MCAS El Toro
Restoration Advisory Board
Meeting

29 May 1996 6:30-9:00 PM

Irvine City Hall
Conference and Training Center
One Civic Center Plaza
Irvine

DRAFT AGENDA

• **Welcome/Introductions/Agenda Review**	Joseph Joyce
• **Old Business**	Marcia Rudolph
Approval of 4/24/96 Minutes	
• **New Business**	
Status of Underground Storage Tank Program	Lt. Hope Katcharian MCAS El Toro
BRAC Funding/Budget Process	Dana Sakamoto U.S. Navy - Southwest Division, Naval Facilities Engineering Command
Tank 398 Fuel Recovery System Update and Slide Presentation	Bill Sedlak OHM Remediation Corp.
Slide Presentation - Environmental Restoration Program Booth, MCAS El Toro Air Show	Bob Coleman CLEAN II
Regulatory Agency Comment Update	Bonnie Arthur U.S. Environmental Protection Agency Tayseer Mahmoud Cal-EPA, Dept. of Toxic Substances Control
Cost Estimates/Projections: - RAB meetings and support - Air Sparging Pilot Study/Soil Vapor Evaporation - Tank 398 remediation work	Joseph Joyce
• **Meeting Summary**	Joseph Joyce/Marcia Rudolph
Meeting Evaluation	
Future Topics and Meetings	
• **Closing**	Joseph Joyce

MARINE CORPS AIR STATION EL TORO

RESTORATION ADVISORY BOARD MEETING

24 APRIL, 1996

DRAFT MEETING MINUTES

A Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, 24 April, 1996 at the Irvine City Hall. The meeting began at 6:35 p.m. These minutes summarize the discussions and presentations from this meeting.

WELCOME/INTRODUCTIONS/AGENDA REVIEW

Marine Corps/Navy RAB Co-Chair Joseph Joyce opened the meeting and welcomed members and the community. RAB Community Co-Chair Marcia Rudolph led the Pledge of Allegiance. Mr. Joyce then asked all attendees to introduce themselves, and reminded everyone to sign in on the sheets provided.

OLD BUSINESS

Review and Approval of Minutes of 28 March, 1996 Meeting

The RAB approved the minutes as issued. Ms. Rudolph reminded RAB members to follow the "blue sheet" of upcoming documents that lists scheduled publication and RAB review dates documents scheduled for release this year. A member asked if underground storage tank (UST) removal documents could be included on the list; Mr. Joyce agreed to include major UST reports in future lists.

NEW BUSINESS

Air Sparging Technology Groundwater Cleanup Pilot Test (Site 24) - Pat Brooks, CLEAN II

Mr. Brooks the project leader for the VOC Source Area Investigation and Feasibility Study discussed the team's plan to test insitu air sparging technology for possible groundwater cleanup for Site 24. He briefly explained that groundwater containing more than 500 parts per billion (ppb) of the industrial solvent trichloroethylene (TCE) at Site 24 is the focus of the pilot test. This "hot spot" of groundwater begins beneath Building 296 and extends about 2,500 feet to the northwest. The Phase II Remedial Investigation demonstrated that contaminated soil beneath Site 24 is the source of VOCs in the regional groundwater.

Currently, the Marine Corps/Navy is evaluating appropriate technologies for cleaning up TCE contamination at Site 24. As part of the feasibility study process that examines

various technologies, an insitu air sparging pilot test is being conducted to determine the effectiveness of this technology for removing VOCs from groundwater at Site 24. Several case studies from a 1995 U.S. Environmental Protection Agency Superfund conference reported successful remediation using air sparging. Additional details about the pilot test are available in the handout provided at the meeting.

Air sparging takes place in the ground and avoids the cost of bringing contaminated groundwater to the surface for treatment. The process involves injecting clean air into the groundwater aquifer creating bubbles of air which causes the VOCs, mainly TCE, to "partition" (become gaseous) and enter the air bubbles. The air bubbles then rise up to the unsaturated zone of soil above the water table where the soil vapor extraction system, which uses a vacuum process, removes the TCE-contaminated vapor from the soil. The soil vapor is then treated to remove the TCE using various methods, including carbon adsorption and incineration. After treatment, the remaining vapor is released to the atmosphere.

The pilot test uses a dual completed well, which is essentially two wells in the same boring: one above the water table to capture vapors, and one beneath the water table to force air into the aquifer. The test well is at the leading edge of the TCE plume at Site 24. The pilot test is designed to demonstrate that the vapor can be captured, that VOC concentrations in groundwater can be reduced, and that excessive clogging in the soil vapor extraction well does not occur. Additionally, the test will determine if air sparging and soil vapor extraction is effective in the stratified soil layers (silt and clay layers in the aquifer) at Site 24.

Rates of TCE removal can then be calculated based on the information collected from the pilot test. Cleanup effectiveness will be measured by the evaluation of water samples over time. The pilot test began the week of April 15. Minor adjustments were made to the soil vapor collection device, and testing resumed the week of April 29. Mr. Brooks expects the test to last approximately one week; however, test data will yield a more accurate indicator of how long the test should run.

In response to questions from RAB members on pilot test costs and implementing air sparging technology, Mr. Joyce agreed to present costs at the next RAB meeting.

Tank 398 Jet Fuel Removal and Cleanup Update - Bill Sedlak, OHM Remediation Services Corporation

Mr. Bill Sedlak summarized the cleanup progress at the Tank 398 site which contained a 110,000 gallon tank of JP-5 jet fuel used for "hot" refueling (with the aircraft's engine running) that was located near the control tower. The groundwater in this area is approximately 200 feet deep, considerably deeper than in the VOC Source Area (Site 24). Jet fuel contamination was first detected in the soil in 1988. Pilot tests demonstrated that "free product" could be removed by pumping. Free product refers to jet fuel that is

floating on top of the groundwater table. In June 1995, the thickness of the free product plume ranged from zero to nearly 11 feet.

OHM was contracted to install and operate a remediation system to recover (pump out) free product from the site. The system entered into operation in December 1995. It currently consists of a single recovery well. Plans call for up to three new recovery wells at the site. During initial operations the system recovered only 160 gallons from 4 December to 16 February. OHM worked with the pump manufacturer to change the pump inlets and make other adjustments to match site conditions. Better results were achieved and product recovery is now approximately 100 to 120 gallons per week. As of 19 April, the system had recovered 1,250 gallons of free product. Specific system details are included in the handout provided at the meeting.

Additional tasks underway at Tank 398 include:

- Air sparging for groundwater;
- Soil vapor extraction for soil contamination;
- Targeting specific subsurface layers with wells; and
- Continuing free product recovery system operation.

A RAB member asked Mr. Sedlak to estimate the total amount of free product at the site; he replied that new information, based on the revised contours, will be forthcoming. In response to a question about disposal of the collected product, he explained that it will be recycled, most likely into fuel oil for sale to a commercial customer.

Groundwater Monitoring Status Report - Andy Piszkin, Remedial Project Manager, U.S. Navy, Southwest Division, Naval Facilities Engineering Command

Mr. Piszkin's presentation focused on the results of the groundwater sampling for the first quarter of 1996. The sampling program monitors and documents groundwater quality and flow; monitors and assesses existing plumes; and provides data to support cleanup actions.

During the sampling, a total of 163 well ports were sampled for various contaminants. Most of the on-station contamination is in the shallow aquifer, whereas most off-station contamination is in the principal, or deep, aquifer. Groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides and herbicides, metals, and general chemistry parameters including total organic carbons, dissolved oxygen, pH and turbidity.

Based on the preliminary results of the first quarter round of groundwater sampling, Mr. Piszkin noted the following data trends:

- Groundwater levels continue to rise.
- VOC concentrations are not increasing.
- VOC extent is generally steady.
- The on-station VOC Source Area has the same extent but with lower concentrations.

- The off-station VOC regional plume has the same extent and concentrations.
- Benzene concentrations are decreasing, however, benzene appears to be moving deeper.
- No non-VOC plumes are emanating from MCAS El Toro.
- For semi-volatile organic compounds (SVOCs) there were fewer compounds and lower concentrations detected.
- No detections were found for pesticides and herbicides at the landfills and at areas with previous detections of these contaminants.
- No significant concentrations of metals were found, and the results generally confirm past data.
- The general chemistry evaluation yielded more groundwater data, and helped outline the first treatability parameters to support cleanup actions. Results are generally consistent with past findings.
- No nitroaromatics and nitroamines were detected at the explosive ordnance disposal (EOD) range.
- No cyanide was found at the sludge drying beds at Site 12.

Mr. Piszkin recommends that groundwater monitoring be conducted every two months instead of monthly, that a consistent set of analytical parameters be maintained, and that sampling frequency be reduced for some wells. He would also like to see further assessment of the benzene contamination.

Next steps include reviewing and validating the results of Round 3 testing, establishing the approach for the next rounds, issuing a final monitoring report, and developing a long-term monitoring program. Mr. Piszkin recommends evaluating monitoring plans from other areas to see if they can be coordinated to prevent expensive duplication of effort.

Mr. Piszkin provided OU-1 subcommittee chairman Don Zweifel with a copy of the quarterly groundwater monitoring report for subcommittee review.

Early Actions (Landfills - Sites 2 and 17) Slide Show - Bill Sedlak

Mr. Sedlak's presentation focused on the early interim actions being planned for Site 2, Magazine Road Landfill, and for Site 17, the Communication Station Landfill.

Tasks at these areas include:
1. Installing security fencing to minimize illegal dumping and eliminate unauthorized access (joggers, pet walkers, horseback riders, etc.);
2. Removing debris from stream channels downstream;
3. Protecting streambanks from further erosion; and
4. Preventing water from Borrego Canyon Wash from entering the landfills.

The team is working with regulatory agencies to minimize effects to the gnatcatcher (an endangered species) and the coastal sage, part of the gnatcatcher's habitat. Additionally,

Borrego Canyon Wash runs through Site 2, and future road improvements may affect what can be done at the landfill sites.

Mr. Sedlak presented slides of Site 2 that showed the damaging effects to the landfill areas that are occurring from surface water flows and erosion. He explained that the landfill is at a low point in the wash, because in the 1940s and 1950s, it was standard practice to locate landfills at the lowest elevations in an area.

The Site 17 landfill is located one canyon beyond the Borrego Canyon Wash. Slides showed an access road, surface debris, and a steep embankment. One area has suffered collapses as a result of severe erosion.

RAB members asked about the content of storage drums in the landfill, and whether the drums leaked chemicals into the soil. Mr. Sedlak replied that most drum materials at the landfill were crushed, thus, the slides show only the drum remnants. Specific contents of what was originally contained in the drums is not known. Mr. Joyce added that the Draft Remedial Investigation (RI) Report for Site 17 is available in the Information Repository at Heritage Park Regional Library, and will be discussed at an upcoming RAB meeting.

