY STUDY FOR SITE 24, OPERABLE UNIT 2A, 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 document dated August 9, 1996, prepared by Bechtel National, Inc. The report presents the results of a feasibility study (FS) conducted to identify and evaluate potential remedial action alternatives for volatile organic compounds (VOC)-contaminated soil and groundwater at Site 24. Site 24 is designated as potential VOC Source Area at MCAS El Toro. It is one of two OU-2A sites. Investigation of the other OU-2A site, the Major Drainages (Site 25), has been completed but not formally submitted to the agencies for review. We suggest that you add an addendum to this FS for the evaluation of Site 25 to conclude all OU-2A sites.

This letter is to transmit the enclosed Department of Toxic Substances Control (DTSC) comments and the Regional Water Quality Control Board comments dated October 8, 1996 on the report. The report is well written. A few clarifications and modifications are needed as outlined in the enclosed comments. Please incorporate the comments, where appropriate, and send us a response to comments along with a revised document. Thank you for your cooperation. If you have any questions, please call me at (310) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Base Closure Unit
Office of Military Facilities
Southern California Operations

Enclosures

cc: See Next Page

cc: Ms. Bonnie Arthur
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Mr. Roy Herndon
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Feasibility Study Report For Site 24, OU-2A
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. The report is well written. A few clarifications and modifications are needed as outlined in the comments below. Please incorporate the comments, where appropriate, into the revised document.

General Comments:

1. An alternative should be added to the FS which includes only the active remediation of Site 24 and excludes OU-1.

2. An alternative should be added to the FS which includes active remediation on-site and insitu remediation (natural attenuation) in the principal aquifer because it is unclear whether or not Alternative 11 proposes no action or natural attenuation of the principal aquifer.

3. The data and analysis generated by the SVE, air sparging, and aquifer pump test pilot studies should be included in the final draft of the FS and appropriate review time should be allotted. Additionally, in the future there should be a consensus with the BCT regarding submittal dates for work plans and reports concerning pilot studies.

Specific Comments:

1. **Executive Summary, Development of Remedial Alternatives, page v**

   The text is unclear whether or not Alternative 11 proposes no action or natural attenuation of the principal aquifer. If Alternative 11 proposes no action for the principal aquifer then the cost for groundwater monitoring should not be included.

2. Section 1.3.2 Relationship Between OU-2A and OU-1

The title should be revised because this section contains information regarding OU-2B, OU-2C, and OU-3.

3. Section 1.4.4.2, Stratigraphy, Figure 1-7

Cross-section B-B' on this figure should show a 1000 ppb contour.

4. Section 1.4.6.2, Saturated Zone, page 1-28

The text states that during the Phase II RI the horizontal characterization of VOCs were completed in groundwater. DTSC disagrees with this conclusion. Further horizontal delineation of VOCs in groundwater is needed down-gradient of Building 296. Also, further vertical delineation is needed in the area of 09_DGMW45. These data could be collected through pilot studies during the design phase.

5. Section 1.4.6.2, Saturated Zone, page 1-38

Regarding 24HCPT83, did the geologic material from which TCE was detected at 3100 ppb differs from the geologic material 16 feet deeper where the TCE was detected 26 ppb?

6. Section 1.4.7.3, Chemical Persistence, page 1-45

Although DTSC agrees that chemical and biological degradation of TCE is a minor component contributing to mass reduction, the rationale as to why the comparison of a field measured concentration to the regulatory concentration of TCE is used as an indicator of chemical and biological degradation should be provided.

7. Section 2.1, Development of Remedial Action Objectives

The National Contingency Plan (NCP) states that the "point of departure for excess cancer risk is 1E-06 and that risks estimated to fall in the range of 1E-06 up to 1E-04 should be managed on a case-by-case basis. The language in this section seems to state risks between 1E-06 and 1E-04 are always acceptable. Please change this section to conform with the NCP.

8. Section 2.1.4, Remedial Action Objectives, page 2-5

The fourth bullet under the Groundwater heading, as written, is not an RAO for Site 24. It is suggested to delete the fourth bullet and then modify the second bullet to include the fourth bullet.

9. Section 2.1.5.3, Cleanup to Background Level, page 2-9

Please provide further explanation as to the intended meaning of the last sentence in this section.

10. Section 2.4, Identification and Screening of Technology Types and Process Options, Table 2-8

Given the available information received at the BCT meetings Process Options - Oxygen enhancement and Air sparging should be identified as Not Applicable. As shown from the preliminary information generated from the pilot study, air sparging is not a feasible technology, therefore oxygen enhancement is not either. Furthermore, the known lithologies underlying Site 24 indicate clay and silt layers throughout the area similar to the lithologies where the air sparging pilot study took place.

11. Section 3.2, Alternative Screening Methodology, Table 3-1

This table should state "yes" in the column Retained for Evaluation for Alternative 2a because further evaluation of this alternative was provided in the document.

12. Section 4.2, Groundwater Modeling, page 4-4

Model input parameters resulting from the aquifer pump pilot study is not substantiated. Please include the field data and analyses from the aquifer pump tests in the draft final.

13. Section 4.3.1, In Situ Soil Vapor Extraction Description, page 4-6

This section cannot be reviewed with regard to the SVE well field design until the field data generated from the SVE pilot study is submitted to the agencies.

14. Section 4.4, Individual Evaluation of Remedial Alternatives, Figures 4-4 and 4-5

Show the location of Culver Drive on these figures to give the reviewer a better feel of where the model predicts the plumes to reach.

15. Section 4.4.2.1, Description of Shallow Groundwater Unit & Principal Aquifer, Figures 4-6 and 4-7

The presentation of the extraction and injection well fields are considered conceptual. It is assumed that there will be changes in the design phase. Also, as shown on the figures, it is difficult to evaluate the locations of the wells because the map scales are too small.

16. Section 4.4.3.2, Long-Term Effectiveness and Performance for Alter. 6a, page 4-38 & Section 4.4.5.2, Long-Term Effectiveness and Performance for Alter. 10, page 4-50

According to the model, shallow groundwater unit will be dewatered in approximately 17 years. This would cause downward hydraulic gradients to develop and mobilize TCE into deeper units. The BCT should discuss, at the design stage, the possibility of partial groundwater reinjection to flush the aquifer. Also, SVE treatment after the aquifer is dewatered.

17. Section 4.4.6. 2, Evaluation of Alternative 11 for Compliance with ARARS

Alternative 11 does not have an active component for remediation of the principal aquifer. This subsection should discuss compliance with ARARS for the principal aquifer.

18. Section 4.5.2, Compliance with ARARS, page 4-63

Reference to Alternative 61 is a typographical error. The correct reference is 6a. Also, the 1st sentence suggests that alternatives 2a, 6a, 9, 10, and 11 generally comply with their respective ARARS. See comment #17 above regarding Alternative 11.

19. Section 5, Pilot Testing

Please provide the SVE, air sparging, and groundwater extraction/injection pilot test reports for the testing conducted at Site 24 during Phase II RI/FS.

20. Section 6.1, Results of Remedial Alternatives Evaluation, page 6-2

The text states "Alternative 11 also facilitates natural attenuation of TCE in the principal aquifer in OU-1." but in Figure 3-1 it states "no action" for Alternative 11. No action does not equate to natural attenuation, although the terms are used interchangeable throughout the FS. The usage of these terms should be clarified and corrected as appropriate.

21. Section 6.2, Results of the Draft OU-1 IAFS

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.

22. Section 6.3.2, Horizontal Groundwater Extraction/Injection, page 6-4

DTSC agrees that a horizontal groundwater extraction/injection well may be a viable remedial technology, however, further information is needed before a pilot study is initiated. Information related to cost may be the determining factor as to the appropriateness of this alternative. This information can be compiled before initiating any field activities. Information should include, but not be limited to, comparative cost of vertical wells to horizontal well(s), additional piezometers needed to measure the influence of the horizontal well(s), and approach to capture zone analysis. The Navy may want to check with personnel associated with Sacramento Army Depot, where horizontal wells were successfully installed.

23. Section 6.3.3, Air Sparging Using Ozone, page 6-5

Given the preliminary results from the air sparging pilot studies, DTSC does not agree that a pilot study which involves air sparging using ozone should be conducted. Air sparging test results, as reported at the BCT meetings, showed that this remedial technology is not appropriate at Site 24, therefore it is reasonable to conclude that air sparging with ozone is also not appropriate for this site.

24. Appendix A, Table A2-3, Chemical-Specific 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 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_1) 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_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 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_o of 0.06 mg/kg-day and an RfD_1 of 0.057 mg/kg-day.

Table 4-1 in the Draft Final Risk Assessment gives the same RfD_o and $RfD_1$for dichlorodifluoromethane and 2-butanone, but his table shows no values for 2-hexanone. Risk-based concentrations for chemicals of potential concern are not shown in the human health risk assessment. PRGs are risk-based concentrations which do not contain any site-specific information.

25. Appendix A, Section A3.1.1, ARARS, Floodplains, page A3-8

The paragraph discussed the ARAR relevancy of section 66264.18(b), CCR, Title 22. Although the concentration of TCE in groundwater may not be classified as hazardous waste when managed, OU-2A addresses a situation where a pollutant is being remediated to prevent environmental degradation as is the purpose of the RCRA regulation. Discharging of contaminated groundwater to surface or injection would not be allowed if the groundwater was hazardous.

Also, for this non-hazardous groundwater, the contaminated groundwater should be handled like hazardous waste. That is why 66264.18(b) would be relevant. That section requires proper construction.

26. Appendix A, Section A4.2.1.1, ARARS, page A4-21

Reference to 22 CCR 66364.193 is a typographical error. The correct reference is 22 CCR 66264.193. Section 66264.193(c) requires leak detection if the unit cannot be inspected visually. The leak detection for underground piping can be placed in the annual of the double-walled pipe.

27. Appendix E, Table E2.31, page E-4

A footnote text is not provided for footnote letter (c) shown in the table. Also, the number of SVE samples calculated may not be accurate. Please explain how you arrived at the number.

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 FEASIBILITY STUDY REPORT (FS) SITE 24 OU-2A MARINE CORPS AIR STATION (MCAS) EL TORO

We have reviewed the subject report dated August 9, 1996 and received by us on August 9 1996. We have the following comments:

EXECUTIVE SUMMARY

Page iii, Nature and Extent of Contamination

The 4th paragraph, last sentence states, " Off-station, the maximum reported TCE concentration is 35 micrograms per liter. However , TCE in the principal aquifer has been detected at levels near 50 micrograms per liter in well MCAS -7 on 12/22/95, and above 34 micrograms per liter in various other wells; please explain these findings.

Page iv, Remedial Action Objectives

The second objective states, " minimize the off-station migration of VOC - contaminated groundwater in the shallow groundwater unit." Please define "minimize". We recommend control of off-station migration such that the contamination is contained and /or reduced through natural attenuation or treatment. The goal should be no migration beyond the established plume boundary.

SECTION 2 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Table 2-8 Page 2-47

The first process option, on page 2-47 , Natural Attenuation, states no action to implement and no direct cost. However, natural attenuation would incur costs to measure/evaluate if natural attenuation is effective. In addition, natural attenuation may require the additional installation of monitoring wells in strategic locations to aid in demonstrating its effectiveness.

SECTION 6 CONCLUSIONS AND RECOMMENDATIONS

Page 6-1

The second paragraph states, "the natural attenuation alternative requires implementation of a detailed groundwater monitoring plan to monitor the progress of remediation". In addition to monitoring natural attenuation progress, the alternative should also include a contingency plan to address the possibility that natural attenuation may not be progressing satisfactorily and active intervention may be necessary.

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

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

al/EPA

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ontrol

15 West Broadway,
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ng Beach, CA
)802-4444

Pete Wilson
Governo

James M. Strock
Secretary fo
Environmenta
Protection

November 1, 1996

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

FINAL TECHNICAL MEMORANDUM APPROVAL: BACKGROUND AND REFERENCE LEVELS REMEDIAL INVESTIGATION, 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 document dated October 1996, prepared by Bechtel National, Inc. The technical memorandum presents the procedures and results for the calculation of background concentrations for metals and reference levels for herbicides and pesticides in the soils at MCAS El Toro.

Cal/EPA is satisfied that comments emanating from our July 24, 1996 letter on the draft report has been adequately addressed in the final report. As such, we hereby approve the report. If you have any questions, please call Mr. Tayseer Mahmoud at (310) 590-4891.

Sincerely,

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

cc: Ms. Bonnie Arthur
U. S. Environmental Protection Agency
Region IX
Hazardous Waste Management Division, H-9-2
75 Hawthorne Street
San Francisco, California 94105-3901

cc: Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Peter Janicki
California Integrated Waste Management Board
8800 Cal Center Drive
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Mr. Andy Piszkin
Remedial Project Manager
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Mr. Tim Latas
Bechtel National, Inc.
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November 1, 1996

/EPA

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Governor

James M. Strock
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Mr. Joseph Joyce
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COMMENTS ON DRAFT PHASE II FEASIBILITY STUDY REPORT FOR THE MAGAZINE ROAD LANDFILL, SITE 2, OPERABLE UNIT 2B, 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 document dated September 6, 1996, prepared by Bechtel National, Inc. The report presents the results of a feasibility study (FS) conducted to identify and evaluate potential remedial action alternatives at Site 2, the Magazine Road Landfill. Site 2 is one of two sites in Operable Unit 2B for the MCAS El Toro.

This letter is to transmit the enclosed Department of Toxic Substances Control, California Integrated Waste Management Board, and Regional Water Quality Control Board comments dated September 30, 1996 and October 29, 1996, respectively. The draft report is well written. A few clarifications and modifications are needed as outlined in the enclosed comments. Please incorporate the comments, where appropriate, and send us a response to comments along with a revised document. Thank you for your cooperation. If you have any questions, please call me at (310) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Base Closure Unit
Office of Military Facilities
Southern California Operations

Enclosures

cc: See Next Page

cc: Ms. Bonnie Arthur
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Feasibility Study Report for Site 2, OU-2B
Marine Corps Air Station-El Toro
Dated September 6, 1996

The Department of Toxic Substances Control (DTSC) has reviewed the Draft Phase II FS Report for Site 2 landfill. The Document was reviewed by Mr. Tayseer Mahmoud, Remedial Project Manager for DTSC, and Ms. Sherrill Beard, Registered Geologist from DTSC's Geological Services Unit. The comments are directed to MCAS El Toro and their consultants. The report is well written. A few clarifications and modifications are needed as outlined in the comments below. Please incorporate the comments, where appropriate, into the revised document.

1. **Executive Summary, Remedial Action Objectives, page ES-11, last sentence**

   Please reference the decision document that supports the statement that BRAC Cleanup Team has agreed that treatment of the groundwater contamination is not necessary. This comment also applies to Section 3.1.4.

2. **Section 2.2.1.3, Geology and Hydrogeology, Figures 2-3 and 2-4**

   Typographical error, change B' to B shown on the index legend.

   Provide a symbol and explanation in the legend for the lithology symbol on the cross-section illustrated with solid black circles.

3. **Section 2.2.2.6, Groundwater, page 2-35**

   As previously stated in the review of the remedial investigation at Site 2, DTSC still suggests it be necessary to generate background values for gross alpha and beta activity to determine if the values detected in groundwater samples collected from landfill monitoring wells are impacted as a result of leachate or similar values are detected throughout the Station.

   Another acceptable approach to handle this issue is to conduct isotopic analysis because gross alpha does not help too much in determining whether or not there is an actual release from the landfill. The Navy's response to RI comments #11 for Sites 3 and 5, prepared by Bechtel, indicates that isotopic analysis is

planned to be incorporated into the groundwater monitoring plan for MCAS El Toro. Please enure that isotopic analysis is performed when the next round of groundwater monitoring takes place.

4. **Section 2.2.3.1, Contaminant Persistence (Persistence of Metals), second paragraph, page 2-42**

Provide the necessary data and discussion to support statements regarding metals concentration and correlation, or lack of correlation, to turbidity (unfiltered samples?). It is confusing as to the purpose of such a limited discussion.

5. **Section 2.2.3.1, Contaminant Persistence (Persistence of Metals), third paragraph, page 2-42**

While the Eh - pH diagram shown in Figure 2-15 suggest that chromium detected in groundwater samples may only be present in the trivalent state, the assumption is that the system is in equilibrium and the Eh values are accurate. Reality is that hexavalent chromium is often detected in groundwater samples from impacted sites that exhibit a geochemical profile that would suggest hexavalent chromium should not be detected. In fact, given the higher solubility of hexavalent chromium with respect to trivalent, if dissolved chromium is present, a significant portion is probably in the hexavalent state. Furthermore, given the weight hexavalent chromium carries with respect to a risk assessment as compared with trivalent chromium, to resolve this issue, water-quality samples should be analyzed for hexavalent chromium. Please note that any such samples need to be analyzed within 24 hours of collection.

6. **Section 2.2.3.1, Contaminant Persistence (Persistence of Metals), fourth paragraph, page 2-44**

What is the significance of the discussion concerning nickel?

7. **Section 2.2.3.1, Contaminant Persistence, Figure 2-16**

The title of this figure should include a descriptor that reflects the uncertainty of the oxidation - reduction zone boundaries.