RAB members expressed concern regarding management of surface water flows, erosion, and contents deposited in Borrego Canyon Wash from areas upgradient of the station, at the landfill on-station, and downgradient of the station. Mr. Joyce stated that whatever flows through Borrego Canyon Wash comes from areas upgradient of the landfill (such as Foothill Ranch and Portola Hills) as well as MCAS El Toro. Mr. Christopher Crompton, RAB member, added that before Foothill Ranch was developed, the wash was wide in some spots but it appears to be larger now. Causes may include major storms, agricultural use, and real estate development. The Marine Corps/Navy is working with the Orange County Environmental Management Agency's Public Works Flood Program Division to make sure that on-station and off-station projects are compatible in the flood-control arena.

Regulatory Agency Comment Update - Bonnie Arthur, U.S. EPA and Tayseer Mahmoud, California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control

Mr. Joyce introduced Mr. Tayseer Mahmoud from Cal-EPA's Department of Toxic Substances Control, who is replacing Mr. Juan Jimenez on the MCAS El Toro BRAC Cleanup Team (BCT).

Ms. Arthur reported that the Site 24 Draft Remedial Investigation (RI) Report had limited agency comments because the Marine Corps/Navy and contractors worked closely with regulators, meeting weekly to collaborate on sampling decisions. She offered copies of her comments to attendees, and said that additional copies were available from her office.

Additional documents currently under review by the agencies are:

- Draft Work Plan for Soil Vapor Extraction Pilot Testing, Site 24
- First Quarter 1996 Groundwater Monitoring Report
- Draft Vacuum Assisted and Conventional Groundwater Extraction Pilot Study Work Plan, Site 2
- Draft RI Reports for Sites 2 and 17 Landfills
- Draft RI Reports for Sites 3 and 5 Landfills

Ms. Arthur added that if RAB subcommittee members need help reviewing a particular document, regulators are available to provide technical clarification. She added that MCAS El Toro is scheduled to sign its first Record of Decision (ROD) later this year, and several more in 1997. She specifically referred to RODs for Operable Unit (OU) 1 and the OU-2 subunits - OU-2A, OU-2B, and OU-2C.

MEETING EVALUATION

One member observed that the strictly enforced, time-limited format of the meeting was helpful in guiding presentations and discussions toward the most important points. Others commented that the room setup worked well, and that the presentations were not overly technical but still informative. The slide presentation was also well-received.

For future meetings, several members requested cost information (estimates, projected costs, funds spent to date) for technologies and projects discussed. Others asked for the names of public officials to write to concerning the potential reduction in RAB funding. Ms. Cohn suggested that the RAB skip a meeting in either July or August because summer turnout is usually low. She would like to poll members at the May meeting to see which month they prefer not to meet.

FUTURE MEETING DATE AND LOCATION

The next RAB meeting is scheduled for Wednesday, 29 May, 1996 at the City of Irvine, Conference and Training Center, at 6:30 p.m.

Attachments:
- Sign-in sheets

Handouts provided at the meeting and available at the Information Repository:
- RAB meeting agenda
- RAB meeting minutes - February 28, 1996 meeting
- "Blue Sheet" - Revised MCAS El Toro RAB Major Document Release and Review Dates, revised 2/27/96
- Presentation - *Insitu* Air Sparging for Groundwater Cleanup
- Presentation - Tank 398 Site Update
- Presentation - Groundwater Sampling, Results 1st Quarter Sampling 1996
- U.S. EPA comments on "Draft Phase II RI Report, OU-2A, Site 24"
- Cal-EPA, DTSC comments on "Draft Phase II RI Report, OU-2A, Site 24"

Status of Underground Storage Tanks at MCAS El Toro

May 29, 1996

Tank Status

- Active
- Inactive
- Abandoned
- Removed
- Closed

Active Tanks

- 66 total
- 21 are associated with oil/water separators
- generally store JP-5, Diesel or Gasoline
- MCAS El Toro is trying to minimize active tanks to prepare for operational closure and turnover to the Reuse Authority

Inactive Tanks

- 145 total
- Schedules for additional removals...
  - 3 tanks at Tank Farm 5 will be removed this June
  - 32 tanks at Tank Farms 1, 3, 4 & 6 will be removed over the next nine months beginning with Tank Farm 4 in June

Inactive Tanks (cont.)

- plans and specifications for removal of 58 tanks at various locations are prepared, the removals will be separated into smaller groups (10-15 tanks) to manage the removals properly
- Remaining inactive USTs will be removed in conjunction with operational closure

Removed Tanks

- 137 total
- Site assessments and closure reports for the former UST sites are being prepared through various contract mechanisms

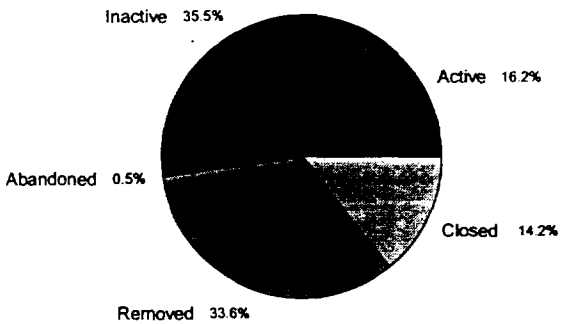
Closed Tanks

- 58 total
- Closure reports for 16 former UST sites submitted to Orange County Health Care Agency last week (May 23, 1996)

Regulatory Agencies

- Santa Ana Regional Water Quality Control Board
  - regulatory closure of 16 tanks to date
- Orange County Health Care Agency, Environmental Health Division
  - regulatory closure of 42 tanks to date
  - present during all tank removals to direct locations for soil sampling

Tank Status



408 USTs

Point of Contact

LT Hope Katcharian
(714) 726-6607
Fax 726-6586

BRAC ENVIRONMENTAL BUDGET AND PROGRAM BRIEF

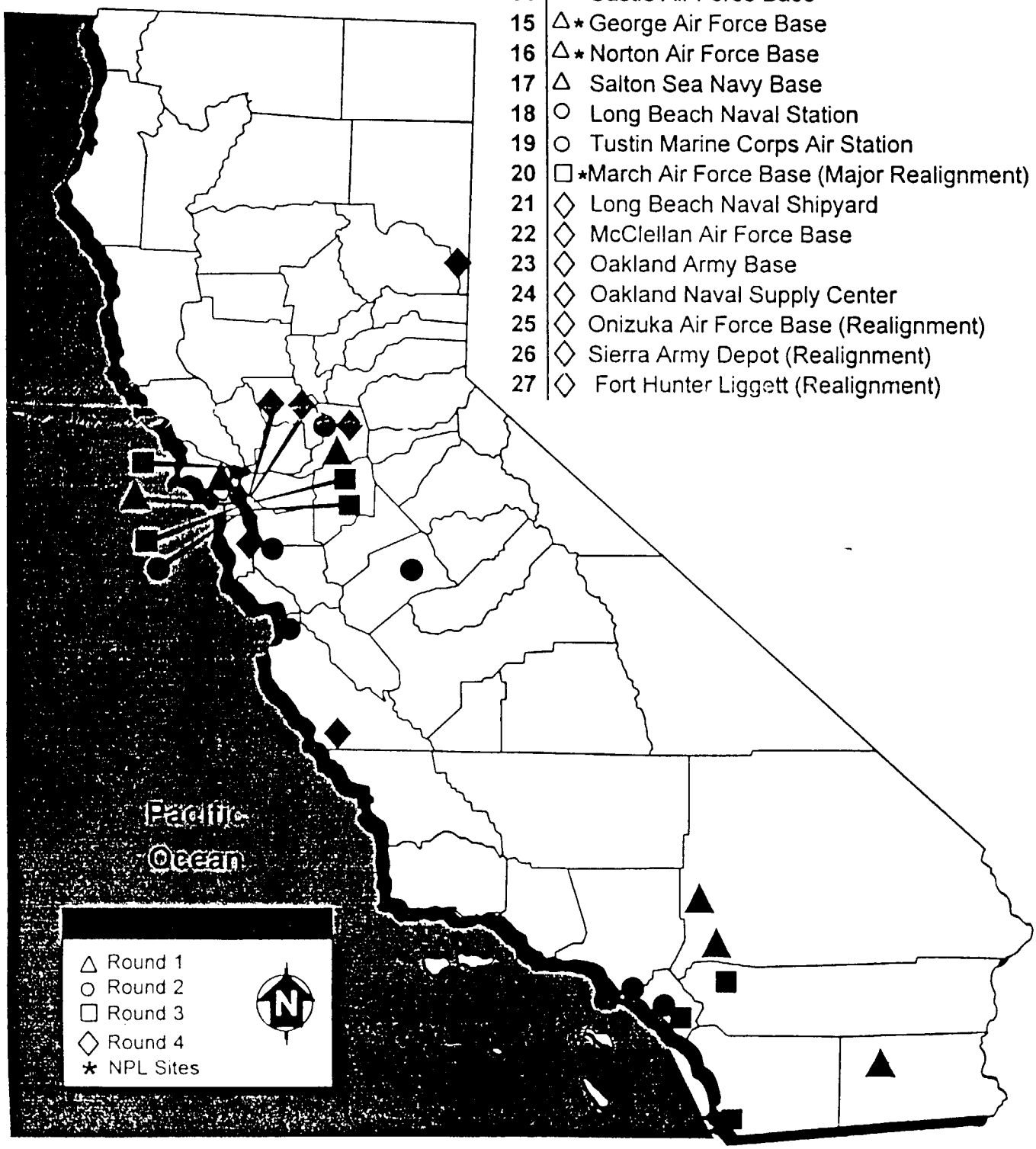
- FAST TRACK CLEANUP
- BRAC PROGRAM SUMMARY
- WESTCOAST BRAC BUDGET PROCESS
- GUIDANCE, CRITERIA AND PRIORITIES
- MCAS EL TORO FUNDING STATUS