8. Section 2.2.3.2, Contaminant Migration (infiltration), page 2-47

This section states that leaching of VOCs from the landfill appears to be relatively insignificant, however, elevated concentrations of TCE and PCE in groundwater have been detected. Provide further explanation and data to support this section.

9. Section 2.2.3.2, Contaminant Migration (infiltration), page 2-48

Are there other indicators, additional field data, or further evaluation that may be used to determine if metals are leaching from the landfill? As the discussion stands, it is unclear as to the groundwater impact from metals.

10. Section 4.3, Alternative 3, Single -Layer Cap, Figure 4-1

Show location of cross section I-I' on figure 4-1.

11. Tables 5-1 through 5-10, Cost-Estimate Summary

The 20-percent contingency has not been applied to operation and maintenance costs. This is inconsistent with Appendix E, Section E4.1, page E4-1 which states that the contingencies are 20-percent of direct and indirect capital cost and operation and maintenance costs.

12. Section 5.2.1.2, Evaluation, State and Community Acceptance, page 5-5

Please change the text from California DTSC to Cal/EPA. Cal/EPA includes DTSC, RWQCB, CIWMB, etc. Please make the changes throughout the document.

13. Section 5.2.5, Alternative 5, Short-Term Effectiveness, page 5-34, 1st paragraph

Delete reference to an additional 2-foot-thick vegetative soil layer because we are not comparing Alternative 5 with Alternative 4. The statement would be appropriate in Section 5, Comparative Analysis of Alternatives. This comment also applies to Alternatives 5-b and 5-c.

14. Appendix A, Applicable or Relevant and Appropriate Requirements (ARARs)

The Tables of ARARs and the written sections are well organized making the ARARs analysis easy. We have the following general comments that could apply to all the landfill sites:

A. The reason(s) that an ARAR was determined to be "not an ARAR" should be written in the column headed "Comments". We note that few citations determined "not an ARAR" without a reason provided in the "Comments" column.

B. The Navy did not address all the submitted potential ARARs that DTSC solicited from the agencies. The Navy should analyze all the submitted ARARs using the same format used for the appendices tables.

C. In the section "Resource Conservation and Recovery Act Requirements", the Navy discussed the issue whether or not California RCRA authorized program made Title 22 regulations federal regulations. Please see the attached in-house memorandum dated August 25, 1995, from DTSC's Staff Counsel which disagrees with the assertion that DTSC's regulations are federal ARARs.

15. Appendix B, Proposed Monitoring Plan, Section B2.3, Monitoring and Reporting Frequency, page B2-2

As a signatory to the Record of Decision for the landfill, we expect the Navy to submit the reporting requirements to DTSC. Please add DTSC as a recipient to all monitoring and reporting requirements due to all other agencies. DTSC is the designated one voice for Cal/EPA that will coordinate comments and approval of reports. This comment also applies to Sections B2.4, B3.3, B3.4, B4.3, B4.4, B4.5, and B5.1.

16. Appendix B, Proposed Monitoring Plan, Section B4.3, Groundwater Monitoring and Reporting Frequency, page B4-1

For the purposed of the Site 2 FS, the groundwater monitoring plan and reporting frequency are acceptable. However, the operation and maintenance plan and/or remedial phase should include reporting procedures and a fully developed groundwater monitoring plan.

17. Appendix B, Proposed Monitoring Plan, Section 4.4, Corrective Action, page B4-2

Include in this section further discussion detailing the elements that would lead toward corrective action. A clearly outlined contingency plan should be included in the FS. The Navy should provide information such as the following: Define what is meant by "significant change from conditions presented in the RI". What procedure would be followed if "significant change" does occur? How soon after a significant change will a validation groundwater sample be collected? What if the second groundwater sample does not validate the first sample collected? What if it does? Answers to these and other related questions need to be clearly outlined in the FS.

18. Appendix B, Proposed Monitoring Plan, Section B5.5, Site Security Inspection, page B5-3

Inspection and maintenance of the bench mark for the landfill should be added to the list of signs to be inspected during postclosure.

STATE OF CALIFORNIA—CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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P.O. Box 806
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M E M O R A N D U M

TO: Isaac Hirbawi
Remedial Program Manager
Office of Military Facilities
Southern California Operations
Department of Toxic Substances Control
Region 4
245 West Broadway Suite 245
Long Beach, California 90802

FROM: Ramon B. Perez
Senior Staff Counsel
Office of Legal Counsel

DATE: August 25, 1995

SUBJECT: ARARS REVIEW -- CAMP PENDLETON

Pursuant to your request, I reviewed the ARARs for Site 9, Camp Pendleton. The document contains a serious misstatement of the law, relating to the reference to state regulations as federal ARARs.

The last paragraph of page B-3 states that 22 California Code of Regulations (Calif. Code of Reg.) 66264.94 is a federal ARAR "because it was approved by the United States Environmental Protection Agency (U.S. EPA) in its July 23, 1992 authorization of the State of California's RCRA program and is federally enforceable." As was stated in Volume 57, federal register 32726, July 23, 1992, California applied for, and was granted final authorization, under the provisions of RCRA, to operate its state hazardous waste control program in lieu of the federal hazardous waste program. When this takes place, the federal requirements no longer apply in the authorized state. California was granted final authorization limited only by the provisions of the Hazardous and Solid Waste Amendments of 1984 (HSWA). New requirements and prohibitions imposed by HSWA are enforceable by U.S. EPA. Subject to this limitation, the provisions of the state hazardous waste control program are provisions of state law, and are not "federally enforceable."

This issue was made clear in United States v. State of Colorado, 990F.2d 1565 (1993). The court considered the issue of "whether a state which has been authorized by the Environmental Protection Agency to 'carry out' the state's hazardous waste program 'in lieu of' RCRA... is precluded from doing so at a ... facility owned and operated by the federal government." The Court stated:

> "As a federal facility, the arsenal is subject to regulation under RCRA... More importantly, because the EPA has delegated RCRA authority to Colorado, the Arsenal is subject to regulation under CHWMA (Colorado state law)"

Lastly, U.S. EPA published a list of examples of potential state ARARs at 55 fed reg 8765 (March 8, 1990). Among the examples listed are the requirements of authorized state hazardous waste control programs.

In conclusion, we disagree with the assertion that the DTSC's regulations are federal ARARs. For the above stated reasons, we conclude that these regulations are state ARARs.

I hope that these comments will be of help to you. Please call me if you have any questions.

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 29, 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 PHASE II FEASIBILITY STUDY, OPERABLE UNIT 2B - SITE 17 AND SITE 2, MARINE CORPS AIR STATION EL TORO, CTO - 0076/O240,0246**

We have reviewed the subject reports dated September 6, 1996 and received by us on the same date. We have the following comments:

1. Beside providing a cap for the landfill, no other corrective action measures to remediate metal and VOCs contaminated groundwater are identified in the draft feasibility study. Will there be other corrective action measures such as the installation of passive gas venting systems or an active gas collection system, pump and treat system, etc. for groundwater remediation?

   Note: Groundwater beneath Site 17 landfill contains metals such as manganese, selenium, and thallium above USEPA MCLs; VOCs are detected but are below MCLs. For Site 2 Landfill, PCE and TCE in the groundwater are detected above MCLs. Since the beneficial uses of the groundwater basin (Irvine Forebay I) beneath the site include municipal and domestic supply, groundwater contaminated by VOCs and metals above MCLs should be remediated. Capping the landfills will minimize further groundwater degradation but may not remediate the groundwater. However, if metals/VOCs in groundwater are contained and monitored, groundwater remediation may not be necessary. Installing a passive gas venting system and capping the landfill may be sufficient.

2. Cover design alternatives such as Alternatives 4a, 4b, 4c, 4d, 5c, and 5d are acceptable to us. Criteria used for acceptance: The selected cover design must offer equivalent waste containment capability to the Title 23 prescriptive cover. Alternatives 4a, 4b, 4c, 4d, 5c, and 5d meet this performance criteria.

   We recommend a monolithic cover (4-6' of silty sand material with 10^{-5} cm/s permeability, depending on the depth of the root systems of the vegetation selected) in semi-arid/arid region. If El Toro MCAS is designated as semi-arid climate, then a monolithic cover (Alternative 3) is a good idea. Eventhough the HELP model run result shows that Alternative 3 does not offer equivalent water quality protection when compared to the prescriptive cover, we believe that the equivalency can be demonstrated by selecting the appropriate vegetation type and thickness for the cover, maintaining a certain moisture level within the cover (if necessary, an irrigation system may be installed), and selecting the appropriate unsaturated flow model to predict the amount of flow through the cover.

Because of many variables that will affect the moisture content of the cover, moisture monitoring of the monolithic cover may be necessary to effectively minimize water flow through the unsaturated zone .

3. The draft FS mentioned that GCL barrier is more likely than clay to be penetrated by burrowing animals or by root systems of grasses or shrubs, and that GCL when dry is not impermeable to gas. The type of GCL that may be used is not identified in the draft FS. Is the GCL going to be a layer of clay bound by upper and lower geotextiles (e.g. Claymax, Bentomat, Bentofix) or a layer of clay bound to a geomembrane (e.g. Gundseal)? Will the use of Gundseal minimize penetration by burrowing animals or by root systems of grass, and create an impermeable surface to gas flow?

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

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

Cal. EPA

California Environmental Protection Agency

Integrated Waste Management Board

8800 Cal Center Dr.
Sacramento CA 95826
(916) 255-2200

SEP 3 0 1996

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Review of Draft Phase II Feasibility Study Report for Operable Unit 2B - Site 2, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

We have reviewed the subject document dated September 1996, prepared by Bechtel National, Inc., on behalf of the Department of the Navy. The California Integrated Waste Management Board (Board) staff have reviewed this submittal for conformance with Title 14, California Code of Regulations, Division 7 (14 CCR), Chapter 3, Article 7.8. These regulations consist of potential applicable or relevant and appropriate requirements for the Site 2 Landfill.

Based on our review, we submit the following comments:

General Comments

1. For ease of review, we request that the landfill gas monitoring results retain consistent units throughout the text.

2. Since the previously reviewed Remedial Investigation Report did not include an adequate lateral/vertical waste extent investigation, it is unclear if the past gas surveys are fully representative of landfill gas concentrations at the site or how the depths of the proposed landfill gas monitoring probes have been chosen.

3. For the analyses of costs associated with each of the final cover alternatives, it should be clarified that the postclosure maintenance costs are provided on a per year basis.

4. The analyses of the proposed final cover alternatives do not account for soil loss resulting from surface erosion. Specifically, soil loss analyses should be conducted for the proposed final site configuration. A commonly used method to evaluate soil losses is the Universal Soil Loss Equation with acceptable soil loss not exceeding two tons per acre per year.

5. Similarly, the drainage system design considered for this project must be supported by appropriate drainage calculations yielding channel sizing and validating energy dissipating features (if present). In addition, the issue of flow capacity of the downsteam facilities should be included. Sediment load must be included in channel sizing calculations.

6. When analyzing final cover costs, the costs related to construction of a final cover test pad should be included when applicable.

7. The Feasibility Study Report does not include a description of the long-term plan for postclosure land use for both the landfill and the surrounding areas. Certain postclosure land uses may potentially affect the performance of some low permeability materials.

8. For the alternatives proposing the use of synthetic or geocomposite low permeability materials, the need for a drainage layer should be discussed.

9. If waste consolidation is to be considered as a part of the landfill closure, more specific information about the volume and type of waste to be relocated must be provided. Also, the proposed grading plan must account for the additional waste when developing the landfill configuration.

Specific Comments

10. Figure 4-3, Typical Drainage Cross Sections, should include final cover materials on the drainage system cross-sections. Specifically, anchoring points for the synthetic and geocomposite materials, and keying locations for earth materials should be shown

11. Section B.2.3, Landfill Gas Monitoring and Reporting Frequency, states that the perimeter landfill gas monitoring will be conducted semiannually for the first five years following landfill closure. In accordance with 14 CCR, 17783.11, these inspections should be conducted quarterly, at least until the landfill gas situation stabilizes and monitoring results become consistent.

12. Section B.5.1, Landfill Cap Inspection, states that the final cover will be inspected monthly for the first six months after site capping and then semiannually for the next four and one-half years, and annually for the remaining 25 years. Cap inspections should be conducted on a quarterly frequency and following major storm events until full site revegetation occurs. Upon site condition stabilization, a lesser frequency may be proposed.

13. Section B.5.2, Drainage System Inspection, should state that the drainage system will be monitored quarterly and after major storm events, until site conditions stabilize; upon approval, a lesser frequency may be then allowed. Also, it should be stated that repairs and maintenance of the drainage system will be conducted prior to the next storm event.

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,

Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

November 4, 1996

Cal. A

Department of Toxic Substances Control

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

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

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

COMMENTS ON DRAFT PHASE II FEASIBILITY STUDY REPORT FOR THE COMMUNICATION STATION LANDFILL, SITE 17, OPERABLE UNIT 2B, 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 document dated September 6, 1996, prepared by Bechtel National, Inc. The report presents the results of a feasibility study (FS) conducted to identify and evaluate potential remedial action alternatives at Site 17, the Communication Station Landfill. Site 17 is one of two sites in Operable Unit 2B for the MCAS El Toro.

This letter is to transmit the enclosed Department of Toxic Substances Control, California Integrated Waste Management Board, and Regional Water Quality Control Board comments dated September 30, 1996 and October 29, 1996, respectively. The draft report is well written. A few clarifications and modifications are needed as outlined in the enclosed comments. Please incorporate the comments, where appropriate, and send us a response to comments along with a revised document. Thank you for your cooperation. If you have any questions, please call me at (310) 590-4891.

Sincerely,

Tayseer Mahmoud
Remedial Project Manager
Base Closure Unit
Office of Military Facilities
Southern California Operations

Enclosures

cc: See Next Page

cc: Ms. Bonnie Arthur
U. S. Environmental Protection Agency
Region IX
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75 Hawthorne Street
San Francisco, California 94105-3901

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Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Peter Janicki
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Mr. Steven Sharp
County of Orange
Environmental Health Division
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2009 E. Edinger Avenue
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Mr. Tim Latas
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401 West A street, Suite 1000
San Diego, California 92101-7905

Mr. Andy Piszkin
Remedial Project Manager
Naval Facilities Engineering Command
Southwest Division, Code 1831.AP
1220 Pacific Highway
San Diego, California 92132-5187

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Feasibility Study Report For Site 17, OU-2B
Marine Corps Air Station-El Toro
Dated September 6, 1996

The Department of Toxic Substances Control (DTSC) has reviewed the Draft Phase II FS for Site 17 landfill. The Document was reviewed by Mr. Tayseer Mahmoud, Remedial Project Manager for DTSC, and Ms. Sherrill Beard, Registered Geologist from DTSC's Geological Services Unit. The comments are directed to MCAS El Toro and their consultants. The report is well written. A few clarifications and modifications are needed as outlined in the comments below. Please incorporate the comments, where appropriate, into the revised document.

1. **Executive Summary, Remedial Action Objectives, page ES-9, last sentence**

   Please reference the decision document that supports the statement that BRAC Cleanup Team has agreed that treatment of the groundwater contamination is not necessary. This comment also applies to Section 3.1.4.

2. **Section 2.2.1.3, Geology and Hydrogeology, page 2-7**

   How was the gradient of 0.15 feet per foot determined?

   Are there adequate lithologic data to support the statement that the physical characteristics for sediments at Site 17 are similar to Site 2, and where can the results be found that support permeability and effective porosity to determine average linear flow velocities under the Site 17 landfill?

3. **Section 2.2.2.1, Extent of Landfill Wastes, page 2-8**

   The text states that "The boundary of the landfill wastes in shown on Figure 2-1", however, the title of Figure 2-1 is "Site Topography and Surface Features". This discrepancy is misleading and should be reconciled.

   If the actual landfill boundaries are to be shown on a figure, question marks should be included on the boundary lines where there is uncertainty.

4. Section 2.2.2.6, Groundwater, page 2-20

The text states that "...total and dissolve arsenic, chromium, and nickel concentrations were generally found to be higher downgradient of the landfill." According to Appendix K of the Draft RI for Site 17, monitoring wells 17NEW1 and 17NEW 2 are screened in different geologic formations, therefore it is not appropriate to compare constituent concentration.

Does total and dissolved refer to unfiltered and filtered groundwater samples, and if so, please state it in the text?

The text states that gross beta activity has been reported in groundwater samples. This statement is vague, therefore, provide clarification as to the implications of gross beta activity.

5. Section 2.2.3.1 Contaminant Persistence (Persistence of Metals), page 2-27

There is not enough data to correlate dissolved and total metals concentration to turbidity.

While the Eh - pH diagram shown in Figure 2-12 suggests that chromium detected in groundwater samples may only be present in the trivalent state, the assumption is that the system is in equilibrium and the Eh values are accurate. Reality is that hexavalent chromium is often detected in groundwater samples from impacted sites that exhibit a water-quality profile that would suggest hexavalent chromium should not be detected. Furthermore, given the weight hexavalent chromium carries with respect to a risk assessment as compared with trivalent chromium, to resolve this issue, water-quality samples should be analyzed for hexavalent chromium.

What is the significance of the discussion concerning nickel?

6. Section 2.2.3.2, Contaminate Migration, page 2-35

Please provide reference to the evidence to support values for gradient and linear groundwater velocities.

There are three monitoring wells screened in two different formations located at Site 17. What evidence was collected to support the conceptual model of aerobic and anaerobic groundwater conditions as shown on Figure 2-13?

Provide further information to support that the migration of nickel is due to the reduction and oxidation conditions and logic as to why metals with similar chemical characteristics are not affected. It is reported in Section 2.2.2.6 that arsenic and chromium concentrations increased downgradient. The discussion in Section 2.2.3.2 and Section 2.2.2.6 should be consistent.

7. Tables 5-1 through 5-10, Cost-Estimate Summary

The 20-percent contingency has not been applied to operation and maintenance costs. This is inconsistent with Appendix E, Section E4.1, page E4-1 which states that the contingencies are 20-percent of direct and indirect capital cost and operation and maintenance costs.

8. Section 5.2.1.2, Evaluation, State and Community Acceptance, page 5-5

Please change the text from California DTSC to Cal/EPA. Cal/EPA includes DTSC, RWQCB, CIWMB, etc. Please make the changes throughout the document.

9. Section 5.2.5, Alternative 5, Short-Term Effectiveness, page 5-33, 1st paragraph

Delete reference to an additional 2-foot-thick vegetative soil layer because we are not comparing Alternative 5 with Alternative 4. The statement would be appropriate in Section 5, Comparative Analysis of Alternatives. This comment also applies to Alternatives 5-b and 5-c.

10. Appendix A, Applicable or Relevant and Appropriate Requirements (ARARs)

The Tables of ARARs and the written sections are well organized making the ARARs analysis easy. We have the following general comments that could apply to all the landfill sites:

A. The reason(s) that an ARAR was determined to be "not an ARAR" should be written in the column headed "Comments". We note that few citations determined "not an ARAR" without a reason provided in the "Comments" column.

B. The Navy did not address all the submitted potential ARARs that DTSC solicited from the agencies. The Navy should analyze all the submitted ARARs using the same format used for the appendices tables.

C. In the section "Resource Conservation and Recovery Act Requirements", the Navy discussed the issue whether or not California RCRA authorized program made Title 22 regulations federal regulations. Please see the attached in-house memorandum dated August 25, 1995, from DTSC's Staff Counsel which disagrees with the assertion that DTSC's regulations are federal ARARs.

11. Appendix B, Proposed Monitoring Plan, Section B2.3, Monitoring and Reporting Frequency, page B2-2

As a signatory to the Record of Decision for the landfill, we expect the Navy to submit the reporting requirements to DTSC. Please add DTSC as a recipient to all monitoring and reporting requirements due to all other agencies. DTSC is the designated one voice for Cal/EPA that will coordinate comments and approval of reports. This comment also applies to Sections B2.5, B3.3, B3.4, B4.3, B4.4, B4.5, and B5.1.

12. Appendix B, Proposed Montoring Plan, Section B3.2, Proposed Vadose Zone Monitoring Network, page B3-2

This section states that "Soil-pore liquid within the vadose zone will be monitored by collecting liquid samples from the existing lysimeters." However, the draft Final Phase II RI (Vol. 1, Page 4-74, Section 4.5 Leachate) and the Draft FS (Page 2-19, Section 2.2.2.5) states that purging of the lysimeters was unsuccessful, and therefore, no moisture (or leachate) samples were collected. Has any attempt been made to determine whether represented samples can be obtained from the lysimeters?

13. Appendix B, Proposed Monitoring Plan, Section B4.3, Groundwater Monitoring and Reporting Frequency, page B4-1

For the purpose of the Site 17 FS, the groundwater monitoring plan and reporting frequency are acceptable. However, the operation and maintenance plan and/or remedial phase should include reporting procedures and a fully developed groundwater monitoring plan.

14. Appendix B, Proposed Monitoring Plan, Section 4.4, Corrective Action, page B4-2

Include in this section further discussion detailing the elements that would lead toward corrective action. A clearly outlined contingency plan should be included in the FS. The Navy should provide information such as the following: Define what is meant by "significant change from conditions presented in the RI". What procedure will be followed if "significant change" does occur? How soon after a significant change will a validation groundwater sample be collected? What if the second groundwater sample does not validate the first sample collected? What if it does? Answers to these and other related questions need to be clearly outlined in the FS.

15. Appendix B, Proposed Monitoring Plan, Section B5.5, Site Security Inspection, page B5-3

Inspection and maintenance of the bench mark for the landfill should be added to the list of signs to be inspected during postclosure.

STATE OF CALIFORNIA—CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
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M E M O R A N D U M

TO: Isaac Hirbawi
Remedial Program Manager
Office of Military Facilities
Southern California Operations
Department of Toxic Substances Control
Region 4
245 West Broadway Suite 245
Long Beach, California 90802

FROM: Ramon B. Perez
Senior Staff Counsel
Office of Legal Counsel

DATE: August 25, 1995

SUBJECT: ARARS REVIEW -- CAMP PENDLETON

Pursuant to your request, I reviewed the ARARs for Site 9, Camp Pendleton. The document contains a serious misstatement of the law, relating to the reference to state regulations as federal ARARs.

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> "As a federal facility, the arsenal is subject to regulation under RCRA... More importantly, because the EPA has delegated RCRA authority to Colorado, the Arsenal is subject to regulation under CHWMA (Colorado state law)"

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In conclusion, we disagree with the assertion that the DTSC's regulations are federal ARARs. For the above stated reasons, we conclude that these regulations are state ARARs.

I hope that these comments will be of help to you. Please call me if you have any questions.

State of California

Memorandum

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

Date: October 29, 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 PHASE II FEASIBILITY STUDY, OPERABLE UNIT 2B - SITE 17 AND SITE 2, MARINE CORPS AIR STATION EL TORO, CTO - 0076/O240,0246**

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1. Beside providing a cap for the landfill, no other corrective action measures to remediate metal and VOCs contaminated groundwater are identified in the draft feasibility study. Will there be other corrective action measures such as the installation of passive gas venting systems or an active gas collection system, pump and treat system, etc. for groundwater remediation?

   Note: Groundwater beneath Site 17 landfill contains metals such as manganese, selenium, and thallium above USEPA MCLs; VOCs are detected but are below MCLs. For Site 2 Landfill, PCE and TCE in the groundwater are detected above MCLs. Since the beneficial uses of the groundwater basin (Irvine Forebay I) beneath the site include municipal and domestic supply, groundwater contaminated by VOCs and metals above MCLs should be remediated. Capping the landfills will minimize further groundwater degradation but may not remediate the groundwater. However, if metals/VOCs in groundwater are contained and monitored, groundwater remediation may not be necessary. Installing a passive gas venting system and capping the landfill may be sufficient.

2. Cover design alternatives such as Alternatives 4a, 4b, 4c, 4d, 5c, and 5d are acceptable to us. Criteria used for acceptance: The selected cover design must offer equivalent waste containment capability to the Title 23 prescriptive cover. Alternatives 4a, 4b, 4c, 4d, 5c, and 5d meet this performance criteria.

   We recommend a monolithic cover (4-6' of silty sand material with 10^{-5} cm/s permeability, depending on the depth of the root systems of the vegetation selected) in semi-arid/arid region. If El Toro MCAS is designated as semi-arid climate, then a monolithic cover (Alternative 3) is a good idea. Eventhough the HELP model run result shows that Alternative 3 does not offer equivalent water quality protection when compared to the prescriptive cover, we believe that the equivalency can be demonstrated by selecting the appropriate vegetation type and thickness for the cover, maintaining a certain moisture level within the cover (if necessary, an irrigation system may be installed), and selecting the appropriate unsaturated flow model to predict the amount of flow through the cover.

Because of many variables that will affect the moisture content of the cover, moisture monitoring of the monolithic cover may be necessary to effectively minimize water flow through the unsaturated zone .

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

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

Cal/EPA

California
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Pete Wilson
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James M. Strock
*Secretary for
Environmental
Protection*

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Review of Draft Phase II Feasibility Study Report for Operable Unit 2B - Site 17, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

We have reviewed the subject document dated September 1996, prepared by Bechtel National, Inc., on behalf of the Department of the Navy. The California Integrated Waste Management Board (Board) staff have reviewed this submittal for conformance with Title 14, California Code of Regulations, Division 7 (14 CCR), Chapter 3, Article 7.8. These regulations consist of potential applicable or relevant and appropriate requirements for the Site 17 Landfill.

Based on our review, we submit the following comments:

General Comments

1. Landfill areas "C" and "D" do not appear on all appropriate drawings.

2. A more accurate estimate of waste quantities contained in areas "C" and "D" should be provided in order to validate the proposed grading plan. Also, the text must discuss an action plan for waste removal, underlying soil verification testing, and regrading activities.

3. Since the previously reviewed Remedial Investigation Report did not include an adequate lateral/vertical waste extent investigation, it is unclear how the depths of the landfill gas monitoring probes have been chosen.

4. For the analyses of costs associated with each of the final cover alternatives, it should be clarified that the postclosure maintenance costs are provided on a per year basis.

5. The analyses of the proposed final cover alternatives do not account for soil loss resulting from surface erosion. Specifically, soil loss analyses should be conducted for the proposed final site configuration. A commonly used method to evaluate soil losses is the Universal Soil Loss Equation with acceptable soil loss not exceeding two tons per acre per year.

6. Similarly, the drainage system design considered for this project must be supported by appropriate drainage calculations yielding channel sizing and validating energy dissipating features (if present). In addition, the issue of flow capacity of the downstream facilities should be included. Sediment load must be included in channel sizing calculations.

7. When analyzing final cover costs, the costs related to construction of a final cover test pad should be included when applicable.

8. The Feasibility Study Report does not include a description of the long-term plan for postclosure land use for both the landfill and the surrounding areas. Certain postclosure land uses may potentially affect the performance of some low permeability materials.

9. For the alternatives proposing the use of synthetic or geocomposite low permeability materials, the need for a drainage layer should be discussed.

Specific Comments

10. Figure 4-3, Typical Drainage Cross Sections, should include final cover materials on the drainage system cross-sections. Specifically, anchoring points for the synthetic and geocomposite materials, and keying locations for earth materials should be shown

11. Section A.4.1.2 cites Article 7.8 of Title 23 CCR, which should be changed to Article 7.8 of Title 14 CCR.

12. Section B.2.3, Landfill Gas Monitoring and Reporting Frequency, states that the perimeter landfill gas monitoring will be conducted semiannually for the first five years following landfill closure. In accordance with 14 CCR, 17783.11, these inspections should be conducted quarterly, at least until the landfill gas situation stabilizes and monitoring results become consistent.

13. Section B.5.1, Landfill Cap Inspection, states that the final cover will be inspected monthly for the first six months after site capping and then semiannually for the next four and one-half years, and annually for the remaining 25 years. Cap inspections should be conducted on a quarterly basis and following major storm events until full site revegetation occurs. Upon site condition stabilization, a lesser frequency may be proposed.

14. Section B.5.2, Drainage System Inspection, should state that the drainage system will be monitored quarterly and after major storm events, until site conditions stabilize; upon approval, a lesser frequency may be then allowed. Also, it should be stated that repairs and maintenance of the drainage system will be conducted prior to the next storm event.

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,

Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

Cal/EPA

Department of
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November 4, 1996

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Mr. Joseph Joyce
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DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT: PERIMETER ROAD LANDFILL, SITE 5, OPERABLE UNIT 2C, 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 document dated October 1996, prepared by Bechtel National, incorporated. The report presents the results of Remedial Investigation (RI) conducted at Site 5, the Perimeter Road Landfill. Site 5 is one of two sites in Operable Unit 2C for the MCAS El Toro.

Cal/EPA will accept the final RI report if the enclosed Department of Toxic Substances Control Staff Toxicologist specific comments that pertain to Site 5 dated October 31, 1996 and California Integrated Waste Management Board (CIWMB) comments dated October 18, 1996 are addressed in the final RI report. I would like to direct your attention to the enclosed CIWMB comments dated October 25, 1996 regarding potential reuse issues associated with the site. If you have any questions, please call Mr. Tayseer Mahmoud at (310) 590-4891.

Sincerely,

Anita A. Gallagher

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

Enclosures

cc: See Next Page

cc: Ms. Bonnie Arthur
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MEMORANDUM

TO: Tayseer Mahmoud
Office of Military Facilities (OMF)
Region 4, Long Beach

FROM: John P. Christopher, Ph.D., D.A.B.T.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: 31 October 1996

SUBJECT: MCAS El Toro: Technical Memorandum on Background Levels of Inorganics; Responses to Comments and Draft Final RI Reports for Sites 3 and 5
PCA: 14740 Site: 400055-47

Background

Region 4 OMF has asked HERD for continuing support on issues regarding risk assessment at Marine Corps Air Station (MCAS) El Toro, a closing base in Orange County which is also designated a Federal Superfund site. Remedial activities at this base are being directed by Naval Facilities Engineering Command, Southwest Division (SWDIV).

We had presented our comments on an earlier draft in a memorandum dated 22 July 1996.Sites 3 and 5 are landfills located near the southeast border of the base. We presented our comments in memoranda dated 7 and 10 June 1996 on the baseline risk assessments for these sites which were part of the Phase I Remedial Investigations (RI). Four of the five documents reviewed here are the Navy's responses to those comments and the Draft Final RI Reports (RIR). The fifth document is a technical memorandum on ambient levels of metals in soil.

Documents Reviewed

We reviewed the following five documents, all prepared by Bechtel National, Inc., contractors to SWDIV:

1. Final Technical Memorandum, Background and Reference Levels, Remedial Investigations, Marine Corps Air Station El Toro, California, CTO-0076/0272". October 1996.

2. "Response to Comments, Draft Phase II Remedial Investigation Report for Site 3, OU-2C, MCAS El Toro", dated 23 September 1996.

3. "Draft Final Phase II Remedial Investigation Report, Operable Unit 2C - Site 3, Marine Corps Air Station El Toro, California, CTO 0076/0243", dated October 1996.

4. "Response to Comments, Draft Phase II Remedial Investigation Report for Site 5, OU-2C, MCAS El Toro", dated 23 September 1996.

5. "Draft Final Phase II Remedial Investigation Report, Operable Unit 2C - Site 5, Marine Corps Air Station El Toro, California, CTO 0076/0244", dated October 1996.

We received requests to review these documents on 7 October (#2-5) and 17 October 1996 for (#1).

Scope of Review

The documents were reviewed for scientific content. Minor grammatical or typographical errors that do not affect interpretation were not noted; however, these should be corrected in future versions of the documents. We assume that sampling of environmental media, analytical chemistry data, and quality assurance procedures have been examined by regional personnel. If inadequacies in these areas with respect to risk assessment were encountered, they are noted below. Future changes or additions to the document should be clearly identified.

General Comments

The Navy's analysis of background metals in soil is acceptable. Responses to our comments and changes in text for the Draft Final RIRs for Sites 3 and 5 are acceptable with two exceptions. First, the Navy must re-examine its conclusions regarding the importance of groundwater as a transport medium , because risks to future off-site residents are driven by chromium which might be hexavalent. Second, the ecological risk assessment for Site 5 omitted three metals as constituents of potential concern (COPC).

Specific Comments

1. **Technical Memorandum on Background:** The technical memorandum is acceptable. The Navy was correct to remove a few high values for cadmium and nickel from the ambient sets. The approach shown in Figure 2 accurately represents the compromise worked out in San Francisco in May 1996 among the Department, USEPA Region IX, and the Navy.

2. **Exposure Point Concentrations:** Uncertainties associated with using C_{MAX} as exposure point concentrations are adequately addressed in the sections on uncertainties in the Draft Final RIRs for Sites 3 and 5.

3. **Hexavalent Chromium in Groundwater:** This following refers to the Navy's responses to our comment #14 for Site 3, "Fate and Transport in Groundwater" and our comment #4 for Site 5, "Hexavalent Chromium". Nearly all the estimated risk for a potential future residents at both Sites 3 and 5 comes from groundwater, but the Navy states in conclusions for both sites that fate and transport in this medium is not significant. The Navy did not speciate valence states of chromium, so total chromium was taken to be all hexavalent. Chromium drives the risk estimate, which is >1E-04, a level customarily thought to be highly significant. Thus, transport of chromium in groundwater is very highly significant. The Navy states that conditions in groundwater at both sites are such that nearly all chromium will be in the less toxic trivalent state, but this remains to be established in a monitoring program. Thus, fate of chromium in groundwater is also crucial. The Navy must change the text of the conclusions in Section 7 of both Draft Final RIRs to reflect the importance of the fate and transport of chromium in groundwater.

4. **Ecological Assessment for Site 5, Sec. 7, App. S:** We agree with the Navy's conclusion, expressed in Section 7.5.3, that Site 5 does not pose a significant risk to wildlife. However, this chapter requires minor revision. Copper, lead and zinc were identified as COPC in Table N-2; however, they do not appear in Table 7-2 and were apparently not evaluated as COPCs. Please include assessment of these metals in the final report. Maximum concentrations detected were within a factor of 2 of the 95th quantile of background (Table N-2); so we do not expect the corrected estimates of hazard to change dramatically for any of the species assessed.

5. **Other Changes to Text:** Except as noted in Comment 3 above, the changes in text from the earlier drafts make the Draft Final RIRs for Sites 3 and 5 acceptable

with respect to risk assessment. In particular, we note and accept the changes regarding selection of inorganic COPC (Site 3, App. L; Site 5, App. N).