FAST TRACK CLEANUP POLICIES

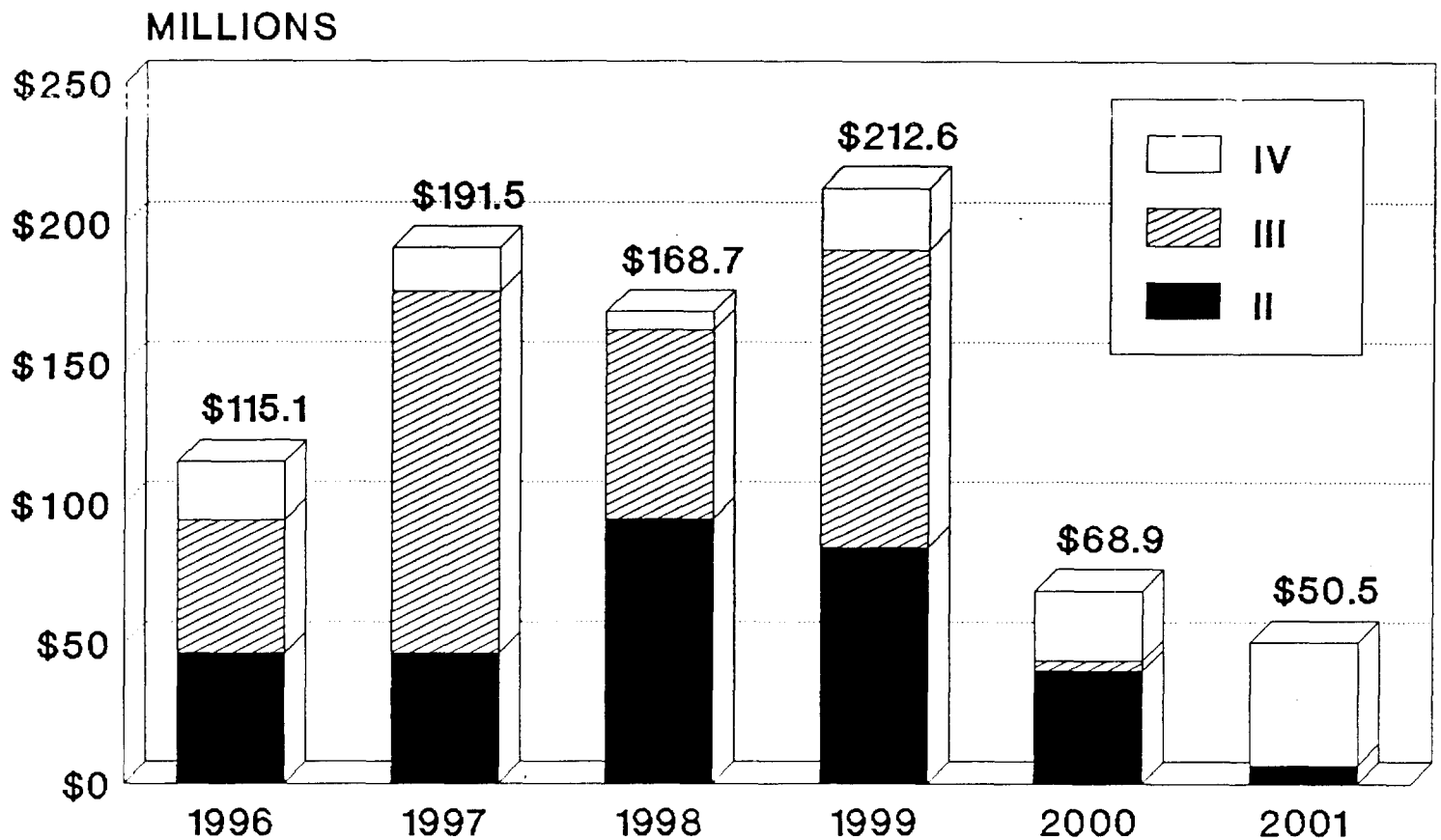
- LESSONS LEARNED FROM BRAC I & II
- BRAC CLEANUP TEAMS AND PARTNERING
- ENVIRONMENTAL BASELINE SURVEYS (RESTORATION AND COMPLIANCE)
- BRAC CLEANUP PLANS
- RESTORATION ADVISORY BOARDS

CALIFORNIA MILITARY BASE CLOSURES

1 ☐ Mare Island Naval Shipyard
2 ☐ Treasure Island Naval Station
3 ☐ Oakland Naval Hospital
4 ☐ Alameda Naval Air Station and Aviation Depot
5 ☐* El Toro Marine Corps Air Station
6 ☐ San Diego Naval Training Center
7 △* Mather Air Force Base
8 ○* Sacramento Army Depot
9 △ Hamilton Army Air Field
10 △ San Francisco Presidio
11 ○* Hunters Point Naval Shipyard
12 ○* Moffett Field Naval Air Station
13 ○* Fort Ord
14 ○* Castle Air Force Base
15 △* George Air Force Base
16 △* Norton Air Force Base
17 △ Salton Sea Navy Base
18 ○ Long Beach Naval Station
19 ○ Tustin Marine Corps Air Station
20 ☐*March Air Force Base (Major Realignment)
21 ◇ Long Beach Naval Shipyard
22 ◇ McClellan Air Force Base
23 ◇ Oakland Army Base
24 ◇ Oakland Naval Supply Center
25 ◇ Onizuka Air Force Base (Realignment)
26 ◇ Sierra Army Depot (Realignment)
27 ◇ Fort Hunter Liggett (Realignment)



BRAC II, III AND IV
WEST COAST PROGRAM SUMMARY



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1. 96/97 = BUDGET TARGETS
2. 98/99/00/01 = POM 98 UNCONSTRAINED

WEST COAST
BRAC BUDGET PROCESS

OCT	TEAM BCP UPDATE BCT/TEAM/CTC/RISK	RE-ANALYZE
NOV	BUDGET FUNDING/GUIDANCE	PRIORITIZE
DEC	VALIDATE BCP/BCT/RAB/REUSE/TECH	TEAM REVIEW
JAN	REVIEW ALL STAKEHOLDERS	WEST COAST REVIEW
FEB	FINAL BCP CONCURRENCE BY ALL	TEAMWORK
MAR	SUBMIT NAVCOMPT/OSD	SPONSORSHIP
JUN - DEC ?	APPROVAL CONGRESS/PRESIDENT EXECUTE	SUCCESS CLEANUP REUSE

DNS:EPO:3/28/96:104

BRAC ENVIRONMENTAL
FY 96 GUIDING PRINCIPLES

- KEEP ENVIRONMENTAL "OUT OF THE WAY OF REUSE"
- FIRST PRIORITY WORK: INCREMENTAL FUNDING OF ACTIONS STARTED IN FY 95, LTO/LTM, EBS/FOST/FOSL FOR SPECIFIC PARCELS, BCP UPDATES, NOMINAL SITE CHARACTERIZATIONS.
- SOME WORK SHOULD CONTINUE AT ALL BASES.
- ENSURE COST EFFECTIVE SOLUTIONS.
- RELATIVE RISK IS A TIE BREAKER.
- ENCOURAGE COMMUNITY MOVEMENT TO REUSE CONSENSUS.
- INVOLVE BCT IN ACQUISITION PLANNING AND PRIORITIZATION PROCESS.
- LOW PRIORITY WORK IS NON-CRITICAL FEDERAL TO FEDERAL LAND TRANSFER OF OR ACTIVITIES WITH REUSE PROBLEMS.

DNS:EPO:3/28/96:105

Integrating Land Use & Cleanup Planning at Closing Bases

EPA DoD CAL-EPA California Base Closure Environmental Committee

December 1994

Introduction

As participants in the cleanup and reuse of closing military bases, your contribution to the integration of cleanup and land use planning is critical. Ideally, all environmental investigation and cleanup of closing bases would be completed when reuse plans are developed. However, given the status of investigation and cleanup, and the need to convert closing bases to civilian use as expeditiously as possible, it is necessary for reuse planning to proceed concurrently with environmental investigation and cleanup.

We have found that if these two processes proceed independently and without consideration of one another, there is a high likelihood that reuse might be frustrated or cleanup impeded, leading to significant cost and schedule impacts on both the reuse and cleanup processes. The integration of land use and cleanup planning is very important and should be an early and continuing effort of the base realignment and cleanup (BRAC) cleanup team (BCT), the reuse group, and the military real estate office.

The reuse group is responsible for developing the preferred reuse alternative. It is the responsibility of the BCTs to integrate reuse priorities into the cleanup as well as educate the reuse group regarding the environmental condition of the base so that it can be considered in developing the most appropriate reuse alternatives. The military real estate office has the responsibility of preparing the lease and transfer documents with appropriate covenants, restrictions, and access clauses. Successful integration of land use and cleanup planning will (1) allow the comprehensive consideration of land use and cleanup, (2) identify and execute high priority reuse opportunities, and (3) eliminate surprises.

In order to help facilitate the integration of cleanup and reuse planning, this fact sheet provides the following tools for your use:

- A list of key milestones for integration of cleanup and land use planning (page 2).
- Lessons learned in solving problems associated with integration of cleanup and reuse planning at a BRAC I site (page 1 and 2).
- A conceptual flow diagram illustrating how cleanup and reuse planning integration should occur and how disagreements should be elevated (page 3).
- A hypothetical land use matrix to provide a mechanism to identify cleanup options and their impacts on reuse (page 4).

Lessons Learned: Mather Air Force Base (AFB)

Issue: Initial cleanup plan did not meet the needs of the reuse plan.

In assessing costs to remediate several landfills at Mather AFB, the Air Force initially proposed to leave a landfill in place, cap and monitor it. However, the County of Sacramento felt this option was not compatible with their reuse plan and requested excavation of this landfill and consolidation into another existing, larger landfill. Enhanced communication at staff and management levels of the regulatory agencies, the Air Force, and Sacramento County focused in particular on comparison of the cost estimates to excavate the landfill, and consolidate the excavated material into another existing landfill versus the cost of capping the landfill. Initially, the cost of capping and leaving the landfill in place appeared less expensive. However, once the costs were carefully examined and costs such as regulatory requirements regarding air monitoring were included, it was determined that costs for this excavation and consolidation were comparable to separate capping of these two landfills. The Air Force selected the remedial option of excavating the landfill and consolidating the material into another landfill, which accommodated the County of Sacramento's proposed reuse plan.

Land Use Matrix

We suggest the use of the following consensus-building tool. This matrix presents the impacts that various cleanup options will have on a reuse alternative.

Hypothetical Site Description: An area of approximately 25 acres. Current contamination exists in the upper 20 feet of soil (no potential threat to groundwater.)

Alternatives

Residential	School	Open Space	Industrial	Cleanup Options	Cost	Impacts	Deed Restrictions
●	●	○	◎	Institutional controls	$250,000	1 Month	Industrial, with no excavation
◎	◎	○	◎	In-Situ treatment	$10,000,000	Less than 5 years: restricted access After 5 years: unrestricted	No excavation below treated depth; restrictions to ensure access for 5 yrs.
⊙	⊙	⊙	⊙	Excavation/treatment	$25,000,000	Less than 2 years: no reuse After 2 years: unrestricted	None

○ Unrestricted use for this cleanup option
⊙ Unrestricted use after a period of time
◎ Useable under this cleanup option with restrictions
● Not useable under this cleanup option

Note: Costs are based on the current present worth of the alternatives, including short and long term monitoring, construction, operation and maintenance, and costs of other regulatory actions that the cleanup option may trigger.

Conclusion

These tools are designed to identify and help resolve issues related to cleanup and reuse so that the two processes can be successfully integrated. In summary, reuse forums can help to ensure that issues are raised in a timely manner, the land use matrix and associated principles can aid in assessing reuse options and cleanup alternatives, and the process diagram should facilitate resolution of conflict and meaningful information exchange. These tools are simply that, tools. Each base and reuse entity is unique and should adapt these tools to fit their particular situation and needs. Although they are not intended to solve every issue that may arise during land use and cleanup planning, their effective application should improve and accelerate the overall integration of those processes.