Conclusions and Recommendations

Document 1 is acceptable. Documents 2 through 5 require minor revisions to address hexavalent chromium in groundwater at both sites and inorganic COPCs at Site 5.

Reviewer: Michael J. Wade, PhD, DABT
Senior Toxicologist, HERD

cc: Mr. J. Paull, USEPA Region IX
Dr. C. Callahan, USEPA Region IX

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OCT 1 8 1996

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Responses to Comments on Draft Phase II Remedial Investigation Report for Operable Unit 2C - Site 5, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

California Integrated Waste Management Board (Board) Closure and Remediation staff have reviewed the responses to Board staff comments transmitted in the letter of June 3, 1996, which were submitted with two volumes of Draft Final Phase II Remedial Investigation Report. The submittal, dated October 3, 1996, was received on October 7, 1996. The aforementioned documents were prepared by Bechtel National, Inc., on behalf of the Department of the Navy, for conformance with Title 14, California Code of Regulations (14 CCR), Division 7, Chapter 3, Article 7.8. These regulations consist of potential applicable or relevant and appropriate requirements for the Site 5 Landfill.

Based on our review we are providing the following comments:

General Comments

1. Generally, the responses do not address fully Board staff comments which were included in the letter of June 3, 1996. Adequate responses should answer all issues stated in the review letter including all necessary justification, and inform, where applicable, that appropriate changes have been made in the body of the document. The latest responses appear to address certain parts of the comments and only in a surficial manner.

   If necessary, Board staff are available to provide assistance in clarifying any issues related to their comments.

2. The response document lacks a table of contents and continuous page numeration, both of which make review of this document difficult and cumbersome. It is recommended that the format of the response document be revised to expedite its review.

3. The response document mistakenly associates Mr. Peter Janicki not with CAL EPA but with the U.S. EPA.

4. Comments included in the letter of June 3, 1996, are identified as "General Comments." No such terminology was used in the original letter.

Specific Comments

5. The response to comment 1 does not address the request for site exploration data relevant to the disturbed ground areas. Also, a statement explaining why these land features do not appear on the drawings should be inserted in the text.

6. In comment 2, Board staff inquired not only about previous geophysical studies but also about exploratory trenching. This part of Board staff inquiry has not been answered. Also unanswered remains the issue of more rigorous study on the vertical extent of the landfill. All relevant drawings depicting vertical cross sections of the landfill show the bottom of the landfill using "?" symbol, which implies inconclusive information.

   Additionally, Board staff requested that the terminology be unified for identifying areas covered in Phase I Site Investigation and Phase II Site Investigation.

7. The response to comment 3 does not address issues raised by Board staff in regards to using 14 CCR 17783.5 as a guide for the subsurface gas survey. The response does not explain which elements of this regulation were used and to what extent. In the letter of June 3, 1996, Board staff have pointed out that this regulation applies to permanent monitoring structures with monitoring depths reflecting the actual vertical configuration of the landfill Also, as previously mentioned, site investigation did not yield conclusive findings. Thus, unless satisfactory justification along with conclusive landfill vertical extent documentation are provided, it is requested that the reference to 14 CCR 17783.5 be removed from the text.

8. The response to comment 4, which suggested clean closure of this waste management unit, should be substantiated by volumetric and cost effectiveness analyses (they may be included as a part of feasibility study).

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,

Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

Pete Wilson
Governor

James M. Strock
Secretary for Environmental Protection

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OCT 2 5 1996

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Potential Reuse Issues Associated with Operable Unit 2C - Site 5, Marine Corps Air Station (MCAS), El Toro, California

Dear Mr. Mahmoud:

During a telephone conversation on October 21, 1996, California Integrated Waste Management Board (Board) staff were informed that an irrigated postclosure land use (golf course extension) had been proposed as the final land use for the Site 5 landfill. In addition to the verbal information we have also received a facsimile copy of excerpts from the draft of MCAS El Toro Community Reuse Plan, originated by MCAS El Toro Local Redevelopment Authority and dated August 1996.

In Board staff letter of June 3, 1996, it was stated that the extent of our review and the subsequent approval of the investigation program was limited by the assumption that the site will be closed under presumptive remedy method and final postclosure land use of the site will be a non-irrigated open space. It was also indicated that both the site investigation and design of the final cover may have to be upgraded in an event when the final site use would involve irrigation (e.g., a park or golf course).

In order for Board staff to consider Site 5 suitable for the proposed golf course expansion, a more rigorous site investigation and/or analyses of appropriate existing data are required. The site investigation (or existing site information) should address the following:

1. Comprehensive landfill extent delineation survey for both the vertical and lateral limits of the waste fill.

2. Waste characterization study including types of waste, age of waste, moisture content and saturation capacity.

3. Comprehensive landfill gas survey with samples collected from the fill area at several representative depths. The laboratory analyses would have to include both fixed gases and organic compounds analyses.

4. Landfill gas generation potential study based on gas monitoring results collected over a period of one year from perimeter probes constructed in accordance with 14 CCR 17783.5.

5. Modified HELP model infiltration analyses based on the proposed irrigation and approved final cover design.

In addition to the site investigation requirements and based on its results, modifications to the design of the final cover may be required as well. The modifications may include the following elements:

6. Modified final cover design which would include a synthetic impermeable membrane along with a subsurface drainage layer connected to the runoff collection system.

7. In addition to the final cover design modification or in lieu of , a subsurface moisture sensing system synchronized with the onsite irrigation system may be required.

8. Landfill gas monitoring and collection systems and audible gas detection devices (for onsite enclosed structures) may be required, based on the results of the landfill gas survey.

9. Special design consideration should be given to allow ease of all monitoring and control systems related to the landfill postclosure maintenance.

As an alternative to constructing actual irrigated golf course areas over the fill, the project proponent may consider designating the landfill for golf course related functions such as parking lot, restrooms, etc. By eliminating site irrigation, the site investigation and closure requirements may be then reduced.

It should be pointed out that the extent of site investigation may have a direct effect on the final cover and other closure related requirements for this project. Should the site investigation supply sufficient information about the landfill's low environmental threat potential, the extent of the closure and, subsequently, construction and postclosure maintenance costs may be greatly reduced.

Conversely, should the proposed design address all potential public health and safety and environmental impacts (worst case scenario), the necessity for a comprehensive site investigation will be reduced.

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,

Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

Cal/EPA

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November 4, 1996

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Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
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DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT: THE ORIGINAL LANDFILL, SITE 3, OPERABLE UNIT 2C, 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 document dated October 1996, prepared by Bechtel National, incorporated. The report presents the results of Remedial Investigation (RI) conducted at Site 3, the Original Landfill. Site 3 is one of two sites in Operable Unit 2C for the MCAS El Toro.

Cal/EPA will accept the final RI report if the enclosed Department of Toxic Substances Control and California Integrated Waste Management Board comments dated October 18, 1996 are addressed in the final RI report. If you have any questions, please call Mr. Tayseer Mahmoud at (310) 590-4891.

Sincerely,

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

Enclosures

cc: Ms. Bonnie Arthur
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cc: Mr. Lawrence Vitale
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Final Phase II Remedial Investigation Report for Site 3, OU-2C
Marine Corps Air Station-El Toro
Dated October 1996

The Department of Toxic Substances Control (DTSC) has reviewed the Draft Final Phase II RI Report for Site 3 landfill. We also reviewed the response to Mr. Tayseer Mahmoud, Remedial Project Manager for DTSC and Ms. Sherrill Beard, Registered Geologist from DTSC's Geological Services Unit comments on the draft report. Based on our review, the Navy did not provide adequate responses to all the comments. In some cases, the response indicated that the document will be corrected but was not corrected. Mr. Mahmoud's and Ms. Beard's comments are listed below. Dr. John Christopher, Staff Toxicologist from DTSC's Human and Ecological Risk Division, prepared additional comments on the document. Dr. Christopher's comments are contained in a separate memorandum dated October 31, 1996 and are attached to this letter. We suggest a meeting to clarify any issues relating to the comments:

1. **Executive Summary, Remedial Investigation Scope, Figure ES-1**

   Show former Site 3 boundaries on Figure ES-1 and provide an explanation why site boundaries were reevaluated and expanded. This information will support the reasons why the scope of the investigation was increased.

2 **Executive Summary, Nature and Extent of Contamination, page ES-6**

   The estimation for the volume of waste should be revised to reflect recent information collected during the Phase II investigation.

   Soil gas results should not be compared with California Air Resources Board (CARB) values. Values generated from the CARB study are intended for the comparison of surface air samples not subsurface soil gas samples.

3. **Section 3.1, Surface Features, page 3-1**

   The list of DQO decisions should include the following to be added:

   Identify the limits of exposed and buried landfill waste.

4. **Section 3.5.2, Regional Occurrence and Movement of Groundwater, Figure 3-6, page 3-19**

   In the legend of this figure, the explanation for the groundwater divide depicted near Site 2 should be revised to read "Groundwater Divide Location and Trend Inferred."

5. **Section 3.6.4.2, Groundwater Quality, page 3-30**

   Third paragraph: Most of the reasoning discussed as to why iron and manganese results are inconclusive regarding potential degradation of groundwater from leachate of the Site 3 landfill are due to sample collection (high turbidity values) and laboratory duplicate results (not within control limits). If the laboratory duplicate results were not within control limits the sample lot should have been rerun. Since, it is assumed by the reviewer, that the samples were not rerun, it is suggested to use past data, including results form the most recent groundwater sampling event that occurred in January and February of 1996 (collected by CDM Federal Programs Corporation and reported in the draft quarterly groundwater monitoring report dated April 18, 1996) to interpret the iron and manganese analytical data.

   Fourth paragraph: The discussion about major cations and anions is unclear as to its purpose. The discussion leads the reviewer to assume that groundwater beneath Site 3 may be impacted by groundwater that has migrated beneath Sites 2, 5, and 17. Additionally, there is no support provided in the Report showing that Sites 2, 5, and 17 are upgradient, except perhaps Figure 3-6, which shows all relevant groundwater contours as inferred. Furthermore, if this section is going to state that Stiff and Piper diagrams generated from Site 3 data are similar to diagrams generated from data collected at other landfills located at MCAS El Toro, then the significance of the comparison should be addressed.

6. **Section 4.1.6, Aerial Photograph Review, page 4-8, first paragraph**

   Please show the disturbed area and the several stained areas located east and southeast of the existing site boundaries, as shown on the 1958 aerial photograph. Also, provide explanation for the existence of such features.

7. **Section 4.4.2.1, Shallow Soil, page 4-69 of the draft report, sixth paragraph**

   The following statement was deleted from the draft report to the draft final report: "...the laboratory noted that the chromatograph patterns for these analyses were not typical for these fuels." Please provide further discussion about the statement.

8. **Section 5.3.3.1, Volatile Organic Compounds in Groundwater, page 5-32**

   Reference to benzene concentration in groundwater being 5 µg/L is a typographical error. The correct reference is 21 µg/L.

9. **Section 7, Conclusions and Recommendations, Table 7-1, page 7-3**

   The "Nature and Extent" entry for DQO Decision 5 should be reevaluated. Low levels of SVOCs were detected in 21 of 21 groundwater samples collected and analyzed from Sites 3 and 4, yet it is stated that water quality parameters indicate that the landfill contents have not leached to groundwater. Please provide rationale for this interpretation.

   The "Fate and Transport" entry for DQO Decision 6 should be revised to read "Landfill constituents are not predicted to leach to groundwater." In future documents, it is recommended to avoid using relative descriptors such as "significantly" without providing supporting data. It is difficult for the reviewer to interpret the impact a landfill may have to groundwater based on the statement "Landfill constituents have not significantly leached to groundwater."

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MEMORANDUM

TO: Tayseer Mahmoud
Office of Military Facilities (OMF)
Region 4, Long Beach

FROM: John P. Christopher, Ph.D., D.A.B.T.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: 31 October 1996

SUBJECT: MCAS El Toro: Technical Memorandum on Background Levels of Inorganics; Responses to Comments and Draft Final RI Reports for Sites 3 and 5
PCA: 14740 Site: 400055-47

Background

Region 4 OMF has asked HERD for continuing support on issues regarding risk assessment at Marine Corps Air Station (MCAS) El Toro, a closing base in Orange County which is also designated a Federal Superfund site. Remedial activities at this base are being directed by Naval Facilities Engineering Command, Southwest Division (SWDIV).

We had presented our comments on an earlier draft in a memorandum dated 22 July 1996.Sites 3 and 5 are landfills located near the southeast border of the base. We presented our comments in memoranda dated 7 and 10 June 1996 on the baseline risk assessments for these sites which were part of the Phase I Remedial Investigations (RI). Four of the five documents reviewed here are the Navy's responses to those comments and the Draft Final RI Reports (RIR). The fifth document is a technical memorandum on ambient levels of metals in soil.

Documents Reviewed

We reviewed the following five documents, all prepared by Bechtel National, Inc., contractors to SWDIV:

1. Final Technical Memorandum, Background and Reference Levels, Remedial Investigations, Marine Corps Air Station El Toro, California, CTO-0076/0272". October 1996.

2. "Response to Comments, Draft Phase II Remedial Investigation Report for Site 3, OU-2C, MCAS El Toro", dated 23 September 1996.

3. "Draft Final Phase II Remedial Investigation Report, Operable Unit 2C - Site 3, Marine Corps Air Station El Toro, California, CTO 0076/0243", dated October 1996.

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5. "Draft Final Phase II Remedial Investigation Report, Operable Unit 2C - Site 5, Marine Corps Air Station El Toro, California, CTO 0076/0244", dated October 1996.

We received requests to review these documents on 7 October (#2-5) and 17 October 1996 for (#1).

Scope of Review

The documents were reviewed for scientific content. Minor grammatical or typographical errors that do not affect interpretation were not noted; however, these should be corrected in future versions of the documents. We assume that sampling of environmental media, analytical chemistry data, and quality assurance procedures have been examined by regional personnel. If inadequacies in these areas with respect to risk assessment were encountered, they are noted below. Future changes or additions to the document should be clearly identified.

General Comments

The Navy's analysis of background metals in soil is acceptable. Responses to our comments and changes in text for the Draft Final RIRs for Sites 3 and 5 are acceptable with two exceptions. First, the Navy must re-examine its conclusions regarding the importance of groundwater as a transport medium , because risks to future offsite residents are driven by chromium which might be hexavalent. Second, the ecological risk assessment for Site 5 omitted three metals as constituents of potential concern (COPC).

Specific Comments

1. **Technical Memorandum on Background:** The technical memorandum is acceptable. The Navy was correct to remove a few high values for cadmium and nickel from the ambient sets. The approach shown in Figure 2 accurately represents the compromise worked out in San Francisco in May 1996 among the Department, USEPA Region IX, and the Navy.

2. **Exposure Point Concentrations:** Uncertainties associated with using C_{MAX} as exposure point concentrations are adequately addressed in the sections on uncertainties in the Draft Final RIRs for Sites 3 and 5.

3. **Hexavalent Chromium in Groundwater:** This following refers to the Navy's responses to our comment #14 for Site 3, "Fate and Transport in Groundwater" and our comment #4 for Site 5, "Hexavalent Chromium". Nearly all the estimated risk for a potential future residents at both Sites 3 and 5 comes from groundwater, but the Navy states in conclusions for both sites that fate and transport in this medium is not significant. The Navy did not speciate valence states of chromium, so total chromium was taken to be all hexavalent. Chromium drives the risk estimate, which is >1E-04, a level customarily thought to be highly significant. Thus, transport of chromium in groundwater is very highly significant. The Navy states that conditions in groundwater at both sites are such that nearly all chromium will be in the less toxic trivalent state, but this remains to be established in a monitoring program. Thus, fate of chromium in groundwater is also crucial. The Navy must change the text of the conclusions in Section 7 of both Draft Final RIRs to reflect the importance of the fate and transport of chromium in groundwater.

4. **Ecological Assessment for Site 5, Sec. 7, App. S:** We agree with the Navy's conclusion, expressed in Section 7.5.3, that Site 5 does not pose a significant risk to wildlife. However, this chapter requires minor revision. Copper, lead and zinc were identified as COPC in Table N-2; however, they do not appear in Table 7-2 and were apparently not evaluated as COPCs. Please include assessment of these metals in the final report. Maximum concentrations detected were within a factor of 2 of the 95th quantile of background (Table N-2); so we do not expect the corrected estimates of hazard to change dramatically for any of the species assessed.

5. **Other Changes to Text:** Except as noted in Comment 3 above, the changes in text from the earlier drafts make the Draft Final RIRs for Sites 3 and 5 acceptable

with respect to risk assessment. In particular, we note and accept the changes regarding selection of inorganic COPC (Site 3, App. L; Site 5, App. N).

Conclusions and Recommendations

Document 1 is acceptable. Documents 2 through 5 require minor revisions to address hexavalent chromium in groundwater at both sites and inorganic COPCs at Site 5.

Reviewer: Michael J. Wade, PhD, DABT
Senior Toxicologist, HERD

cc: Mr. J. Paull, USEPA Region IX
Dr. C. Callahan, USEPA Region IX

Cal/EPA

California
Environmental
Protection
Agency

*Integrated
Waste
Management
Board*

*8800 Cal Center Dr.
Sacramento, CA 95826
(916) 255-2200*

OCT 1 8 1996

Pete Wilson
Governor

James M. Strock
*Secretary for
Environmental
Protection*

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Responses to Comments on Draft Phase II Remedial Investigation Report for Operable Unit 2C - Site 3, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

California Integrated Waste Management Board (Board) Closure and Remediation staff have reviewed the responses to Board staff comments transmitted in the letter of June 3, 1996, which were submitted with two volumes of Draft Final Phase II Remedial Investigation Report. The submittal, dated October 3, 1996, was received on October 7, 1996. The aforementioned documents were prepared by Bechtel National, Inc., on behalf of the Department of the Navy, for conformance with Title 14, California Code of Regulations (14 CCR), Division 7, Chapter 3, Article 7.8. These regulations consist of potential applicable or relevant and appropriate requirements for the Site 3 Landfill.

Based on our review we are providing the following comments:

General Comments

1. Generally, the responses do not address fully Board staff comments which were included in the letter of June 3, 1996. Adequate responses should answer all issues stated in the review letter including all necessary justification, and inform, where applicable, that appropriate changes have been made in the body of the document. The latest responses appear to address certain parts of the comments and only in a surficial manner.

   If necessary, Board staff are available to provide assistance in clarifying any issues related to their comments.

2. The response document lacks a table of contents and continuous page numeration, both of which make review of this document difficult and cumbersome. It is recommended that the format of the response document be revised to expedite its review.

3. Comments included in the letter of June 3, 1996, are identified as "Specific Comments." No such terminology was used in the original letter.

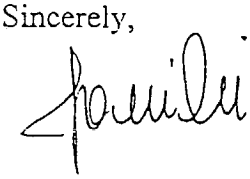
Specific Comments

4. Although the text has been revised to reflect the correct date (1944) of the blueprint, the response does not indicate that this change was made.

5. The response to comment 4 states that the flood-retarding basin will be constructed under Orange County authority. Although the basin's construction and operation fall out of Department of Navy control, its existence and performance will directly affect the situation at Site 3. Also, after the completion of the MCAS ownership reassignment program, Site 3 likely will be operated and/or controlled by Orange County. Thus, it is requested that the basin be considered as a part of the runoff/runon control system and as such taken into consideration for the purpose of this and any future documents relevant to Site 3 closure and postclosure maintenance. As a result of this conclusion, the basin should be depicted on all relevant drawings.

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,



Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

Cal/EPA

Department of
Toxic Substances
Control

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

October 28, 1996

Pete
Go

James M.
Secret
Environ
Pro

Mr. Paul Lanning
County of Orange
Environmental Management Agency
Environmental and Project Planning Division
P.O. Box 4048
Santa Ana, California 92702-4048

MARINE CORPS AIR STATION EL TORO DRAFT COMMUNITY REUSE PLAN

Dear Mr. Lanning:

This is a follow up to the letter I sent on October 11, 1996, regarding comments on the draft Environmental Impact Report and draft Community Reuse Plan (CRP) for MCAS El Toro. The Department wants to make you aware that a draft Feasibility Study (FS) report for Site 5, the Perimeter Road Landfill, has been issued by the MCAS El Toro. The FS report identifies and evaluates potential remedial action alternatives for Site 5. Site 5 is an area formerly used by the military for disposing municipal type waste. We want to inform MCAS El Toro Redevelopment Authority of the status of Site 5 because the remedial actions proposed for the site may not be compatible with a recreation/golf course as shown in the CRP.

The prevalent remedial alternatives discussed in the FS report are based on various landfill cover (cap) systems. The FS also proposes institutional controls and land use restrictions that will limit or prohibit future land use until the regulatory agencies approve closure of the site. The draft FS report does not include a golf course scenario with irrigation of grass and vegetation. Please see the attached comments provided by the California Integrated Waste Management Board for specific concerns. Therefore, we suggest that your Agency consider other alternative uses for this location.

We have found that the use of "reuse forums" helpful in coordinating the reuse activities of the Local Redevelopment Authority (LRA) and the cleanup activities of the BRAC Cleanup Team (BCT). The earlier that the LRA is aware of potential constraints to development, the easier it is for both the LRA and the BCT to resolve the issues and maintain their schedules. MCAS El Toro has regularly scheduled Restoration Advisory Board (RAB) meetings which provide the public an opportunity to review environmental documents and learn about the status of the remedial activities on the base. Ms. Marsha Mingay, Public Participation Specialist, DTSC, can provide information regarding the RAB meetings. Ms. Mingay can be contacted at (310) 590-4881. In addition, DTSC Project Manager, Mr. Tayseer Mahmoud and I are available to meet with the LRA. We can provide the State perspective on the remediation and lessons learned at other closing military bases.

If you have any questions regarding these comments, please feel free to call me at (310) 590-4885.

Sincerely,

Ronald Okuda
Hazardous Substances Scientist
Base Closure and Conversion

Enclosure

cc: Ms. Kari Rigoni
County of Orange
Environmental Management Agency
Environmental and Project Planning Division
P.O. Box 4048
Santa Ana, California 92702-4048

Mr. Tayseer Mahmoud
Remedial Project Manager
Department of Toxic Substances Control
Office of Military Facilities
245 West Broadway, Suite 350
Long Beach, California 90802

cc: Ms. Bonnie Arthur
Remedial Project Manager
U. S. Environmental Protection Agency
Region IX
Hazardous Waste Management Division, H-9-2
75 Hawthorne Street
San Francisco, California 94105-3901

Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
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Mr. Joseph Joyce
BRAC Environmental Coordinator
U.S. Marine Corps Air Station - El Toro
P. O. Box 95001
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Mr. Peter M. Janicki
California Integrated Waste Management Board
Closure and Remediation South
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8800 Cal Center Drive
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Ms. Marsha Mingay
Public Participation Specialist
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, California 90802

Ms. Sharon Fair, Chief
Environmental Assessment and Reuse Unit
Department of Toxic Substances Control
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Cal/EPA

California Environmental Protection Agency

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OCT 2 5 1996

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Office of Military Facilities
Southern California Operations
245 W. Broadway, Suite 350
Long Beach, California 90802-4444

Subject: Potential Reuse Issues Associated with Operable Unit 2C - Site 5, Marine Corps Air Station (MCAS), El Toro, California

Dear Mr. Mahmoud:

During a telephone conversation on October 21, 1996, California Integrated Waste Management Board (Board) staff were informed that an irrigated postclosure land use (golf course extension) had been proposed as the final land use for the Site 5 landfill. In addition to the verbal information we have also received a facsimile copy of excerpts from the draft of MCAS El Toro Community Reuse Plan, originated by MCAS El Toro Local Redevelopment Authority and dated August 1996.

In Board staff letter of June 3, 1996, it was stated that the extent of our review and the subsequent approval of the investigation program was limited by the assumption that the site will be closed under presumptive remedy method and final postclosure land use of the site will be a non-irrigated open space. It was also indicated that both the site investigation and design of the final cover may have to be upgraded in an event when the final site use would involve irrigation (e.g., a park or golf course).

In order for Board staff to consider Site 5 suitable for the proposed golf course expansion, a more rigorous site investigation and/or analyses of appropriate existing data are required. The site investigation (or existing site information) should address the following:

1. Comprehensive landfill extent delineation survey for both the vertical and lateral limits of the waste fill.

2. Waste characterization study including types of waste, age of waste, moisture content and saturation capacity.

3. Comprehensive landfill gas survey with samples collected from the fill area at several representative depths. The laboratory analyses would have to include both fixed gases and organic compounds analyses.

4. Landfill gas generation potential study based on gas monitoring results collected over a period of one year from perimeter probes constructed in accordance with 14 CCR 17783.5.

5. Modified HELP model infiltration analyses based on the proposed irrigation and approved final cover design.

In addition to the site investigation requirements and based on its results, modifications to the design of the final cover may be required as well. The modifications may include the following elements:

6. Modified final cover design which would include a synthetic impermeable membrane along with a subsurface drainage layer connected to the runoff collection system.

7. In addition to the final cover design modification or in lieu of , a subsurface moisture sensing system synchronized with the onsite irrigation system may be required.

8. Landfill gas monitoring and collection systems and audible gas detection devices (for onsite enclosed structures) may be required, based on the results of the landfill gas survey.

9. Special design consideration should be given to allow ease of all monitoring and control systems related to the landfill postclosure maintenance.

As an alternative to constructing actual irrigated golf course areas over the fill, the project proponent may consider designating the landfill for golf course related functions such as parking lot, restrooms, etc. By eliminating site irrigation, the site investigation and closure requirements may be then reduced.

It should be pointed out that the extent of site investigation may have a direct effect on the final cover and other closure related requirements for this project. Should the site investigation supply sufficient information about the landfill's low environmental threat potential, the extent of the closure and, subsequently, construction and postclosure maintenance costs may be greatly reduced.

Conversely, should the proposed design address all potential public health and safety and environmental impacts (worst case scenario), the necessity for a comprehensive site investigation will be reduced.

Should you have any questions regarding this matter, please call me at (916) 255-1195.

Sincerely,

Peter M. Janicki
Closure and Remediation South
Permitting and Enforcement Division

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

October 9, 1996

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 Phase II Remedial Investigation Reports-Operable Unit 2B (Sites 2 and 17)." The reports are acceptable without revision, however, the attached comments (Enclosure A) should be addressed in a technical memorandum and many are applicable to future reports completed for MCAS El Toro. These comments were not sufficiently addressed in the response to comments. Additionally, the comments from the technical reviewer are included for the Site 2 Feasibility Study. 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
Bernie Lindsey, Southwest Div.

Enclosure A

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

October 9, 1996

MEMORANDUM

SUBJECT: Review of El Toro Draft Site 2
Draft Final RI and the Draft FS Ecological Risk Assessment

FROM: Clarence A. Callahan, Ph.D.
Biologist, Technical Support Section

TO: Bonnie Arthur, Remedial Project Manager
Navy Section

I have compared the response to comments with the new material to determine if the responses are adequate or provide sufficient explanation for the observed data and expected risk based on the risk assessment. I have also looked at the Draft Phase Feasibility Study Report -Site 2 and comments are provided.

Review of Draft Final Phase II, RI Report Operable Unit 2B, Site 2.

1. Section T.1.1, Chemicals of Potential Ecological Concern.
Response is satisfactory.

2. Same par, second bullet, what was 2-methyl-4-chlorophenoxyproprionic acid
Response is satisfactory.

3. Bottom of page T-2, With soil representing 100 percent...contact rate (CM) Confirmation or validation samples can be performed to reduce the uncertainty in these predictions.

The confirmation samples from Sites 2, 17 and the reference site should be used to estimate the potential risk or be an integral part of this presentation rather than to rely strictly on the modeling. The "standard" mouse body weights, I believe were an average (p T-21) of those reported in EPA (1993), the Wildlife Exposures

Handbook, however, the average that I obtain for the deer mouse (22, 20, 15.7, 14.8, 22.3, 21.1, 19.6, 20.3, 31.5, 24.5; mean = 21.12; p 2-295) This difference of 29.4% could have a substantial difference on the estimated daily intake. Was the calculation completed as follows:

NOAEL/soil intake rates = safe soil concentration?

Where did the soil ingestion rates come from as the Beyer et al (1994) paper reports less than 2% for the white footed mouse and 5500mg/day seems high? From Beyers's paper (p 379), daily food consumption for the white footed mouse in lab trials was reported as 350mg, 350mg 350mg, 390mg, and 380mg with a mean value of 364mg/day for various percentages of soil in the food. The soil ingestion rate of 2% or 0.02 times 364mg = 72.8mg/day, which is the average ingestion rate of the white footed mouse.

The reference to "confirmation sampling of plants and deer mice for Site 2 and 17" in the response to this comment suggests that more details will be provided in the Risk Characterization section (7.5 pp7-23 through 7-40). From section 7.4, p7-22, "Biological Effects Assessment" states that the "toxicity benchmarks" the NOAELs is found in Appendix T. From Table T-15, the "Final NOAEL" is shown in the second to last column on the right, however, there are no literature citations as to how these were derived. This is a critical omission. The references and data must be evaluated and without the citations this cannot be done.

For instance, Methoxychlor for the "rat" in Table T-15, shows a NOAEL of 4 (and I assume the units are mg/kg body weight/day?) whereas, I suggest that 2.5mg/kg/day is the appropriate toxicological NOAEL based on the study of, "**L. Earl Gray, Jr., J.Ostby, J. Ferrell, G. Rehnberg, R Linder, R. Cooper, J. Goldman, V. Slott, and J. Lasky. 1989. A dose-response analysis of methoxychlor-induced alterations of reproductive development and function in the rat. Fundamental and Applied Toxicology 12, 92-108**. This paper shows that reproductive impact was observed at a dose of 25mg/kg/day (Table 2A p99) and an uncertainty of 10 was applied because of a LOAEL to a NOAEL conversion, the final TRV should be 2.5mg/kg/day. A reading of Table T-15 indicates that others should be changed as well.

Even with the material presented on T-93, it is difficult to see the number was

derived for the site receptor, the deer mouse from the data presented for the rat. My calculations indicate that the NOAEL is 2.5mg/kg/day as explained above. When comparing this TRV to the site specific receptor data, the calculations are not shown for the conversion using the formula on p T-27, and I can't understand the mechanics without these calculations in tabular form on the same page. I cannot easily locate the data for the weights of the laboratory mice and the literature data for the mouse used in the calculations for the formula in section T3.1.1.

4. pT-6, Receptor Exposure Intake Factors, second paragraph; coyote, forage area; ingestion of incidental soil. The Navy concurs.

5. Table T-4, Screening Criteria for Soil COPECs. insufficient details provided; "Jacobs Engineering" does not indicate the source of these data nor how they were derived; "Opresko et al, 1995" does not provide any page numbers to direct the reader to how these data were derived. The same is true for "Stevens and Sumner, 1991"; "HSDB, 1996"; "Topping et al, 1994"; and "ACGIH, 1991" all of which should be referenced by page numbers for each data entry. Please provide page numbers for each data entry from the citations as stated above.

The Navy has not provided page numbers for these citations and data. In addition, the toxicity reference values, TRVs are not shown and supported by citations, nor calculations in tabular form. These data are critical to the interpretation of the potential and actual effects and without supporting citations are essentially not acceptable.

The following is an example of the documentation that is requested, copied from a comment above:

For instance, Methoxychlor for the "rat" in Table T-15, shows a NOAEL of 4 (and I assume the units are mg/kg body weight/day?) whereas, I suggest that 2.5mg/kg/day is the appropriate toxicological NOAEL based on the study of, "L. Earl Gray, Jr., J.Ostby, J. Ferrell, G. Rehnberg, R Linder, R. Cooper, J. Goldman, V. Slott, and J. Lasky. 1989. A dose-response analysis of methoxychlor-induced alterations of reproductive development and function in the rat. Fundamental and Applied Toxicology 12, 92-108. This paper shows that reproductive impact was observed at a dose of 25mg/kg/day (Table 2A p99) and an uncertainty of 10 was applied because of a LOAEL to a

Enclosure A

NOAEL conversion, the final TRV should be 2.5mg/kg/day.

6. p7-23, Uncertainty Analysis, There are a couple of statements made that need clarifying...

The Navy refers to Table 7-6 where "measurement endpoints" is the title of the table, leaving me to make my own assumptions about where uncertainty lies in the process. There are many levels of the risk assessment where uncertainty enters the process, the raw data, the conversion factors, the uptake factors, the receptor species, the life history characteristics of the receptors, none of which is clearly identified by the Navy. From the table, under the column heading "ease of measurement" the following areas of uncertainty should be addressed:

1) are data sufficient to represent the conditions at the site?
2) prediction of dietary intake "from predicted prey concentrations;"
3) toxicological information that is not available for receptor species;
4) uptake predictions into plant and animal prey items;
5) relevancy of toxicity data alone to complete the ecological risk assessment;
6) relevancy of robin for the California blue-gray gnatcatcher because of the difference in feeding habits;

Actually, there is a fairly good description of the potential sources of uncertainty on ppT-98 and 99, however, there is no discussion of how these areas of uncertainty potentially impact the results. These are some of the uncertainties that I believe should be discussed, otherwise the risk assessment is unfinished. The most important of these areas of uncertainty is that involved with limiting the ecological risk assessment to the use of toxicity data rather than completing the process with a discussion of the ecological effects or at least the implications for using toxicity data only. This is particularly troublesome because many of the species did not have toxicity data so a surrogate species was used to estimate the toxicological impact on the receptor. Then this information was used to suggest a certain result for "ecological" endpoints for the site receptors and the site setting. This level of extrapolation requires a great leap of faith without more documentation.

7. Tables T-11,12,13 and 14, The formula shown for estimating the daily dose for each receptor should not use any "modifiers."

Enclosure A

The Navy's response appears to be sufficient.

8. Section 7, p7-19, Hazard Quotient discussions...The strategy used i.e., comparing the estimated HQ for each receptor at Site 2 to an estimated HQ at the reference site to determine the potential "risk" for the selected receptors is not acceptable.

The Navy has not presented a satisfactory response to the comment. The only response provided might be described, at best, as repeating the proposed approach. The decision for the selection of a reference site based on the material presented is highly suspect because of the contaminant levels observed in the samples collected and presented as representative of the reference area.