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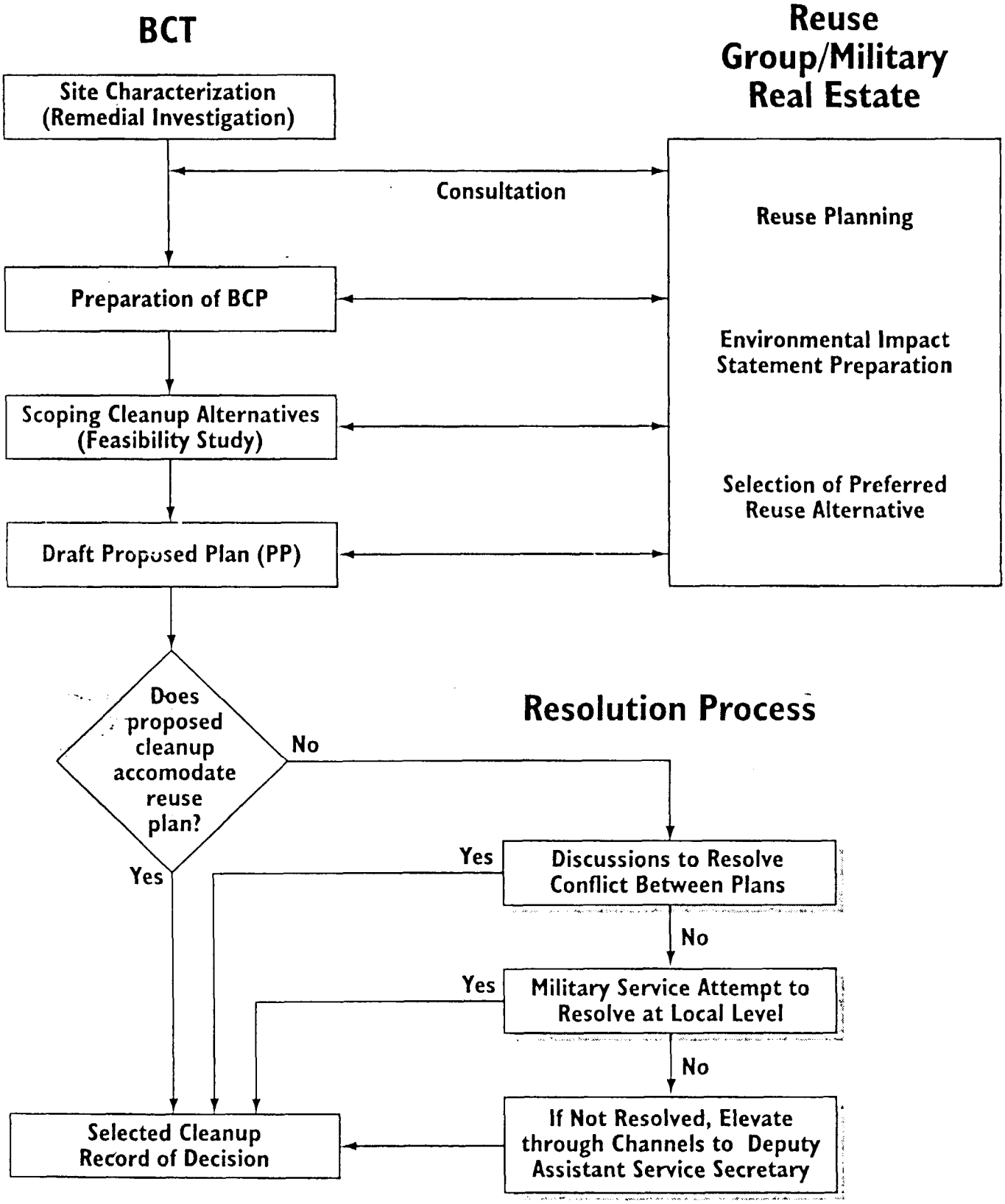
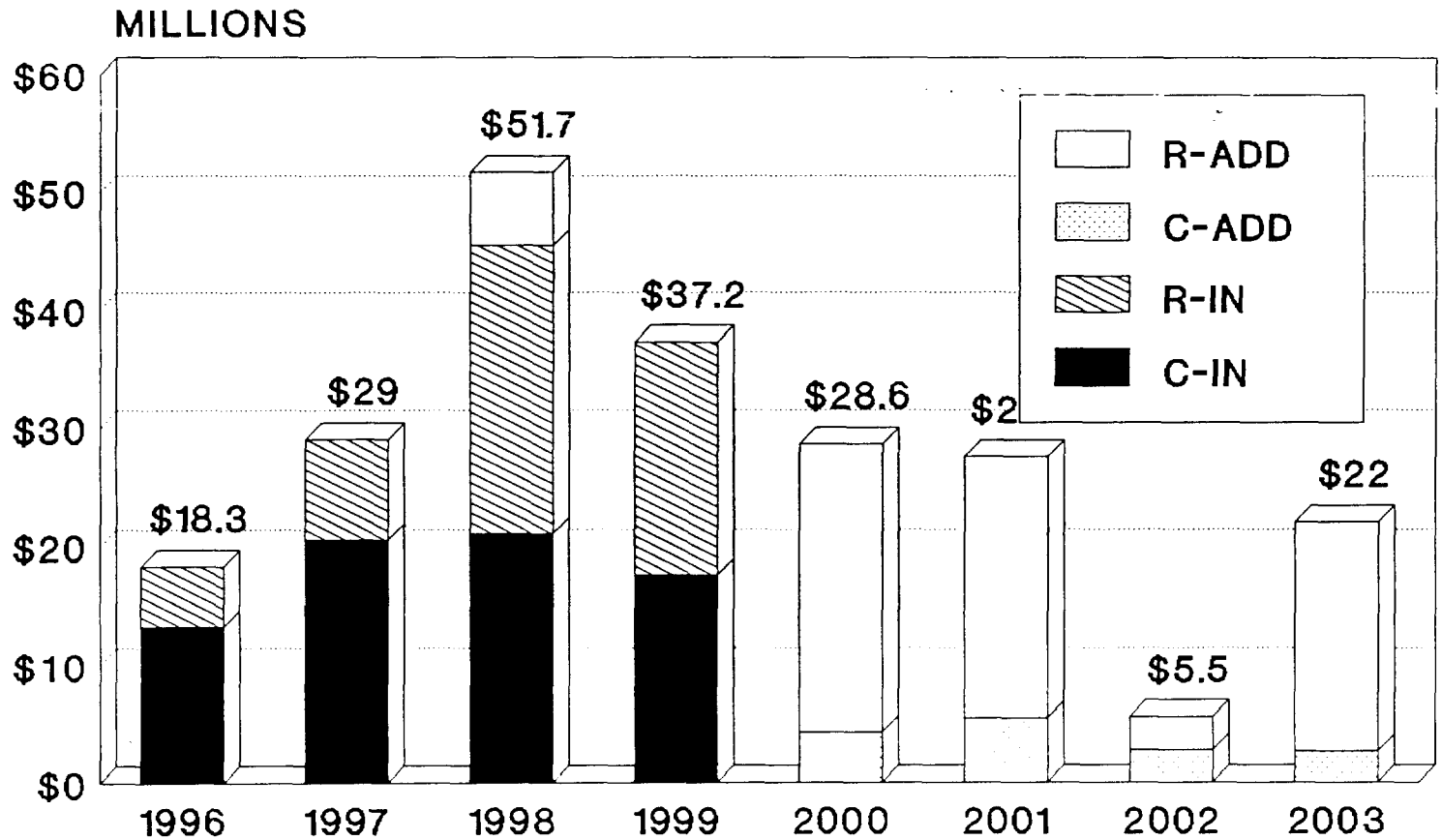
Iterative Integration of Land Use and Cleanup



MCAS EL TORO
BRAC ENVIRONMENTAL PROGRAM STATUS



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96/97 = BUDGET TARGETS
98/99 = DRAFT BUDGET SUBMIT

FAST TRACK CLEANUP ENVIRONMENTAL ACCOMPLISHMENTS

INITIATIVES	ACCOMPLISHMENTS
A. REVIEW TECHNOLOGY	CBCEC TECHNOLOGY MATRIX
B. REMOVAL OF HOT SPOTS	ALL BASES
C. IDENTIFY CLEAN PARCELS	11,300 ACRES (63% EL TORO)
D. OVERLAPPING PHASES	ALL BASES
E. IMPROVED CONTRACTING	CLEAN/RAC/EPA
F. INTEGRATE REUSE PLANS	MASTER INTEGRATED SCHEDULE, REUSE PRIORITIES, REUSE/RISK
G. BIAS FOR CLEANUP	60% AWARDED ON CLEANUPS @ SW
H. TECHNICAL EXPERTS	REGULATORS, RABS, NATIONAL LABS
I. PRESUMPTIVE REMEDIES	GROUNDWATER, LANDFILLS, UST
J. INNOVATIVE MANAGEMENT	PARTNERING, CBCEC, CMECC, JOINT TEAMS, STAKEHOLDERS, CTC MODEL

DNS:EPO:3/28/96:100

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
246 Broadway, Suite 425
Long Beach, CA 90802-4444
(310) 590-4858

May 2, 1996

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 QUARTERLY GROUNDWATER MONITORING REPORT AND DRAFT GROUNDWATER DATA TRENDS AND RECOMMENDATIONS REPORT, 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 reports both dated April 18, 1996, prepared by CDM Federal Programs Corporation. The reports present the results of the January-February 1996 groundwater sampling round from a network of 163 monitoring wells/monitoring ports conducted at MCAS El Toro. Also, the reports propose a modified plan for the sampling frequency and analysis program. During the sampling round, groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds, pesticides, herbicides, general chemistry, metals (filtered and unfiltered samples), treatability parameters, and other site-specific analytes.

The reports are well written. The enclosed comments have been coordinated between the Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board (RWQCB). The RWQCB concurs with DTSC comments. Please incorporate the agreed upon changes, 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

Enclosure

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Mr. Roy Herndon
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Bechtel National, Inc.
401 West A Street, Suite 1000
San Diego, California 92101-7905

bcc: Mr. Roy Yeaman
State Project Team Leader
Base Closure Unit
Office of Military Facilities

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
24[illegible] [illegible]st Broadway, Suite 425
Lo[illegible] [illegible]ach, CA 90802-4444

MEMORANDUM

TO: Mr. Tayseer Mahmoud
Office of Military Facilities
Region 4

FROM: Sherrill Beard, RG
Geological Services Unit
Region 4

Concur: Karen Baker, CHG for
Geological Services Unit
Region 4

DATE: 02 May 1996

SUBJECT: Comments on "Draft Quarterly Groundwater Monitoring Report and Draft Groundwater Data Trends and Recommendations Report, Marine Corps Air Station El Toro, California"

As requested by the Office of Military Facilities, the Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) have reviewed the documents entitled Draft Quarterly Groundwater Monitoring Report and Draft Groundwater Data Trends and Recommendations Report, Marine Corps Air Station (MCAS) El Toro, California, both dated 18 April 1996. The documents was prepared by CDM Federal Programs Corporation (CDM) for Southwest Division Naval Facilities Engineering Command (Navy).

The following items are a compilation of GSU and the Santa Ana Regional Water Quality Control Board (RWQCB) comments. GSU and the RWQCB concur that the next quarterly groundwater sampling event should follow the same protocol as the January-February 1996 sampling event, unless otherwise noted in the comments below. Additionally, it is recognized that many of the monitoring wells included in this groundwater sampling event have not been sampled for over two years, and therefore, inherent and unavoidable problems would occur during CDMs first round of sampling. Some of the comments below reflect these problems, and we encourage the Navy to address such problems before the next groundwater sampling event occurs.