9. One area that is certainly missing and already mentioned by the Navy in other correspondence is the assessment of the potential risk to the California gnatcatcher.

The heavy emphasis on toxicity at the preliminary phase is expected, however, to continue this toxicity emphasis throughout the risk assessment process carries a large amount of uncertainty concerning the potential impact to the overall success or failure of this special status species at this site. Some observations that are suggested are available nest sites, egg viability, hatching success, fledgling success all of which relate to an evaluation of population growth and overall success of this special status species. Some related questions that should be addressed include: What is the relationship between the available food supply and the contaminant concentration and distribution? What is the relationship between the vegetation that provides nest sites and the contaminant concentration and distribution? Can the contaminant concentrations and distribution be expected to impact the nesting success of this species? Have the number of nest sites increased, decreased or stayed the same? Has this species expanded into new areas of the site? Where is this species feeding? Where is this species nesting, especially after the cap is in place?

The field surveys, basic distribution of adults, pairs, nests, feeding areas, etc could be presented to justify the taking of the breeding area when this site will be capped. If other areas of the base are expected to provide more suitable breeding habitat when the present habitat is taken, this should be discussed. The monitoring plan should include a description for tracking the success of these drastic changes for the

gnatcatcher.

10. I would request that the Navy provide a strategy for reducing the uncertainty at Site 2 for the estimate of ecological risk.

Although, I did see much more toxicity information about the samples for Site 2, the potential risk to these receptors were not shown in any distributional pattern for this site. When a risk is estimated for a particular receptor, e.g., the deer mouse, where the total risk estimate by hazard quotient was reported to be 52 for site 2, the important questions are, "Where is risk the highest? Does the high risk for the deer mouse overlap with other receptors? What is the significance i.e., meaning for the hazard quotient at the reference site being above 42? Is the hazard quotient sensitive enough to discern real differences for these chemicals, endpoints, and receptors with the data that were used? Is this reference site appropriate when every receptor had a demonstrated hazard quotient above 1.0 a value that suggests that a significant risk is potentially present?

Enclosure A

Risk characterization should not be a repeat of the hazard quotient results but a comprehensive comparison and contrasting of the estimated effects and the distribution of contaminant concentrations that are observed at the site. The risk characterization should place risk estimates in the context of the types and extent of anticipated effects which may be evaluated in context of several variables:

1) the nature and magnitude of effects;
2) the spatial and temporal patterns of effects;
3) the duration of effects, and
4) the potential for the system or species to recover from the effects.

I don't believe that the Navy has provided an adequate risk characterization that addresses the above four points.

Draft Phase II Feasibility Study Report, Site 2.

p2-58, Ecological Risk Assessment.

The material presented in this section is a recap of the estimation of the hazard quotient and hazard index from the RI document. The feasibility study as is presented is incomplete because there are no estimates of the risk or changes in risk provided with each remedial option.

My review of each option and the impact to the ecological resources at the site as reported by the Navy are as follows:

Option1 - The no action option; offers no protection of ecological resources from the contaminants as discussed in what is called the "baseline" risk assessment as all of the hazard indices were above "one" indicative of potential problems, none of which were sufficiently verified (p7-26, Table 7-7).

Option 2 - Institutional controls; This option is essentially the same as Option 1 with regard to the risks to ecological resources, basically no protection.

Option 3 through Option 5, all parts - will have the same effects on the ecological resources of the site. Although, a cap/barrier/cover will eliminate the exposure route from the surface soils to the ecological resources, this remedy will essentially

destroy the breeding grounds of the gnatcatcher and probably destroy the feeding grounds as well, thus, can hardly be a benefit to this important ecological resource. Option 5a-d as shown on pES-7, Table ES-3, makes misleading statements, "Allows reinvasion of coastal sage" and a statement that these options "Provide a net gain in gnatcatcher habitat" when in fact the cap will destroy the only breeding territory without any statements much less evaluation of the time required for regrowth (i.e. "re-invasion") of the vegetation for nest sites.

Figure 2-6 shows the California Gnatcatcher territory and vegetation types within the site boundary, an interesting figure because the breeding territory is not within the coastal sage scrub, but in the riparian wash area. Figure 2-9 shows the Phase 1 sample results for shallow soil where one sample (sample 02_SA3) was collected close if not in the breeding area of the gnatcatcher. Figure 2-10 shows the Phase 2 sample results for shallow soil where one sample (sample 02BS14) was collected slightly above the breeding area of the gnatcatcher. The contaminant lists are very close to the same with TPH being dominant in the Phase 1 sample and PAHs and pesticides dominating the Phase 2 sample. The Feasibility Study did not sample in any areas close to the breeding area of the gnatcatcher, thus the distribution of contaminants are expected to extend through the breeding area of the gnatcatcher based on the data presented.

The ecological risk assessment information presented in this document was based entirely on the RI results, summarized in this document, as there were no further data collections for the Feasibility Study. As stated above, this strategy does not provide any assessment of the level of protection or correction that any of the remediation alternatives would provide. Most important, the risk assessment as presented in the RI is flawed in that it stops at the predictive phase for the most part rather than providing data to validate the predictions to reduce uncertainty.

Following this strategy (of not verifying the predictions), the Navy is forced to provide explanations for predicted risk that are greater than one, which includes all of the receptors for site 2. The use of a reference site in this ecological risk assessment is flawed, because all of the hazard indices are above 1.0 at the reference site, which suggests that the reference site is not representative of the local area (i.e., an area similar to the habitat of the potentially impacted site, without the site contaminants) or, the data and techniques used for the hazard quotient estimates are questionable, or both. Hazard indices, like hazard quotients, if less

than one are generally considered to be low risk (with good data quality and low uncertainty) and any ratios above 1 are considered to suggest a likely risk that must be examined further i.e., validation. With the effort that went into producing the hazard quotient for all of the contaminants and the receptors, the Navy sort of dismisses the key decision point (i.e., ratio greater than one) that has been traditional for this approach with the statement, "However, a hazard index greater than one is not necessarily indicative of adverse effects associated for a given COPEC or ecological receptor because of the use of uncertainty factors used to derive toxicity criteria." None of these uncertainty factors are addressed in the uncertainty discussion, especially how the range of the uncertainty introduced when transferring an LOAEL to a NOAEL. What is the range of risk, low and high for these kinds of manipulations? Ignoring the results of the HQ and HI results is well demonstrated as shown in the determination of the hazard index for Site 2: The deer mouse hazard index is 52; The total hazard index for the American robin is approximately 1,200; The total hazard index for the California quail is approximately 63; The total hazard index for the coyote at Site 2 is approximately 120; and the total hazard index for the red-tailed hawk is approximately 16. These are the results of the HQ approach used by the Navy and then disqualified because of high uncertainty and a general lack of data.

The hazard quotient approach is shown to be questionable in this presentation by the recognition of the lack of "toxicity" data, then, there is a reliance on the use of surrogate data instead of the site specific forms of the data. The argument that "estimated" risk values presented are really not significant because of the lack of data or comparable data only confirms the inappropriate use of the hazard quotient approach and the need for data collection for the Feasibility Study. The Navy was aware of the lack of toxicity data before the RI effort, however, the approach was continued. The use of an approach with insufficient data is illogical, however, stating that the results of the assessment is questionable because of the lack of data is inexcusable. The lack of data should have been addressed rather than completing a process with little or no data and then questioning the results because there are no data.

The use of the hazard quotient has become the standard for the predictive phase of ecological risk assessments, however with high uncertainty and the use of surrogates as presented here, validation of the predictions is always recommended. Even by the Navy's own estimates, the recommendations that are apparent here for

verification include aluminum, antimony, cadmium, selenium, acenaphthene, benzo(e)pyrene, benzo(g,h,i)perlene, chrysene, fluoranthene, MCPP, methoxychlor, phenanthrene, and pyrene. Surface samples are suggested for at least the area in and near the breeding area for the gnatcatcher or across the surface area of the landfill for the above contaminants to validate the predictions in their respective hazard quotients. This strategy would have provided an actual estimate for the no action option and with combined samples and observations on the gnatcatcher for distribution and nesting success, an estimate of what will be lost by capping the breeding area could have been made. Targeted sampling and chemical analyses would have been the most logical strategy to validate the risk predictions.

Monitoring Plan. The Navy should describe the process that will be used to monitor the California gnatcatcher when the cap is in place resulting in a great disruption to the breeding area for this species.

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

November 8, 1996

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 reviewed the "Draft Phase II Feasibility Study (FS)-Operable Unit 2B Reports (Sites 2 and 17)." The attached comments (Enclosures A & B) should be addressed in the revised reports. Additionally, comments from EPA's biologist were forwarded to you with EPA's Remedial Investigation comments on October 9, 1996. 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

Enclosures

cc: Tayseer Mahmoud, DTSC
Larry Vitale, RWQCB
Bernie Lindsey, Southwest Div.

ENCLOSURE A

November 7, 1996

MEMORANDUM

To: Bonnie Arthur
RPM, El Toro MCAS

Fr: Thelma Estrada
ORC

Re: Draft Phase II - FS Report, Site 17

I have reviewed the above-referenced document and have the following comments.

General Comment on ARARs:

The FS identifies both the Subtitle C (Hazardous Waste) and Subtitle D (Solid Waste) regulations of RCRA as potentially applicable ARARs. I find this approach to be confusing. DON should decide whether this landfill is a municipal solid waste landfill, which means that generally the Subtitle D regulations are the applicable ARARs or this landfill is a hazardous waste landfill, in which case Subtitle C regulations are the applicable ARARs. By choosing one over the other, DON can still use the regulations from the other as relevant and appropriate requirements but should make it clear this is what DON is doing.

I did an analysis of the Subtitle D requirements and the following is my conclusion: Unlike Subtitle C, the approved State Subtitle D program is not in lieu of the federal Subtitle D regulations. Thus, only the state Subtitle D regulations which are more stringent than the federal Subtitle D regulations (found in Title 40, Part 258 of the CFR) are the ARARs. California's Subtitle D regulations are found in Chapter 15, Division, 3, Title 23 of the CCR (Water Board regulations) and Chapter 3, Division 7, Title 14 of the CCR (Integrated Waste Management Board regulations). An additional note regarding the Integrated Waste Management Board regulations: even if this landfill is not subject to the Subtitle D regulations in Title 14 (which are in sections 17258.1 through 17258.74), if DON determines that this a solid waste landfill, the Integrated Waste Management Board regulations in Chapters 3 (sections 17200 through 17895) and 5 of Title 14 (sections 18010 through 18413) are applicable.

The FS also states that the DON believes that the requirements in Title 23 (the Water Board regulations) are not ARARs because these are not any more stringent than Subtitle C,

the federal ARAR. However, the document is still littered with Title 23 citations. First, if in fact the specific Title 23 requirement is not any more stringent than the comparable Title 22 requirement, there should be no need to cite the Title 23 regulation as an ARAR. If the DON wants to cite a Title 23 regulation nevertheless, the document should make it make it clear that the Title 23 regulation is only being considered as relevant and appropriate.

Specific Comments on ARARs/ARARs TABLES:

1. In various places, the document states that the no action alternative (alternative 1) does not comply with ARARs. ARARs are triggered only when an action is taken. Therefore, this statement regarding ARARs and alternative 1 should be deleted.
2. SIP regulations are cited as federal ARARs. Only authorized programs are considered federal requirements. Therefore, citations to SIP requirements should be in the State ARARs.
3. P.A2-13, Control Plan for the Santa Ana Basin: states that DON accepts the provisions of Chapters 2 through 4 of the WQCP as potential ARARs. If Chapter 4 contains guidances, recommendation, considerations for the Regional Board (as it does in other Basin Plans), which can be characterized as not being specific standards, requirements or criteria or limitations, then these are not ARARs but TBCs.
4. P.A2-14, Res.92-49: states that this resolution also requires conformance to 68-16 and Chapter 15. It is EPA's position that applicability of 68-16 and Chapter 15 is determined independently, through the ARARs process, not because 92-49 requires it.
5. P.A2-17, Groundwater ARARs: second paragraph refers to containment of the source areas. It is my understanding that there will be no source are control, i.e., no collection/treatment. Therefore, why are these potential ARARs? Also, this section cites the State primary mcls as potential ARARs. Please clarify that these are only ARARs if they are more stringent than the federal mcls.
6. P.A4-1, State: I cannot find the requirement being cited here as "Article 7.8 of Title 23 CCR."
7. P.A4-2,State: Why are the citations here to Title 23 and not Title 22?
8. P.A4-3: recordkeeping is not considered substantive.
9. P.A4-5: first row, in Comments, refers to solid waste. This should be hazardous waste as this section is analyzing the Subtitle C requirements.
10. P.A4-7: cites to 40 CFR 257.3-4. Why are these potential ARARs? Are these requirements different from the Subtitle D municipal waste landfills and why would they be potential ARARs in this instance?
11. P.A4-9: first row refers to discharge to groundwater. There is no discharge being contemplated in any of the alternatives.
12. P.A4-11,12,13: these requirements are considered offsite

requirements and are therefore not ARARs. The facility is required to comply with these but not because they have been identified as ARARs.
13. P.A4-13,14,15: please see my comment 10.
14. P.A4-18: It is my understanding that the Regional Board Order No. 91-10 only applies to petroleum cleanups.
15. P.A4-22,23,24,25: please review my general comment above regarding the applicability of Title 14. The requirements being cited here may be applicable (and the other requirements in Chapters 3 and 5 of Title 14 as well), not just relevant and appropriate.

Other Comments:
16. P3-8: last paragraph: please see my comment above regarding Subtitle D.
17. P.3-24: the various monitoring being discussed in this section does not indicate the frequency of the monitoring.
18. P.5-10: last paragraph in Compliance with ARARs, refers to Title 23 CCR prescriptive capping requirements. Elsewhere in the document (for instance p. 7-1), I believe the citation is to Title 14. [Page 6-4 cites both.] Which prescriptive capping requirement will not be complied with?

ENCLOSURE B

EPA COMMENTS ON THE OU 2B DRAFT FEASIBILITY STUDY (FS) REPORTS SITES 2 AND 17, MCAS EL TORO

SITES 2 & 17

1) State Acceptance; Add the RWQCB to state agencies under "State acceptance."

2) It appears that Alternatives 4a, 4b, 4c, 4d, 5c and 5d meet the prescriptive capping requirements of either Title 23 and/or Title 14 (see Enclosure A for clarification of which are applicable). The RWQCB's 10/29/96 letter provides recommendation to ensure that Alternative 3's selected cover design is equivalent to the prescriptive cover requirements. Additionally, Alternatives 4a, 4b, 4c and 4d are not acceptable due to the difficulty of coastal scrub revegation. Please discuss your proposed alternative with the BCT.

SITE 2

1) Page 3-14, Section 3.1.4; Clarify the intent of the statement, "consider landfill gas controls in the final remedial design."

SITE 17- MINOR

1) Pages ES-7, 2-19; Please delete the word "trihalomethanes" as a compound category from these sentences; it is only appropriate to use this term if these compounds are derived from the reactions due to chlorination of surface water containing humus materials.

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

October 10, 1996

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).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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October 11, 1996

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 reviewed the "Draft Phase II Feasibility Study-Operable Unit 2A Report." The attached comments (Enclosures A & B) are significant and we recommend that the BCT meet to discuss options for comment resolution. Additionally, I will forward minor comments from EPA legal counsel on October 15, 1996. 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 OPERABLE UNIT (OU) 2A
FEASIBILITY STUDY (FS)

MAJOR COMMENTS

1) As stated in EPA's 10/10/96 comments on the OU 1 IAFS, the proposed monitoring wells at the leading edge of the plume must be installed before EPA will sign a ROD for a Navy stand alone principal aquifer remediation alternative. Please discuss with the BCT the option of preparing a new alternative in the draft final FS which considers only onsite soil and/or groundwater remediation.

2) Aquifer and soil vapor extraction test results were not submitted in a timeframe to allow regulators to review these documents concurrent with the FS. As a result, additional new comments may be submitted during the Draft Final FS review.

3) EPA would like to discuss the positive and negative impacts of dewatering and SVE with the Navy and consultants.

4) Page 3-2, Figure 3-1; This figure misrepresents the text of this report. No action is not the same as passive aquifer remediation.

5) Page 3-19; The discussion of public perception of the acceptability of treated water should be included under the "Community Acceptance Section."

6) Page 4-67, Section 4.5.5; Please include a summary of the preferred alternatives for the principal aquifer as was completed for the shallow aquifer.

7) Page 6-2; The report does include narrative description of alternatives for the principal aquifer, however, the costs for the offsite monitoring is not included in cost estimates. Please clarify with the BCT.

8) Page 6-2; 35 ug/L is the highest Navy detected concentration in the principal aquifer. OCWD's sampling has detected higher concentrations and these levels should be included and referenced.

MINOR COMMENTS

1) Page 1-7; Please update the status of Site 25.

2) Page 4-18; Typographical error end of sentence starting with "The results of the 20 year groundwater simulation...".

3) Page 4-19, "State and Community Acceptance"; Please add Cal/EPA which includes DTSC and the RWQCB.

4) Page 4-59; Please clarify how under Alternative 11, "970 pounds of TCE are removed from the groundwater after 20 years."

5) Page 4-67, Section 4.5.5; Typographical error, first sentence.