General Comments

1. Water level measurements - GSU and the RWQCB agree with the recommendation to change from monthly to bi-monthly water level measurements.

2. Pesticide and herbicide sampling - GSU and the RWQCB agree with the recommendation to change to semiannual sampling for pesticides and herbicides to confirm non-detect results from the January-February 1996 round.

3. Section 5.0 Recommendations - Neither GSU nor the RWQCB can agree with the recommendations for sampling round 5 or 6 until the round 4 data is collected, analyzed, are reported. Furthermore, to adequately evaluate the groundwater data and the recommendations, please allow more review time then was given for the sampling round 3 reports.

4. Please collect samples for volatile organic compounds (VOCs) analysis from extraction wells 02NEW14 and 02NEW 13 during round 4 of the groundwater sampling program. These wells are currently being installed as part of the vacuum assisted and conventional groundwater extraction pilot study. The BCT has agreed to pump 02NEW13 for an extended amount of time, not only to generate data for aquifer parameters, but also to possibly reduce TCE concentrations. Data collected from these wells during the Round 4 sampling event would help to determine if the extraction pilot test was successful in regard to mass removal.

5. Please add all new monitoring wells that were installed during the remedial investigation (OU-2A and OU-2B) into future groundwater sampling events.

6. Please include all groundwater data generated from the remedial investigation (OU-2A and OU-2B) in the next quarterly groundwater report.

7. In addition to the summary tables provided, please provide one comprehensive data table which includes all analytes.

8. Figures showing base boundaries in CDM documents are different than the base boundaries shown on figures in Bechtel documents. Please reconcile this discrepancy.

9. Chemical constituents with concentrations above regulatory standards, such as MCLs, should be flagged in all data tables.

Specific comments

Draft Groundwater Data Trends and Recommendations Report

1. Section 3.2.5 Concentration Trends For Selected Areas, Page 3-24: The text states "The reduction in concentration of the primary VOCs of concern particularly under a regime of increasing regional water levels, suggests that the source(s) of VOCs to the Main VOC plume are not contributing VOC mass at levels which were documented during the Phase I RI." This statement may or may not be true, however, at this time in the investigation it is difficult to substantiate. It is recommended to delete this sentence until further evaluation is completed.

2. Figure B-1, Groundwater Monitoring Wells: Please include an explanation for the symbol (●) in the legend.

3. Appendix A, Table A-1: Either provide a separate table from Table A-1 with a summary of well completion and pump installation information such as Table 3-4 in the 21 July 1994 CH2MHill document, MCAS El Toro...Draft Groundwater Monitoring Program Plan, dated 21 July 1994, or indicate in the title of Table A-1 that there is also well completion data. For example, title the table "Water Level Measurements, Groundwater Elevations, and Summary of Well Completion".

Draft Quarterly Groundwater Monitoring Report

1. Section 2.2 - Groundwater Sampling and Analysis, Page 2-3: The last paragraph of this section discusses problems which occurred while sampling multiport monitoring wells containing dedicated packers. The section refers the reader to Table A-1, Appendix A with the presumption that the problem wells would be identified. However, it is unclear from Table A-1 which wells housed packers that would not pressurize properly. Furthermore, it is reported that monitoring wells with damaged packers were sampled with either a submersible two-inch pump or manual bailer. Due to the construction of multiport wells it is necessary to physically separate well ports with packers to collect groundwater samples from discrete intervals or mixing between intervals will occur. Therefore, it is unclear how representative samples from discrete intervals were collected if the reported sampling techniques was implemented.

It is recommended that the packers be replaced in the appropriate wells before the next sampling event or possibly implementing micropurging techniques during groundwater sampling. Also, please provide an explanation in the final editions of the subject document outlining the sampling procedures at multiport wells with damaged packers, including support showing that reported analytical data represent discrete depth intervals.

2. Section 2.3 - Air Entrainment Evaluation, Page 2-3: Please elaborate on the air entrainment evaluation. As reported, only two of the eight wells were included in the air entrainment evaluation because of inoperable pumps. However in the two wells with operable pumps, field teams observed the presences of entrained air during purging, then varied the discharge rate and pumping water level to eliminate the air entrainment. At what depth was the pump set relative to the waterlevel in the well? How was the sample collected, with a bailer or through the constant speed four-inch pump? How was the discharge rate varied on a constant speed pump? Was the discharge outlet downsized with a nozzle? If the wells were sampled with the constant speed pump only, it is recommended to sample both with the pump and a bailer for all eight wells during the next sampling event and than compare the data. If there are not discrepancies between the data collected with the constant speed pump and a bailer, this information may support, and alleviate any question regarding previous VOC data originating from wells with four-inch constant speed pumps.

3. Appendix C, Table C-1: Many of the reported dissolved oxygen values are very high and the redox values are probably inaccurate. These type of field parameters are difficult to collect properly and precautions should be taken to decrease the questionable nature of the results. Therefore, it is recommended whenever measuring dissolved oxygen and/or redox a flow through cell be used. With regard to redox, when groundwater is brought to the land surface and into contact with air, the redox system in the water may be quickly overwhelmed by reactions involving oxygen. Hence, a measurable redox potential may be obtained, but most likely not a measurement that is representative of the groundwater. Since these field parameters will most likely be used to support the Navy's geochemical model, developed to show concentrations of inorganics in groundwater are not affected by base activities, these field parameters should be collected with the utmost care.

If you have any questions or need clarification please call me extent 5528.

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

ion 4
, West Broadway, Suite 425
Long Beach, CA 90802-4444
(310) 590-4858

May 10, 1996

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

Dear Mr. Joyce:

COMMENTS ON DRAFT QUARTERLY GROUNDWATER MONITORING REPORT AND DRAFT GROUNDWATER DATA TRENDS AND RECOMMENDATIONS REPORT, MARINE CORPS AIR STATION (MCAS) EL TORO

The California Environmental Protection Agency (Cal/EPA) has completed the review of the above subject reports both dated April 18, 1996, prepared by CDM Federal Programs Corporation. The reports present the results of the January-February 1996 groundwater sampling round from a network of 163 monitoring wells/monitoring ports conducted at MCAS El Toro. Also, the reports propose a modified plan for the sampling frequency and analysis program. During the sampling round, groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds, pesticides, herbicides, general chemistry, metals (filtered and unfiltered samples), treatability parameters, and other site-specific analytes.

The Department of Toxic Substances Control and the Regional Water Quality Control Board comments were transmitted the Navy on May 2, 1996. Since then, we received the enclosed, May 8, 1996, comments from Orange County Water District. Please incorporate the agreed upon changes, 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

Enclosure

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

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. Roy Herndon
Orange County Water District
10500 Ellis Avenue
P.O. Box 8300
Fountain Valley, California 92728-8300

Lt. Hope Katcharian
Director, Environmental Engineering Division, (1AU)
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ORANGE COUNTY WATER DISTRICT

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President
WES BANNISTER
First Vice President
DANIEL E. CRISET
Second Vice President
WILLIAM R. MILLS JR.
General Manager
CLARK IDE
General Counsel
DARLANA WHITE
Secretary

May 8, 1996

Mr. Patrick J. Russell
CDM Federal Programs Corporation
3760 Convoy Street, Suite 210
San Diego, CA 92111

SUBJECT: Comments on Draft Quarterly Groundwater Monitoring Report for MCAS El Toro

Dear Mr. Russell:

Summarized herein are my comments to the aforementioned report, as we discussed on the phone on May 6, 1996.

1. P. 1-4, second bullet item: reference to wells should be revised to say, "Wells constructed by Orange County Water District (OCWD) and paid for by the Navy."

2. P. 2-1 and throughout report, tables, and maps: OCWD well 18_MCAS-05 was destroyed in 1994 and was replaced with a new well 18_MCAS-05A in close proximity to the old well. The screened interval of the new well is 120 to 130 feet bgs.

3. P. 2-1: The reference to inaccessibility to well 18_MCAS-09 due to rain probably refers to well 18_MCAS-08, since 18_MCAS-09 is along a sidewalk on a paved street, whereas 18_MCAS-08 is in a dirt lot. This reference should be checked and corrected as appropriate.

4. P. 2-3: Packer problems should be clarified for nested monitoring wells, not for Westbay-type multipoint monitoring wells.

5. Table 4-1: VOC data errors were noted for certain dates for OCWD "MCAS" wells for the period of February through December 1993. Errors are notable for their "non-detect" TCE concentrations among histories of consistent detections. It appears that two specific sampling dates for wells MCAS-01 (most zones with TCE), MCAS-02 (zones with TCE), MCAS-03 (zones 1 and 2), MCAS-07 (zones with TCE), and MCAS-09 have the errors, one sampling event by OCWD and one by CH2M Hill. I noted the same error in the Navy's draft OU-1 RI report in July 1994. A printout of

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TELEPHONE (714) 378-3200 FAX (714) 378-3373

cc: Ms. Sherrill Beard
Engineering Geologist
Department of Toxic Substances Control
245 West Broadway, Suite 350
Long Beach, California 90802

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

Mr. Larry Davidson
CDM Federal Programs Corporation
3760 Convoy Street, Suite 210
San Diego, California 92111

Dr. Dante Tedaldi
Bechtel National, Inc.
401 West A Street, Suite 1000
San Diego, California 92101-7905

OCWD's historical VOC data for the MCAS wells will be forwarded to you in the next week that will contain all OCWD data, but not the Navy data.

6. Regarding the air entrainment issue in the monitoring wells, I believe a strong possibility exists that the air noted in the sample bottles was due to off-gassing from depressurization of groundwater with a high dissolved gas (CO_2, methane, or air) concentration. OCWD has observed and verified "milky" or cloudy water (very small air bubbles) due to off-gassing of groundwater brought to atmospheric pressure in the Tustin, Orange, Anaheim, and Huntington Beach areas. Headspace analysis of the water indicates the gas to be either dissolved air or methane. Such an analysis of the off-gas should be made before drawing conclusions as to the cause/source of the air bubbles in the water samples.

7. Regarding destroyed Navy wells 18_RW3 and 18_RW4, I am requesting a copy of the abandonment records for these wells for our files to document that they were properly sealed. Please forward this request to Andy Piszkin (SWDIV) if CDM Federal is not the appropriate party to address it.

Please contact me at (714) 378-3260 if you have any questions.

Sincerely,

Roy L. Herndon

Roy L. Herndon
Manager, Hydrogeology Department

cc: Tayseer Mahmoud, Cal/EPA DTSC
Larry Vitale, Santa Ana RWQCB
Bonnie Arthur, USEPA Region IX

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
45 West Broadway, Suite 425
Long Beach, CA 90802-4444

(310) 590-4858

May 10, 1996

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

Dear Mr. Joyce:

COMMENTS ON DRAFT WORK PLAN FOR VAPOR EXTRACTION PILOT TESTING-SITE 24, MARINE CORPS AIR STATION (MCAS) EL TORO

The California Environmental Protection Agency (Cal/EPA) has completed the review of the above subject document dated April 16, 1996, prepared by Bechtel National, Inc. The Work Plan presents the design and objectives of a soil vapor extraction pilot test designed for site 24. The test is intended to evaluate the efficiency of removing volatile organic compounds from the vadose zone at Site 24. Comments regarding the document have been prepared by the Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board (RWQCB).

This letter is to transmit the enclosed DTSC comments and the RWQCB comments dated May 1, 1996. Please incorporate the agreed upon changes, where appropriate, and send us a response 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: 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
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Mr. Roy Herndon
Orange County Water District
10500 Ellis Avenue
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Lt. Hope Katcharian
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Dr. Dante Tedaldi
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protocol should be clearly outlined in the final work plan. The test procedures should be written in such a fashion that a field team can easily follow each step.

2. Please include a description of the pilot test design, in addition to the equipment description presented in the draft work plan. Clearly outline in the final work plan, the identifier for each observation location, field parameters collected at each location, and frequency of data collection at each location.

3. Section 3.3 - Equipment Start-up and Operations: Discuss in further detail the duration of the pilot test. For example, will the pilot test run for 14 days at steady state or will different extraction runs be performed?

   Describe how VOC samples will be collected for analytical method 8010/8020 and if the samples will be analyzed on or off site.

4. Section 5 - Data Evaluation: Please provide details how pilot test data will be evaluated. For example; How will the potential effectiveness of SVE to remove the VOCs from the soil at Site 24 be evaluated? How will the data generated from the SVE pilot test be evaluated in regard to the air-sparging pilot test? If the pilot test proves favorable, exactly how will the number of wells required for remediation be estimated? Furthermore, what criteria will be used to judge if SVE is an effective remedial action?

5. Section 5.1 - Soil Vapor Extraction Radius of Influence: In the last sentence in Section 5 it is stated "The distance at which the remote vacuum is projected to be equal to one percent of the applied vacuum will be considered the effective SVE radius of influence." Please provide rationale for using a value of one precent to determine radius of influence.

If you have any questions or need clarification please call me at extention 5528.

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
245 West Broadway, Suite 425
Long Beach, CA 90802-4444

MEMORANDUM

TO: Mr. Tayseer Mahmoud
Office of Military Facilities
Region 4

FROM: Sherrill Beard, RG
Geological Services Unit
Region 4

Concur: Karen Baker, CHG
Geological Services Unit
Region 4

DATE: 06 May 1996

SUBJECT: Comments on "Draft Work Plan for Vapor Extraction Pilot Testing - Site 24 Report, Marine Corps Air Station El Toro, California"

As requested by the Office of Military Facilities, the Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the document entitled Draft Work Plan for Vapor Extraction Pilot Testing - Site 24, Marine Corps Air Station (MCAS) El Toro, California (draft Work Plan), dated April 1996. The document was prepared by Bechtel National, Inc. (Bechtel) for Southwest Division Naval Facilities Engineering Command (Navy).

The draft Work Plan presents the design and objectives of a soil vapor extraction (SVE) pilot test designed for Site 24. The purpose of the pilot test is to generate data that can be used to evaluate the efficiency of removing volatile organic compounds (VOCs) from the vadose zone. The draft Work Plan includes the engineering design of the SVE system but does not include a comprehensive description of the field procedures that will be implemented, or the details concerning the evaluation of the data. Below are general comments that should be addressed before the soil vapor extraction pilot test begins.

General Comments

1. Please include a section in the final work plan with a description of the test procedures. Bechtel's CLEAN II Program Procedures Manual does not include a standard operation procedure for a SVE pilot test, therefore site-specific test

State of California

Memorandum

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

Date: May 1, 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 WORK PLAN FOR SOIL VAPOR EXTRACTION PILOT TESTING -SITE 24 MARINE CORPS AIR STATION EL TORO CTO-0073/0130

We have reviewed the subject document dated April 16 , 1996 and received by us on April 23, 1996. After reviewing the document we find that we have no significant comment.

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

Lawrence Vitale
Lawrence Vitale
DoD Section

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

May 16, 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 Quarterly Groundwater Monitoring Report" and the "Draft Groundwater Data Trends and Recommendations Report" for MCAS El Toro, received on April 22, 1996. Please address the the following comments and enclosed comments (Enclosure) in the revised report:

1) Page 3-24; Please do not include generalizations regarding the onsite VOC source area plume without review of the current OU 2A reports.

2) Page 5-1; A report should be prepared/submitted after Sampling Round #5.

If you have any questions, I can be reached at 415/744-2368.

Sincerely,

for

Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

Enclosure

cc: Mr. Tayseer Mahmoud, DTSC
Mr. Larry Vitale, RWQCB
Mr. Dante Tedaldi, Bechtel
Mr. Andy Pizskin, Southwest Div.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

May 16, 1996

MEMORANDUM

SUBJECT: Review Comments on Quarterly Groundwater Monitoring Groundwater Data Trends and Recommendations Report

FROM: Herbert Levine, Hydrogeologist
FFCO, Technical Support Section

TO: Bonnie Arthur, RPM
FFCO, Navy Section

Per your request I have reviewed the above mentioned documents. I have included Dante Tedaldis' comments as numbers 7, 8 & 9 on the Quaterly Groundwater Monitoring Report. In general these documents do not provide groundwater information in a suitable format for evaluating all relevant data. EPA has previously written to and discussed data presentation with the Navy , which was not incorporated. The method which was employed by the Navy in previous monitoring reports is preferable. The previous report allowed for evaluation of trends for all constituents within a given well. Included was a map showing location and a lithology log and well completion graph. The report reviewed here does not allow for such a comprehensive review without considerable input from the reviewer. As example, the data tables are organized by analytical methods and the plume map does not include well identifiers. To evaluate spacial and within well trends the reviewer needs to check analytes in each data table and then construct a plume map. This is extremely time consuming and not a good use of my (or other reviews) time. Since the Navy will be collecting and reporting groundwater data for at least the next several decades it would be beneficial to use the previous reporting method.

The data trends and recommendations are premature, the three sampling rounds are not sufficient for evaluating trends. The evaluation of metals filtered vs. unfiltered is not useful since the Navy used bailers. EPA has provided the Navy with information regarding unfiltered samples using the low flow purge and sample method, which was not used in this round.

Specific Comments

Quarterly Groundwater Monitoring Report

1. Section 2.4 page 2-4, bailers are not acceptable for collecting groundwater samples for metal analysis. It is my understanding that after having discussions with the Navy regarding this issue that the Navy would use the low flow purge and sample method using a well pump. The bailers tend to act as surge blocks and introduce formation material into the well casing.

2. Section 4.1 page 4-1, please breakout the voc contamination for each saturated zone and present separately.

3. Section 4.2, page 4-2, the map of TCE in groundwater including data from both saturated zones is not useful. Figure 4-1 should be revised to present data from each saturated zone separately. The revised figure should include well identifier posted at the wellhead.

4. Section 4.3, page 4-4, the map of PCE in groundwater including data from both saturated zones is not useful. There is no significance of a 1 ppb contour for PCE, this should not be included in the revised figure. Figure 4-2 should be revised to present data from each saturated zone separately. The revised figure should include well identifier posted at the wellhead.

5. Table 4-1 should be revised to present data on a within well basis as well as a within contaminant basis. For example see Groundwater Quality Data Report 30 September 1994.

6. Section 7.2, page 7-2 this evaluation has no merit since the data were collected using a bailer. The purpose of this evaluation was to determine dissolved concentrations in groundwater without including formation material. As previously discussed, bailers tend to act as surge blocks and introduce formation material into the well bore. The comparison presented here has no scientific validity and should be deleted from this document and repeated correctly in the next sampling round.

7. Table 7-1. This table reports significant increases in several metals, in particular chromium and iron. It appears that there is a strong relationship between these two analytes. In unfiltered samples, iron levels are approximately 10 times the chromium levels. This situation should be examined in detail since the elevated chromium levels are significant. A recent publication, 1996 Winter Ground Water Monitoring Review pp. 93-99, 'Nickel and Chromium in Ground Water Samples as Influenced by Well Construction and Sampling Methods', provides an excellent reference to this phenomenon. The Navy should examine the potential reasons for the apparent increase and provide an evaluation. Crevice corrosion in the stainless steel wells may be the source of chromium; however, modifications to sampling technique may be successful in alleviating the inclusion of corrosion releases into the samples. The filtered and unfiltered samples may be used for examination of the effect of colloids on the measured metals values. It appears that the effect of filtering was significant for only these two metals.

8. The measured dissolved oxygen levels listed in Appendix C are often in excess of the theoretical maximum for natural waters. The solubility if oxygen for water exposed to water-saturated air at atmospheric pressure and no salinity ranges between 9.7 and 8.1 mg/L between 17 and 26° C respectively (see Standard Methods, 17th Ed., 1989). At least 25% of the reported dissolved oxygen values for MCAS EL Toro are in excess of the theoretical maximum. A closer examination of these data is required because a substantial portion of the other measurements are at or very near saturation. This situation does not appear likely given that the Marine Corps' geochemical model for the station proposes that substantial pyrite oxidation is occurring throughout the vadose and saturated zone. Therefore it can be expected that oxygen consumption during pyrite oxidation would reduce dissolved oxygen values to levels noticeably less than what was reported. This decrease does not include further reductions due to the consumption of dissolved oxygen by reaction in the organic-rich layers of the surface soils. Freeze and Cherry (Groundwater, 1979; p.245) have noted that in recharge areas of silty or clayey soils, groundwater commonly does not contain detectable dissolved oxygen. Thus, the predictions and expected conditions do not support the measured dissolved oxygen values and the data collection techniques should be reexamined to ensure that proper procedures were followed and instrument calibrations were verified.

9. In Appendix D the report notes that air entrainment in water collected at selected locations as reported by DTSC in 1993 has been confirmed. The issue of air entrainment in the discharge of 4-inch well pumps appears to have been deferred to the "... well pump maintenance activities." It is not clear what the intent of this statement is. Please provide detail as to what the next actions are with respect to this confirmed problem.

Groundwater Data Trends and Recommendations Report

1. Figures 1.2 and 3-10, please include wells 18_MCAS09, 18_BGMP10, and the Culver Dive water supply well.

2. Section 2.2, page 2-2 data from Orange County wells should be included in data trends.

3. Section 3.1.4, page 3-8, hydrographs for each well should be presented, preferably on the same page as concentration trends for each contaminant. For example see Groundwater Quality Data Report 30 September 1994.

4. Section 3.1.4, page 3-9, table in B-1 should flag quantification results greater than MCLs. Preferably this should be presented graphically, For example see Groundwater Quality Data Report 30 September 1994.

5. Section 3.2.2, page 3-15, Figure 3-9 is not acceptable. The Navy should present data from each saturated zone separately. Well identifiers should be posted at the well head. The conclusion presented here that the extent of contamination is defined is agreed with. However, there does appear to be concentration decrease and increase with time. This suggests that there might be other factors involved which were not included in the evaluation. The impact of changing water levels and recharge/discharge needs to be evaluated. This will be useful in determining the optimum time to sample, as well as

17. Section 5 , page 5-1, agree with item one, except for format. EPA prefers using the more comprehensive format which the Navy used for rounds 1 & 2. Disagree with item 2. Quarterly sampling should continue as discussed in comments 8, 9, and 15. Disagree with item 3. The Navy should evaluate long term monitoring and continue monitoring. EPA will consider alternative frequencies and analytes, but only after completing the evaluation currently underway.

sampling frequency.