ENCLOSURE B

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

October 10, 1996

MEMORANDUM

SUBJECT: Review Comments on Draft Phase II Feasibility Report
Operable Unit 2A – Site 24 MCAS El Toro

TO: Bonnie Arthur, RPM
Navy Section, FFCO

FROM: Herbert Levine, Hydrogeologist
Technical Support Section, FFCO

General Comments

In general I found this document to be unacceptable as an usable report to evaluate the effectiveness of the presented remedial alternatives. The interpretation of subsurface lithologies is simplistic and not appropriate for designing a remediation scheme. It is appropriate when constructing cross-sections to group lithologies based on grain size and estimated hydraulic properties. The inclusion of silty sand and clayey sand as coarse grained units in cross-section is misleading since these units clearly have different hydraulic properties than the other coarse grained units. There are more sophisticated techniques available for interpreting the subsurface than was presented here (see attachment).

The ground water flow model as presented is not a useful tool for accomplishing the model objectives, since critical supporting documentation and data were not included. The supposition that the pumping test data (and pilot test data) and interpretation may be presented in a draft final document is incorrect. These data are required to be included in the draft document. The draft final document is intended to resolve and include response to comments raised with the draft document (see FFA). The pumping test data is critical to evaluating both the model and well locations.

A sensitivity analysis was not presented with the ground water model. As stated in the ASTM Standard Guide for Application of a Ground-Water Flow Model to a Site-Specific Problem , "*The purpose of a sensitivity analysis is to quantify the uncertainty in the calibrated model caused by uncertainty in the estimates of aquifer parameters, stresses, and boundary conditions.*" Since a sensitivity analysis was not done (or presented) then the uncertainty of the flow and transport

model predictions can not be evaluated (see Specific Comments to Appendix D).

The proposal for placing extraction wells at the 5 ppb TCE contour is a very simplistic approach. The Navy should develop alternatives which include placing extraction and injection wells screened in the appropriate geologic materials and TCE hot spots. The reported drawdown from the IDP (if built) is significant and will have a dramatic impact on water levels within this OU. The Draft Final OU-1 Interim Action Addendum predicts water level declines over the first ten years of operation which dramatically impact on this project. The Navy must include this while selecting and comparing remedial alternatives.

I have repeatedly requested from the Navy data in an electronic format. The requested data included a site map, site 24 chemistry and water level data, and lithologic data. I was specifically interested in these data to attempt an alternative interpretation of geology and contaminant distribution. These data are supposed to be freely distributed and the reluctance to provide those data is very suspicious, especially since previously supplied pumping test data included viruses.

These deficiencies are critical components for a draft document. It is not appropriate, in my opinion, to address these in a draft final document. These issues must be resolved prior to issuing the draft final document. Therefore, I suggest that we either reject this document, or request that the next revision be submitted as a draft. The Navy may choose to separate the vadose zone and ground water and pursue a ROD for SVE while addressing these concerns for the ground water.

Specific Comments

1. Section 1.4.4.2 Stratigraphy, page 1-18. EPA disagrees with the statement that the coarse grained and fined grained units are continuous and extensive. This is an artifact of including silty sand and clayey sand in the coarse grained units (Figures 1-7 and 1-8) and an oversimplification of the geology. Both of these lithologies have an expected hydraulic conductivity several orders of magnitude less than sand. This is likely an explanation for the observation of contaminant distribution and an important distinction for extraction well placement. These Figures point out the data gaps present for understanding occurrence of contaminated ground water and the knowledge needed to place extraction wells. (See attachment)

2. Section 1.4.5.1 Shallow Groundwater Unit, page 1-23. EPA disagrees with the first paragraph interpretation of heterogeneities. See above comment. The reference to Phase II pilot tests points out the inadequacy of this document. EPA can not review data which are not presented nor comment on reported summary data (hydraulic conductivity of 1 to 5 ft/day). Which sands were measured for porosity? What value is there in averaging these data? The average linear velocity has little credence and little value as calculated. There is no supporting documentation for averaging hydraulic conductivity nor for averaging porosity. What is the significance of an average linear velocity of 146 ft/yr? What are the implications of plume movement based on this number? (73 years to reach 2 mi., 108 years to reach 3 mi.).

3. Figure 1-9, Conceptual Model of VOC Source Area. This Figure oversimplifies the distribution of VOC in the upper portion of the SGU. This Figure uses two dimensional data for contaminant distribution which is misleading. The data presented in Figures 1-7 and 1-8 shows that the contaminant concentrations vary dramatically. The three dimensional data distribution should be incorporated into the conceptual model.

4. Section 1.4.6.2 Saturated Zone, Horizontal Characterization, page 1-37. The interpretation of a homogeneous sandy unit is wrong and not appropriate for this report. The Navy should revise the cross-sections and then attempt an interpretation of contaminant distribution as a function of lithologies. As presented the Navy assumes similar behavior between sand and silty sands and clayey sands. EPA recommends using a third distinction for the cross-sections, an intermediate unit consisting of silty sands and clayey sands.

5. Section 1.4.6.2 Saturated Zone, Vertical Characterization, page 1-38. The discussion of silt and clay layers separating sandy units is a significant observation. How were the hydraulic conductivity values measured? For discussion purposes it is reasonable to assume that the hydraulic conductivity of clays and silts in the SGU are not significantly different from hydraulic conductivities of silts and clays in the SGU. This might provide an explanation of the stratification reported for TCE measured in HCPT83. If the Navy still contends that the upper 40 feet of the SGU is homogeneous sands and is laterally extensive please provide an explanation for the contaminant stratification found in the CPT/Hydropunch data.

6. Section 2.1.5.3 Cleanup to Background Level, page 2-8. RCRA is not necessarily an ARAR. This is dependent on how the groundwater treatment unit is defined. Why must background level or chemical concentrations be achieved? The reference to past U.S. EPA efforts to restore impacted aquifers to pristine levels should be expanded. One overriding conclusion presented in these site review reports (EPA, 1992a, 1992b) and subsequent ones (NRC, 1994) is that sites are not often characterized sufficiently to implement an effective remedy. This has important implications for El Toro. The general discussion (paragraph 2) on extraction and adsorption of contaminants should be expanded to discuss the impact of poorly placed extractions wells and the presence of DNAPLS. Though EPA does not mean to suggest that DNAPLs are present at El Toro, this has been an important factor in determining feasibility of pump and treat. The above mentioned reports do discuss as limiting factors for cleanup an appropriate site characterization and site heterogeneities. These should be addressed in the FS for site 24.

7. Section 2.3.2 Groundwater Volume and Associated Trichloroethene Mass, page 2-16. This estimate is based on an oversimplification of contaminant distribution and is likely wrong. As previously mentioned the distribution of TCE is highly stratified. Assuming that the upper 50 ft. of the SGU has a uniform contaminant distribution is wrong. The Navy should revise this section using measured concentration data.

8. Section 2.4.7 Screening of Technologies and Process Options, Figure 2-4 page 2-27. The data presented to the BCT indicated that air sparging did not work in the area where the pilot test was conducted. During BCT discussions the EPA has expressed reservations regarding this technique. Again, the EPA's position is that air sparging might be appropriate for shallow,

homogeneous zones. This is clearly not the case at El Toro. Please change this technology, as well as in-well air stripping, to not applicable. Also, please change dual phase from potential to applicable.

9. Section 2.4.7 Screening of Technologies and Process Options, Table 2-8, page 2-47. Comment # 8 applies here as well. Page 2-49, Please change ozone-enhanced air sparging to not applicable. Page 2-51, why is on station discharge limited to 6 months only? The irrigation does not necessarily need be for food crops as off-station.

10. Section 3.4 Alternative 2A, page 3-7. Please discuss why VOCs are to be polished to non-detect.

11. Section 3.5 Alternative 3, page 3-9. Please change process drawings to show treatment via IDP prior to VOC treatment.

12. Section 5.1 Effectiveness, page 3-9. If capture and treatment is provided by the IDP why is this alternative considered to have a low effectiveness?

13 Section 3.5.3 Results of Screening Alternative. Comment # 12 applies here as well.

14. Section 3.10.2 Implementability, page 3-23. Please provide information supporting the claim that the public will not accept treated groundwater as a potable water supply. EPA and DoD routinely provide treated groundwater as a potable supply.

15. Section 4.2 Groundwater Modeling, page 4-4. EPA agrees with the approach of developing the model based on an existing regional model. However, it was our expectation that the model would be developed at a different scale for site 24. The resolution of site parameters such as lithology and associated hydraulic conductivities is too coarse for this project. Figure A-3-5 from the OU-1 FS indicates that the upper 40 ft will be dewatered in 10 years at well 22_DBMW47 at the downgradient end of the plume. This dewatering follows an exponential curve with significant water level declines in the first 2 years. For this reason dual phase extraction should be considered as an alternative.

16. Section 4.4.2.1 Description, Shallow Groundwater Unit, page 4-20 and Figure 4-6. The problems associated with the groundwater model preclude the EPA from concurring with the extraction and injection scheme presented here. The Navy did not consider the implications of placing extraction and injection wells in the fine grained units. The modeling effort averaged the aquifer parameters so it is not possible to evaluate whether it is possible to maintain pumping rates in the fine grained units and whether the fine grained units can accept the recharge. This has dramatic implications for aquifer flushing and contaminant plume capture. Attachment A to these comments is a three dimensional geologic model with TCE concentrations. Slices through the geologic model indicate that high concentrations of TCE are contained in the fine grained units. It is possible to use such a model of geology and contaminant distribution to refine the groundwater model and more logically place the extraction and injection wells. EPA recommends the Navy to consider this approach since the presented model and alternatives are not acceptable.

17. Section 4.4.6.2 Evaluation, Long-Term Effectiveness and Permanence, page 4-58. While this alternative poses many positive actions; sve, containment of the shallow plume, extraction wells placed in the shallow plume hot spots, and natural attenuation of the principle aquifer, there are significant problems with the ground water conceptual and numeric model to actually document the scheme proposed here. While EPA agrees in principle with this approach, changes to the ground water conceptual and numeric model are needed to evaluate effectiveness. Specifically, the conceptual model and numeric model needs to address the concerns mentioned in comments 1,2,3,4,5,7,15,16, & Attachment A). All data produced by the numeric model are considered suspect until these concerns are addressed.

18. Section 4.5.3 Long-Term Effectiveness and Permanence, page 4-64. EPA agrees with the added benefit of removing mass from the vadose zone via SVE. EPA disagrees with the conclusion that the SGU dewaters after 17 years. As discussed in comment 15, the downgradient edge of the 500 ppb contour is significantly dewatered after 2 years, and after 10 years is dewatered by 40 ft.(see Figure A-3-5, OU-1 FS). This phenomenon must be included in the evaluations of alternatives. The Navy must revise the numeric model prior to EPA agreeing that the extraction/reinjection scheme as proposed for any alternative is valid.

19. Section 5.0 Pilot testing, page 5-1. It is inappropriate for the Navy to propose including these pilot tests in a Draft Final document. According to the FFA, and discussion with the Navy during BCT meetings, the Draft Final document should address the comments made during the initial presentation in the Draft document and not require extensive comments from the agencies.

20. Section 6.3 Recommendations, page 6-4. EPA agrees that the presentation of remedial alternatives is conceptual, however the failure to include a representative conceptual model and limitations of the subsequent numeric model leaves significant doubt that appropriate alternatives have been evaluated. While it is true that many design details can be addressed during the remedial design phase, the presentations of alternatives here, including alternative 11, does not include a realistic estimation of aquifer response to stresses (see comments for Appendix D). Therefore, EPA can not agree in concept to comparisons of cost and effectiveness.

21. Section 6.3.1 Soil Vapor Extraction, page 6-4. Agree.

22. Section 6.3.2 Horizontal Groundwater Extraction/Injection, page 6-4. Agree that a horizontal well could be beneficial and be simulated. EPA agrees with the suggestion that this technology be investigated, but not until the conceptual and numeric models are revised to incorporate EPA's comments.

23. Section 6.3.3 Air Sparging Using Ozone, page 6-5. EPA rejects the use of air sparging at EL Toro. The use of air sparging with ozone has not been demonstrated at any sites to be effective in destroying TCE in ground water. The example provided (Kerfoot, 1996) can not demonstrate whether the induced air is being captured and if TCE is being destroyed.

24. Section D1, Introduction, page D1-1. While a review of the model did not reveal any fatal flaws, sufficient information is missing to determine if the model actually meets the stated objectives. While the model might actually be modeling flow and response to stress, the Navy has

not demonstrated that the aquifers beneath EL Toro are being modeled.

25. Section D1, Introduction, page D1-1. A model sensitivity analysis was not presented. As stated in the ASTM Standard Guide for Application of a Ground-Water Flow Model to a Site Specific Problem, "*The purpose of a sensitivity analysis is to quantify the uncertainty in the calibrated model caused by uncertainty in the estimates of aquifer parameters, stresses, and boundary conditions.*" Since a sensitivity analysis was not done, then the uncertainty of the flow and transport model predictions can not be evaluated. EPA recommends conducting a sensitivity analysis when this model is revised.

26.Section D1, Introduction, page D1-1. According to the text, the objective of the OU-2A modeling effort was to "*provide a tool for the evaluation of remedial alternatives for the trichlorethene (TCE) contamination of the shallow groundwater unit underneath Site 24 and TCE sources in this area (p. D1-1)*" yet a significant amount of effort also went into developing a tool which simulates the deep Principal aquifer, and many of the remedial scenarios also include addressing contamination present in the deep Principal aquifer. Please clarify whether the objectives of this modeling effort also included addressing contamination present in the deep Principal aquifer, or whether the efforts to that end are considered out of the scope of the OU2-Site 24 modeling effort presented in the August, 1996 FS Report.

27. Section D2.2.2, Intermediate Zone, page D2-2. The text indicates that the intermediate zone average hydraulic conductivity measured from soil samples collected at Site 24 during the Phase II RI was 4.5×10^{-9} cm/sec and Figure D5-2 indicates that the value used in the OU2A model for the intermediate unit hydraulic conductivity at Site 24 was 2.0 ft/day (7.1×10^{-4} cm/sec). Please clarify which of these values represent horizontal and/or vertical hydraulic conductivity and specify the ratio of anisotropy used in the model. Also, explain how the horizontal and vertical hydraulic conductivity values used in the model compare with values obtained from site tests or with values expected from geologic descriptions of the soil where hydraulic data was not available.

28. Section D2.4, Hydraulic Conductivity, page D2-3. The hydraulic conductivity distribution in the Principal Aquifer used in the OU-1 and OU-2A models is shown on Figure D2-3. Please discuss the basis for this hydraulic conductivity distribution.

29.Section D2.4, Hydraulic Conductivity, page D2-3. Figure D2-5 shows that a hydraulic conductivity value of 10 ft/day was used to represent the Shallow Unit at Site 24 in the OU-2A model, and the text indicates that this value was based on the field measured hydraulic conductivity values shown on Figure D2-4. Neither the text nor the figure indicate how the value of 10 ft/day was derived from the field data. There are 15 OU-2A field obtained hydraulic conductivity values located within the gray zone representing 10 ft/day in the model on Figure D2-4, however, the geometric mean of these 15 values is 1 ft/day. Also, all of the field obtained values located in the northern half of the MCAS range from 0.01 to 1.1 ft/day, which is considerably lower than 10 ft/day. This apparent difference between observed hydraulic conductivity values and modeled values could impact the predicted capture zone widths and flow rates and should be incorporated into the model. Please clarify how the value of 10 ft/day was derived from the field data, and also explain why the model hydraulic conductivity was not varied

spatially across the MCAS based on the 28 field obtained values shown on Figure D2-4.

30. Section D4.3, Key Assumptions in the Transport Model, page D4-6.

The second listed assumption states that no biodegradation or chemical reactions are modeled. The reason given is that this creates a conservative result from the transport model. While it is true that the predicted contaminant distribution prior to remediation efforts would probably be larger, the effects of remedial pumping are likely exaggerated by these assumptions. The input file for MT3D shows that the factor describing both biological decay and adsorption reactions were set to zero in accordance with the statement in the text. The assumption of no decay is routine since there is insufficient data about the reactions resulting in the biodestruction of TCE to support a single input value. The assumption regarding adsorption is also reasonable given the uncertainties in accurately describing the governing reactions. However, these assumptions combine to create a situation where the resulting predictions are likely less reliable than if some attempt had been made to estimate one or the other of these components.

The third listed assumption indicates that a longitudinal dispersivity of 50 feet and a lateral dispersivity of zero feet were used in the transport model. The potential range of dispersivity and also the relative uncertainty in predicting the appropriate dispersivity is relatively high. However, it is generally considered to be affected by the scale of the problem. 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 downgradient."* 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 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 zero lateral dispersivity of 0 feet was used to represent large plumes ranging from 2,000 to 10,000 feet in length. The values used could potentially affect the predicted distribution of contaminants and also the recovery well design layout.