6. Figure 3-11, page 3-19, data from these wells are form outside the sampling range reported in Section 2.2. The Navy should present all data available. The use of a dashed line is not appropriate, the revised Figure should not include this.

7. Section 3.2.3, page 3-20, Figure 3-12, the Navy should remove the 1 ppb contour line.

8. Section 3.2.5, page 3-24, comment #4 above applies here as well. Given that TCE has varied with time in the past the statement that levels are decreasing is premature. It is more appropriate to note that a limited data set does not support the evaluation of variable data. The time series analysis should be graphically constructed for each well with a bold horizontal line drawn for the MCL.

9. Section 3.5, page 3-29, the discussion of filtered vs. unfiltered is not relevant given that the samples were not correctly obtained. This comparison should be repeated during the next sampling round using low flow purge and sample methods.

10. Section 4.2.1, page 4-4, I disagree with the conclusion presented here for the main voc plume. The decreasing trend is supported with one additional data point (1996) without evaluation of impacts from recharge/discharge nor changing water levels. The sampling should be continued quarterly until the effects of recharge/discharge and changing water levels is evaluated. Then, with the use all available data the Navy can determine the frequency of sampling and the appropriate times to sample.

11. Section 4.2.1, page 4-4, I agree with the assessment of site 2 voc plume with exception to sampling frequency as discussed in comment # 9.

12. Section 4.2.1, page 4-5, agree with conclusions regarding the occurrence of benzene and the suggestion to monitor quarterly.

13. Section 4.2.4, page 4-5, agree with conclusions regarding the landfill sites.

14. Section 4.2.5, page 4-6, disagree with this conclusion, see comment # 8.

15. Section 4.2.6, page 4-6, agree that more groundwater elevation data is appropriate.

16. Section 4.5, page 4-7, agree with first bullet, disagree with the others. It is premature to decrease the sampling frequency as discussed in comment # 9. The wells in the center of the plume are of particular interest. If the concentration of TCE is indeed decreasing then the collection of more data might support natural attenuation for some or all of the off base plume. This would result in far greater cost savings than not sampling those wells. Disagree with the observation that background wells be sampled semiannually as discussed in comment # 8. Once the filtered vs. unfiltered evaluation is made, the Navy could sample the upgradient wells annually. Wells in the main voc plume (site 24) should be sampled quarterly as discussed in comment # 9.

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Region 4
West Broadway, Suite 425
Beach, CA 90802-4444

(310) 590-4858

May 16, 1996

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 REMEDIAL INVESTIGATION 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 March 13, 1996 received at our office on March 21, 1996, prepared by Bechtel National, Inc. The report presents the results of Remedial Investigation (RI) conducted 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 comments, the Regional Water Quality Control Board comments dated May 15, 1996, and the California Integrated Waste Management Board comments dated April 30, 1996 on the report. The report is well written and acceptable. A few clarifications and modifications are needed as outlined in the enclosed comments. Please incorporate the agreed upon comments, where appropriate, and send us a response to comments along with a revised document. We appreciate the high quality document and the effort of the consultant who prepared this huge report. We look forward to meeting you and your consultant to discuss the comments. 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.

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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Remedial Investigation Report For Site 17, OU-2B
Marine Corps Air Station El Toro
Dated March 1996

GENERAL COMMENTS:

The report presents the results of the Remedial Investigation (RI) conducted at Site 17, the Communication Station Landfill, to support decisions regarding the need for and scope for future remediation at the site. Data to support the landfill extent includes visual mapping, surface geophysics, trenching (Five trenches which ranged from 8 to 180 feet in length and from 1.5 to 12 feet in depth), soil borings, topographic and base maps, aerial photograph review, and interviews with MCAS El Toro personnel. The report contains data and results from the Phase II RI. In addition, the report presented previous investigations such as the Phase I RI and Air SWAT. To determine the nature and extent of contamination, the report described the sampling activities performed in air, soil gas, soil, groundwater, and flora and fauna as follows:

Air Sampling: Four types of air sampling were conducted: instantaneous surface sampling over the entire landfill; 25-minute integrated surface samples from the landfill surface; 24-hour ambient air samples at the landfill perimeter; and isolation flux chamber samples from the landfill surface. Fourteen (14) air samples were collected during the Phase II RI, including three (3) integrated, six (6) ambient air samples and five (5) isolation flux samples were taken. In addition, instantaneous surface samples 2-3 inches from the surface were collected over the entire landfill. Air sampling indicated that volatile organic compounds (VOCs) are being emitted from the surface of the landfill at concentrations near the detection limits of the analytical methods and below regulatory limits.

Soil Gas: During a 1990 Air SWAT, seven soil gas samples were collected at a depth of approximately eight feet below ground surface (bgs). During Phase II RI, 23 shallow soil gas samples were collected at 20 locations from depths ranging between 3 and 15 feet bgs. Five of 21 soil gas samples detected 1,1,2-Trichlorotrifluoroethane (F-113) at between 1 and 2 µg/L. The F-113 concentration does not exceed the hotspot threshold of 300 parts per million by volume. Eight deep soil gas samples were obtained at depths ranging from 82 to 94.5 feet bgs. Freon-113 was detected in 1 of 8 gas samples (20 µg/L). Toluene was detected in 5 of 8 samples (1 to 3 µg/L).

Perimeter Gas Migration Sampling: Eight (8) perimeter soil gas samples were collected from two sampling stations during Phase II RI. Only two of six proposed sample locations were placed due to access difficulties or dense bedrock that prevented probe placement. The northern sample location (17PG2) obtained gas samples at 10, 25, and 40 feet bgs, and the southern sample location (17PG1) collected samples only at 10 feet bgs. The analyses of the samples detected 1,1,2-Trichlorotrifluoroethane (F-113), 1,1-Dichloroethane (1,1-DCE), and Methane.

Soil Sampling: Sixteen (16) samples were collected from 8 sampling stations during the Phase I RI. Fifteen (15) composite samples from 15 randomly selected locations (less than 1 foot bgs) were collected during Phase II RI. VOCs, TPH, SVOCs, Herbicides, Metals, and Aroclor were detected in shallow soil. The concentration of the VOCs did not exceed the U.S. EPA residential PRGs.

Ten (10) subsurface samples (greater than 10 feet bgs) were collected from two locations during Phase I RI. Fourteen subsurface samples were collected during Phase II RI soil borings and installation of lysimeters and monitoring wells. Levels of VOCs, SVOCs, pesticides, herbicides, radionuclides, metals, dioxins, and petroleum hydrocarbons were detected. No VOCs were detected above the U.S. EPA residential PRGs. One sample detected SVOC, but at a concentration below the U.S. EPA residential PRG.

Leachate: Three lysimeters were installed, however, due to technical difficulties, no moisture samples were collected.

Groundwater: Groundwater samples were collected from three locations: one upgradient and two downgradient wells. VOCs, SVOCs, metals, petroleum hydrocarbons and gross alpha and beta activity have been detected in groundwater samples. VOCs, SVOCs, and petroleum hydrocarbons were detected at levels below U.S. EPA PRGs. Manganese, selenium, and thallium were detected above either the U.S. EPA or California DHS MCLs.

Ecological: From Appendix Q, there were 15 plant samples collected for fixed based laboratory analysis of 70 organic, pesticide and herbicide chemicals along with 23 inoganic analytes; there were 14 mammalian samples collected for fixed based laboratory analysis of 53 organic, pesticide and herbicide chemicals along with 23 inorganic analytes.

For the reference site, there were 15 plant samples collected for fixed based laboratory analysis of 68 organic, pesticide and herbicide chemicals along with 23 inorganic analytes; there were 5 mammalian samles collected for fixed based laboratory analysis of 53 organic, pesticide and herbicde chemicals along with 23 inorganic analytes.

SPECIFIC COMMENTS:

1. Executive Summary, Conclusions, page ES-9

The Data Quality Objectives decision "Are landfill gases migrating out of the landfill at ground surface or in the subsurface" should include a discussion of the perimeter soil gas sample analyses. Six of eight perimeter soil gas samples detected methane and one sample detected F-113 and 1,1-DCE. Two of the samples that detected methane are listed in Table 12 of Appendix F as ambient air samples. Is there a possibility that the perimeter soil gas samples are actually within the boundary of the

landfill?

2. **Section 1.1.1, Guidance and Agreement, Figure 1-3**

Revise Figure 1-3 to add the Remedial Design step before Remedial Action. Also, add Certification step after Operation and Maintenance.

Reference to Department of Health Services now being California Environmental Protection Agency (Cal/EPA) is not accurate. The correct reference is Department of Toxic Substances Control (DTSC). Both DTSC and California Regional Water Quality Control Board (RWQCB) are under the umbrella of CAL/EPA.

Rewrite the sentence regarding FAA signatory agencies as follows: "The BCT consists of representatives from SWDIV, U.S.EPA, and Cal/EPA (DTSC & RWQCB)."

3. **Section 1.1.2, Remedial Investigation Approach**

Reference to Cal/EPA should be changed to DTSC.

4. **Section 1.2.1.1 Site Characteristics, page 1-13**

Revise the term "OU-28" in the third sentence of the second paragraph to "OU-2B."

5. **Section 1.2.2.2, Recent Station Operations, page 1-17**

Revise the first sentence in the second paragraph to read as follows: Currently, hazardous materials/wastes are managed under appropriate Federal, State, local, and DoN requirements.

Also, reference to on-Station RCRA-Interim-Status Storage Facility is not accurate because the term Interim-Status refers to temporary authorization until a final permit is received from the regulatory agencies. Please note that MCAS El Toro was issued a RCRA Hazardous Waste Storage Permit in August 1993. DTSC terminated the permit on March 8, 1996 after we accepted the closure certification for Building 673-T3. MCAS El Toro is allowed to store hazardous waste at generator accumulation areas for periods less than ninety (90) days.

6. **Section 1.2.3.1, PHASE I REMEDIAL INVESTIGATION RESULTS, page 1-21**

Please clarify whether the metal concentrations were compared to residential or industrial PRGs.

7. Section 2.4 TRENCHING, page 2-6

The report contains several maps which indicate the boundary of the landfill based on the RI. Appendix D contains several cross-sections of trenches excavated as part of the RI. The cross-section of trench 17TR1 indicates landfill debris in the southwest portion of the trench. Section 4.1.3 contains the comment that the southwestern 40 feet of this trench exposed landfill. However, Figure 2-1 on page 2-7 shows the trench outside the boundary of the landfill. Please clarify the rationale for not including the debris discovered in the trench 17TR1 within the boundary of the landfill.

8. Section 2.7.1 Surface Soil Sampling, page 2-20

This section states that in addition to the 15 sampling stations located at Site 17, 15 stations were located at a reference site west of Site 17. If Figure 2-5 contains the correct station locations, the "reference area"appears to be located southeast of Site 17. This section should explain the rationale for sampling the reference area. Please clarify the difference between reference samples and background samples.