31.Section D5.2, Calibration Method, page D5-1. Figure D5-1 presents the recharge distribution used in the OU-2A model with values ranging from 0.1 to 1.6 ft/yr. The text on page D2-2 indicates that it is assumed that 10 percent of rainfall will infiltrate to the groundwater, which, based on the calculations on page D3-4, is equal to 1.18 in/yr (0.1 ft/yr). Please explain what data or literature sources were used in developing the recharge zones (0.1, 0.3, 0.4, 1.0, 1.4, and 1.6 ft/yr) input into the model. Explain what the variable recharge zone shown on Figure D5-1 represents. Also, explain why the amount of deep percolation from direct precipitation input into the MODFLOW was twice as high as the estimated amount shown on Table D5-1

32. Section D5.3, Calibration Results, page D5-3. The calibration results are briefly summarized on Table D5-2 and plotted on Figure D5-3. The lack of surface features shown on Figure D5-3 make it difficult to determine what area is represented by the figure. However, the contours indicate some areas where the model predicted groundwater elevation and flow direction differ significantly from the observed data. Most notably there is a 20 foot difference between 120 ft OU2A model contour and the adjacent 140 foot observed contour. The 120 ft OU2A model contour line also indicates a groundwater low area which is not seen in the observed data.

Also, the flow directions indicated by the 150 ft to 180 ft contours vary between the observed and predicted values in some areas. Discuss the distribution of the 101 calibration points relative to the location of the existing shallow and deep contaminant plumes and the existing and simulated recovery and production wells. Explain whether all of the calibration points were located in the shallow unit, or whether some of them were located in the deep unit.

There is no discussion of vertical gradients in the modeling text. Discuss whether the groundwater flow within the model domain is predominately horizontal, and if not, describe the vertical gradients that were observed in the field. Discuss whether the model duplicates any vertical gradients that are present. Since the shallow and deep units are both represented by more than one layer, indicate the layers within these units that were designated for comparison with values observed in the field.

33. Comments on Conclusions and Recommendations: Section D7

The following comments are provided with respect to the review of the groundwater flow and contaminant transport modeling effort review. They are organized in the same order as the bulleted items provided on page D7-1 of the subject report.

- Soil vapor extraction likely does reduce remediation times.
- Any conclusions regarding the effectiveness of a remedial alternative on drawdown, on water levels in deeper units or on vertical gradients may be biased because hydraulic conductivities and recharge values may be overestimated.
- Injection in the upper units (layers 1 and 2) should increase downward gradients in the lower layers. This observation may be indicative of effects of other uncertainties on the model results.
- Pumping in the zone most highly affected is likely the best approach.
- Alternative 11 is the most effective because of a large number of groundwater extraction wells combined with source input term reduction designed to reflect the use of SVE.
- The estimate of exactly 38 years to reach MCL concentrations for TCE is likely unreliable. At best attempts to model contaminant migration scenarios provide approximate time scales and are most useful when comparing alternatives. It is risky to rely on models for precise estimates of cleanup time.

Attachment A

EPA performed a geospatial analysis of the available geologic and contaminant data for Site 24, MCAS El Toro. This analysis was done using the EarthVision software developed by Dynamic

Graphics, Inc. The result of this analysis is provided as a three dimensional solid model of both the geologic conditions at the site and the contaminant distribution. Our objectives were: to determine if the observed distribution is controlled by the subsurface lithology, develop plan view figures showing the geology and contaminant distribution at fixed intervals through the upper 40 feet of the SGU, and to evaluate the proposed extraction/injection wells based on the geologic model and the distribution of contaminants.

Solid Model Construction

Since the purpose of this task is to provide some input on the likely effects of subsurface lithology on TCE distribution several simplifying assumptions were made to focus the model construction activities. First is the placing specific lithologies based on general grain size. Fine grained deposits were defined as being predominately clay or silt. Coarse grained deposits were defined as being predominately sand or gravel. The geologic data used for this evaluation were taken from the Draft Phase II Remedial Investigation Report Operable Unit 2A Site 24, Marine Corps Air Station, El Toro, CA dated June 1996. The data from approximately 100 borings, including Cone Penetrometer (CPT) points, were reviewed and the lithologies grouped according to the fine grained and coarse grained definitions provided above. These data were then used to construct a geologic solid model of the area of Site 24 by starting at an elevation of approximately 75 feet above mean sea level (MSL) and building upward through the lithologic materials to approximately 300 feet MSL. This results in a fairly detailed geologic model ranging in thickness from 90 to 110 feet. An oblique view of the geologic model showing the alternating layers of coarse grained and fine grained deposits is attached.

A three dimensional interpretation of TCE was constructed using data from monitoring wells and from HydroPunch sampling locations. These data were extracted from the Final Quarterly Groundwater Monitoring Report for MCAS, EL Toro, Ca dataed June 27, 1996. In the case of the monitoring wells the reported TCE concentration was assigned to the vertical location corresponding to the center of the well screen. These data were entered into the EarthVision data base and a three dimensional model of the TCE distribution was constructed. The TCE data analysis was done independent of the geologic model so that the interpretation of vertical distribution would be based only on the actual vertical location of the sample. Any observed correlation between the projected distribution of TCE and the geologic model would then be a result of the natural correlation between the data sets. An oblique view of the three dimensional TCE plume is provided and shows the estimated extent of the 5 ppb TCE surface.

Lithologic Control of Contaminant Distribution

Figures are presented which show horizontal slices depicting both geology and TCE distribution. These Figures are the result of slicing both of the three dimensional solid models at 5 foot intervals from the highest elevation of the water table to an elevation 40 feet below the lowest point of the water table. The Figures are provided in pairs. The first part of each pair shows the geology as fine grained and coarse grained deposits with no TCE information. The second part is a clear overlay showing the projected TCE concentrations down to 5 ppb along with geology only in areas outside the TCE plume. There are a total of 26 Figures attached as 13 pairs. These Figures illustrates the complexity of the distribution of the coarse and fine grained materials and

distribution of TCE. Figures from elevations ranging from 120 MSL to 140 MSL show the TCE distribution separating into two apparently distinct plumes. In addition, the high concentration under buildings 297 and 296 shifts from underneath building 296 toward 297 as depth increases. This separation and shifting is apparently coincident with the occurrence of a large area of fine grained materials which develops with increasing depth. This observation suggests that there may have been two distinct sources in this area and that at depth there remains a separation in these contaminant masses. The other important observation from these figures is that the TCE concentrations seem to be highest in the fine grained materials and have not spread into the more permeable coarse grained material at these depths. This observation suggest the possibility that phase separate contaminants are responsible for the concentrations observed in 24CPT83 (3100 ppb) even though the levels typically expected from a phase separate source would be higher. Figures from 140 MSL to 180 MSL suggest that the contaminants occurring in shallow locations are in coarse grained materials and are spread over a larger area and are more diffuse. This may be indicative of a combination of lower residual concentrations likely present in the more permeable layers and the larger volume of mobile groundwater available to dilute and move the TCE contamination from its original location. It appears from this analysis that the lithology at the site is affecting the distribution of TCE, but the contaminants are not necessarily concentrating in the coarse grained deposits. A more detailed analysis of lighologic data may provide some additional guidance on the relative contribution of lithology and original source location and distribution of TCE. An example would be including a transitional lithologic group between coarse grained and fine grained. An intermediate textural group would likely highlight the lack of very fine grained materials such as clay and determine if the few clays present are influencing contaminant distribution. The occurance of silty sands and clayey sands would be included in this intermediate textural group. This would also highlight the impact of these units included as coarse grained deposits, but having significantly different hydraulic properties.

Data Gaps

There is some bias included in this analysis by the distribution of the available data, the data collection method and the goals of the original data collection activities. The spatial anlysis provided through EarthVision helps provide some input on where additional data would be helpful in achieving the most complete and appropriate level of understanding. A data gap identified from this analysis is the area between buildings 296 and 297. This is an area where the existing data suggest a separation at depth between tow coarse grained sediment zones and the location of a high TCE concentration at approximately 122 ft. MSL. The nature and completeness of this lithologic separation could have a dramatic effect on the effectiveness of the planned remediation. The observed TCE concentration at 122 ft. MSL also suggests the need for additional TCE data in the area at similar depths using a more repeatable data collection technique. Additional data at severla locations at depths greater than 120 ft. MSL would be extremely helpful in confirming the locaiton of the highest contamination and in completing the site conceptual model with respect to TCE migration.

Extraction Well Layout

Review of the proposed extraction well layout for Alternative 11 does not suggest that the distribution of extraction wells is based on lithologic data interpretation. Given the variability in both the lithology of the subsurface and the distribution of TCE, a layout designed to maximize

the effectiveness of each well would be appropriate. In addition, the design of the associated injection wells does not seem to take into account geologic variablility. EPA recommends locating a focused number of extraction wells in areas known to be coarse grained and connected with the more highly contaminated zones. Similarly, the injection wells would be best located in areas most in need of further flushing action. This approach would likely result in fewer wells and a more focused remedial effort. This type of anlysis would also require the use of a ground water flow model that is capable of a focused analysis in the area of Site 24. This could be accomplished with the existing MODFLOW model, but would require some grid modifications to provide the level of detail best suited to extraction system design.

REFERENCES

American Society for Testing and Materials Designation (ASTM) Designation: D5447-93 *"Standard Guide for Application of a Ground -Water Flow Model to a Site-Specific Problem"* October, 1993.

Anderson, M. and Woessner, W. 1992. Applied Groundwater Modeling, Academic Press, Inc. Sand Diego, California.

Fetter, C. 1993. Contaminant Hydrogeology, Macmillan Publishing Company, New York, New York.

National Research Council, 1994, Alternatives for Ground Water Cleanup, National Academy Press, Washington, D.C.

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

October 15, 1996

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 forwarded comments on the "Draft Phase II Feasibility Study-Operable Unit 2A Report" on October 11, 1996. The attached comments (Enclosure A) are additional comments prepared by EPA legal counsel. If you have any questions regarding these comments, I can be reached at 415/744-2368.

Sincerely,

Bonnie Arthur

Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

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

October 15, 1996

MEMORANDUM

To: Bonnie Arthur
RPM, MCAS El Toro

Fr: Thelma Estrada
ORC

Re: Draft Phase II Feasibility Study, OU-2A

I finished reviewing the above document and the following are my comments:

GENERAl COMMENT:

Overall, the document was well-written and well-organized. The ARARs discussion was particularly well-done - it was thorough, well-reasoned, and specifically tailored to the chemicals/locations/actions on site. In other words, it avoids the general pitfall of ARARs discussion which is to have a laundry list of the whole universe of ARARs, without a clear explanation of when these requirements would be ARARs.

SPECIFIC COMMENTS:

1. p.ii: third full paragraph, last sentence - states that offstation, the maximum reported TCE concentration is 35 micrograms per liter. Somewhere in the document, I think it states 34 micrograms per liter.
2. p.iv: second bullet under Vadose Zone - states that vadose zone remediation will continue until the average voc soil gas concentrations are below the threshold concentration capable of contaminating groundwater above the mcls. Question: where will this be measured and how?
3. p.iv-v: under remedial action objectives for groundwater, it doesn't make it clear that the groundwater in the shallow unit and in the principal aquifer will be cleaned up to mcls and that groundwater which will be reinjected will be treated to non-detect levels.
4. p.vi: third full paragraph, second sentence - states that alternative 6a and 10 will increase the mobility of TCE into deeper groundwater units. Why is this the case?
5. p.1-7: section 1.3 - mentions for the first time (and I believe the last time) site 25 as part of OU-2A. Therefore, its not clear to me whether site 25 was evaluated and is considered part of OU-2A.
6. p.1-8: second to the last sentence in full paragraph in section 1.32 - it isn't clear to me what we mean in the sentence that reads "The dividing line that separates Ou-1 and site 24 is

approximated by the 5 ug/l TCE contour in the southwestern portion of the Station." Please clarify.

7. p.2-5: under remedial action objectives for groundwater - states as one of the objectives is to ensure the continued beneficial use of groundwater in the principal aquifer. It doesn't say how this will be accomplished.

8. p.2-18: this section discusses institution controls. The last sentence in the first paragraph states "[r]emedial alternatives are evaluated for soil that the potential to contaminate groundwater above mcls." What does this have to do with institutional controls? In the second paragraph in this section, it identifies long-term monitoring of groundwater conditions and allocation of an alternative water supply in the list of possible institutional controls. These two are not what we typically refer to as institutional controls. The groundwater monitoring may be necessary to determine whether institutional controls such as deed and access restrictions are still necessary. Provision of an alternative water supply may be part of a groundwater remedial action.

9. p.4-17: last paragraph evaluates whether alternative 1 (No Action) would comply with ARARs. ARARs are only triggered when a remedial action is taken. Therefore, an ARARs discussion is not necessary for a no action alternative. Please make this correction here and in other parts of the FS where ARARs is discussed for alternative 1.

10. p.4-31: last sentence, first paragraph - mentions RWQCB General Groundwater Cleanup Permit. Later on, the FS makes it clear that this is not an ARAR because on-site remedial actions do not require a permit and because it appears this General Permit applies to TPH discharges. Nevertheless, the DON feels that it will comply with the substantive requirements of this General Permit. Please make it clear that these will be TBCs, not ARARs.

11. p.4-37: first paragraph under "Overall Protection of HHE" - states that contaminated groundwater extracted from the aquifers is treated to meet prescribed discharge objectives and transferred to the Irvine Desalter Project for treatment. What are these "prescribed discharge objectives?"

12. p.4-49: first paragraph under "Compliance with ARARs" states that the time period required to meet the mcl for the shallow groundwater unit and principal aquifer is significant. Elsewhere in the FS (Table 6-1), I think we actually have a specific number of years. Why not say that here and in the other narrative parts of the FS?

13. p.4-57: last paragraph on this page - this section does not state that the cleanup of the principal aquifer will be accomplished through natural attenuation. I think it is important to state that under this alternative, it is projected that mcls for the principal aquifer will be met by natural attenuation.

14. p.4-63: section 4.5.2 states that alternative 1 will violate the RCRA groundwater protection ARARs. Please see

comment above regarding ARARs and no-action alternative.
15. p.A2-4: row which identifies ACLs as ARARs under CERCLA. The identification of ARARs is part of the procedure for Superfund compliance with requirements of other environmental and public health statutes when conducting remedial actions. The establishment of site-specific ACLs is provided for under RCRA (40 CFR 264.94), with CERCLA 121(d)(2)(B)(ii) providing a set of three additional conditions limiting the use of ACLS at Superfund sites where mcls would otherwise be applicable or relevant and appropriate. The 3 conditions identified here should just be listed as a footnote.
16. p.A2-7: second row - states that only the primary standards for vocs are State ARARs for this action. Are these State standards more stringent than the federal ones? Please make this clear.
17. p.A2-8: first paragraph under State and Regional Water Quality Control Board - since this only describes the Board's authority to establish water quality objectives, this should be deleted since this is not the ARAR. Alternatively, under the column comments, the sentence "[s]ubstantive provisions are ARARs" should be revised to read: "Substantive provisions which establish beneficial uses and water quality objectives for ground and surface waters are ARARs."
18. p.A2-10: please clarify what the following (in the last sentence of the second paragraph) means as applied to this site - "... located at the hydraulically downgradient unit of the waste management area that extends throughout the uppermost aquifer underlying the regulated unit...."
19. p.A2-17: first and second paragraphs refer to waste discharge requirements that implement the water quality plan. Since these waste discharge requirements are typically in permits, please clarify that the permits are not the ARAR but the substantive requirements in the permits. Also, delete reference to secondary mcls which are not ARARs as well as the substantive portions of the General Permit which are also not ARARs for reasons cited above. Both may be identified as TBCs if DON agrees they should be TBCs.
20. p.A4-1: delete A4.1.1, A4.1.2, A4.1.3 as ARARs are not triggered by a no action alternative.
21. p.A4-2: delete last row as record keeping requirements are not substantive requirements.
22. p.A4-8-10: delete these requirements that pertain to DOT requirements. These DOT requirements apply to offsite activities and are therefore not ARARs, although the facility has to comply with them in any transport of hazardous materials offsite.
23. p.A4-14: first row refers to waste discharge requirements. Again, make clear that the requirement is not the permit but the substantive requirements of such a permit. Also, on this page, delete reference to alternative 1.
24. p.A4-15: the row where Res. 92-49 is discussed - the last sentence two sentences should be deleted or rewritten. First, the last sentence should be deleted completely as this part of

the resolution does not establish any new requirement. In other words, whether the requirements of Chapter 15 and Res. 68-16 are ARARs depend not on this section of Res. 92-49 but on an independent analysis of Chapter 15 and 68-16, as applied to the site and remedial actions on that site. The second to the last sentence should be rewritten so that it quotes directly the language of Res. 92-49 III.G, which is the only substantive requirement of Res. 92-49 that may be an ARAR.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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November 8, 1996

Joseph Joyce
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Dear Mr. Joyce:

EPA has reviewed the "Draft Final Phase II Remedial Investigation (RI) Report-Operable Unit 2C (Sites 3 and 5)." These documents are approved without revision, however, Comment #1 should be addressed in a technical memorandum and/or BCT meeting:

1) Please update with the BCT the status of isotope analyses in the current groundwater sampling program. These should be included as agreed at past BCT meetings.

2) Section 7, Conclusions and Recommendations; EPA does not agree that it can be conclusively stated that benzene in the groundwater underlying Site 3 is only attributable to Tank Farm #5. Additionally, EPA cannot agree that landfill contents have not leached to groundwater, given the low levels of SVOCs, as well as the benzene, detected in groundwater samples.

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
Bernie Lindsey, Southwest Div.