9. Section 4.3.2 Perimeter Gas Migration Sampling, page 4-32

There are two discrepancies in the discussion of the Air SWAT. Please verify whether the first two sentences in the first paragraph are discussing site 2 or site 17. Also, the first paragraph and the fifth paragraph (on page 4-38) contain different number of samples collected and sampling stations.

10. Section 4.4.2, Subsurface Soil, page 4-69

The bulleted items indicate that pesticides were detected, yet, on page 4-70, the text states that pesticides were not detected. Please clarify the discrepancy in this section.

11. Section 4.5 LEACHATE, page 4-70

The third sentence in the first paragraph states that groundwater contamination is not present. This contradicts section 4.5 which states that VOCs, SVOCs, metals, petroleum hydrocarbons and gross alpha and beta activities have been detected in groundwater samples. Although many of the compounds are not at concentrations above their respective MCLs, their existence in the groundwater indicates the likelihood that leachate is migrating to groundwater.

12. Section 4.6.1.2, MONITORING WELL GROUNDWATER SAMPLES, page 4-95

In the first paragraph, the text misidentified groundwater monitoring wells 17NEW1 and 17NEW2 as 12NEW1 and 12NEW2, respectively. The last sentence of the first paragraph contains two incorrect statements; that four sampling events were conducted during Phase I, and the reference to figures 4-18 and 4-19.

13. Table 4-21, Compounds Detected in Groundwater - Phase I and Phase II, pages 4-97 though 4-21

The analysis for groundwater monitoring well 17NEW1 is missing from the Table. Also, please spell out the words for the initial TRG (See Notes, page 4-101).

14. Section 5, Fate and Transport, page 5-1

Pleas revise the first sentence of the fourth paragraph to state that the site conceptual model was developed for the Communication Station Landfill.

15. Section 5.1.1.2, Geology/Hydrology, PAGE 5-2

The third paragraph in this section states that groundwater at the southern end of site 17 "is encountered approximately 200 feet bgs in alluvial sediments where the flow turns to the west under the Tustin Plain." However, Figure 5-2 appears to indicate that the groundwater flow direction at the southern end of site 17 is to the north.

16. Section 5.1.2.3, Groundwater, page 5-4

There appears to be a discrepancy in the statements made in the first and second paragraphs. The first paragraph states that "Concentrations for VOCs and SVOCs were detected in the downgradient wells, ...," yet, the second paragraph contains the statement "These results (for the metals, manganese, selenium, and thallium) are the only indication of a potential impact to the groundwater in the area of the landfill, ..." VOCs and SVOCs detected in the groundwater are indications that the groundwater has been impacted by the landfill.

17. Section 5.3.2 Groundwater Transport, page 5-21

The report is minimizing the potential that the groundwater is transporting contaminants. The low concentrations detected in the monitoring wells can be an indication that 1) the landfill does not contain a large quantity of contaminants, 2) the majority of the contaminants have already flowed out of the landfill, 3) the contaminants are leaching out at a low rate, or 4) the contaminants detected in the wells are indicating the front of a contamination plume. At least another round of

groundwater samples should be collected to determine if the concentration fluctuates over time. This issue should be included for discussion at BRAC Team (BCT) meetings.

18. Section 5.4, Summary of Fate and Transport, page 5-21

The fate and transport summary stated in this section is not consistent with the Executive Summary (page ES-5). The Executive Summary states that leaching and surface water transport are the most significant transport mechanisms. Section 5.4 states on page 5-22 that migration in groundwater is the most significant for transport of contaminants. Please clarify this discrepancy.

19. Appendix S, Ecological Risk Assessment, Tables S-9 and S-10

The number of samples, N, should be specified.

20. Section 6 and Section 7, Human-Health Risk Assessment and Ecological Risk Assessment

For additional comments, please see attached Memorandum dated May 14, 1996 from DTSC staff Toxicologist, Dr. John Christopher.

21. Section 8.1.3, Fate and Transport, page 8-13

The second paragraph should be revised to state that ".... the fate and transport of contaminants at site 17 are important ...."

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governor

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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
Office of Scientific Affairs (OSA)
Human and Ecological Risk Section (HERS)

DATE: 14 May 1996

SUBJECT: MCAS El Toro: Site 17
PCA: 14740 Site: 400055-45

Background

Region 4 OMF has asked OSA for continuing support on issues regarding risk assessment at Marine Corps Air Station (MCAS) El Toro. This is 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). Site 17 is a landfill in the northern portion of the base. It has significant ecological resources both on the sites and close by. Under the current reuse plan, future development for residential use could occur nearby.

Document Reviewed

We reviewed "Draft Remedial Investigation Report, Operable Unit 2B, Site 17, Marine Corps Air Station El Toro, California". This document, dated March 1996, was prepared by Bechtel National, Inc., contractors to SWDIV.

Scope of Review

The document was reviewed for scientific content. Minor grammatical or typographical errors that do not affect the interpretation have not been noted. However, these should be corrected in any future version of the document. We assume that

sampling of environmental media, analytical chemistry data, and quality assurance procedures have been examined by regional personnel. If inadequacies in this regard for the purposes of risk assessment were encountered, they are noted. Any future changes or additions to the document should be clearly identified.

General Comments

1. **Overall Impression:** The risk assessments of human and ecological health are quite thorough but not always clear. OSA disagrees with some of the methods used. Several clarifications are required. The document can be made acceptable with respect to risk assessment upon adequate responses to the comments below.

2. **Ambient Concentrations of Metals:** The Navy used the maximum value detected in the set of background values for metals in soil, which might have led to inappropriate elimination of cadmium as an inorganic constituents of concern. The Navy's analysis of their set of background values for soil is incomplete.

3. **Human Health Risk Assessment:** The assessment is quite thorough and well written, but we believe the Navy has overestimated risks for the site. Potential exposures to organic chemicals were estimated using the maximum value detected instead of the recommended 95% upper confidence on the mean. Dermal intakes might have been overestimated.

4. **Ecological Risk Assessment:** We cannot accept the Navy's conclusions regarding non-human receptors because of questions about the methods used. Exposure point concentrations did not match those used to assess human health. The derivation of the toxicity criteria was not clear.

Specific Comments

1. **Ambient Concentrations of Metals, Appendix G:** OSA does not approve of the use of upper tolerance limit (UTL) for estimating quantiles of distributions of ambient concentrations of metals, as described on page G-2. The UTL, which is an upper bound on a quantile, can yield an inflated estimate when the sample size is small. For this reason, we recommend using a simple estimate of the quantile, provided the raw or transformed data can reliably be fitted to a normal distribution. If metals are selected as chemicals of potential concern with this procedure but these metals are actually present within the range of background, subsequent levels of decision in the process, i.e. risk assessment and risk management, can be used to correct inequities.

In fact, the method used for selection of inorganic constituents of concern was to compare the highest value detected (C_{MAX}) at the site to the highest detected value among 43 samples judgmentally determined not to have been impacted by site-related activities. OSA does not agree the use C_{MAX} for this purpose for two reasons. First, chemical analysis samples might reveal anthropogenic impacts where none were thought to occur. Second, simple statistical methods, such as plotting cumulative probability, are readily available to determine whether C_{MAX} is a reasonable estimator. These simple methods have been employed successfully at several other Navy bases in California.

Table G-4 presents the summary statistics for ambient metal concentrations. The column labeled "Calculated UTL Value" contains the value for C_{MAX} for 11 of 23 metals, which would seem to make "UTL" a misnomer. With the exception of cadmium, the values shown in this column are similar to values we have seen to represent the upper range of ambient conditions for other military bases in Orange County. The value for cadmium is extremely high; C_{MAX} for cadmium was perhaps one order of magnitude higher than we would have expected. We are accustomed to seeing the 95th quantile for cadmium between 1 and 2 mg/kg. The use of 11.4 mg/kg could have led to inappropriate exclusion of cadmium as a chemical of concern. The Navy should present a detailed analysis of ambient cadmium concentrations.

2. **Chemicals of Potential Concern (COPC) in Water, Secs. 6.1.3, Table RI-2:** The value for selenium in the upgradient well, 56.8 µg/L, is surprisingly high. Please explain this. It seems possible that this metal might have been inappropriately eliminated as a COPC.

3. **Exposure Point Concentration (EPC), Sec. 6.2.3, p. 6-8, p. R-1, Table RI-1:** A potential problem arises when C_{MAX} is used as the EPC. The rules described on page R-1 for selecting EPC seem reasonable, especially if high detection limits or very low frequencies of detection are encountered, because these conditions make estimates of the mean uncertain or artificially inflated. However, in Table RI-1 for Site 2, C_{MAX} is selected as the EPC for 34 of 44 detected organic chemicals, even though detection limits are acceptably low for nearly every chemical. Surely, something is wrong with such a method. The Navy and the agencies should meet to arrive at a consensus on this subject.

   Table RI-1 also shows "Background UTL" values for six pesticides. We do not see any purpose for these values. They were clearly not used for selection of COPC. They cannot be used for estimation of risk in background, because this would

require 95% upper confidence limits on mean values as EPCs. Please remove this column from this table.

4. **Dermal Absorption Factor, Table RII-1:** We assume that the values in this table are intended for application into the equation on page R-14 for dermal contact with soil. As such, no value greater than about 25% (2.5E-01) is likely and no value greater than 100% (1E-00) is possible. However, many values in this table are greater than 50%, even much greater than 100%. We recommend that the Navy use the values in the Department's *Preliminary Endangerment Assessment Guidance Manual* (DTSC, 1994).

   It seems likely that dermal intakes for many chemicals might have been overestimated. We strongly urge the Navy to verify that reasonable values were used for estimation of dermal intakes.

5. **Risk Characterization, Sec. 6.4, pp. 6-16 ff.:** Figures 6-1 through 6-7 are particularly well done. The conceptual site model is easy to understand; contributions to risk and hazard by pathway and chemical are clearly and dramatically shown for each receptor group

   We do not disagree with the Navy's conclusions regarding human health risk as given in Section 6.4. However, the factors enumerated in comments 3 and 4 suggest that the Navy has overestimated human risks and hazards at Site 17, especially via the dermal route of exposure. We concur that the greatest cancer risk arises from residential exposure to arsenic and volatile organic chemicals in groundwater (Figure 6-3), while the greatest non-cancer hazard comes from exposure to metals in groundwater.

6. **Uncertainty in the Exposure Assessment, Sec. 6.5.2, p. 6-28:** Somewhere in this section, the Navy should present a discussion of how the use of C_{MAX} as the exposure point concentration might have overestimated risk or hazard.

7. **Chemicals of Potential Ecological Concern (COPEC), Sec. 7.2.2.3, p. 7-6, Table 7-1, Sec. T1.1, p. T-2:** Departmental guidance on ecological risk assessment, cited in the Navy's report, does present a discussion on why COPC do not necessarily have to match COPEC. We note that the following metals were selected as COPEC (Table 7-1) but were deselected as COPC for human health after comparison with background (Table RI-1): aluminum, antimony, cobalt, and vanadium. Comparison with background should yield identical lists of metals. Treatment of background concentrations of metals continues to be a problem; the Navy, the Department, and USEPA must resolve this confusion and controversy.

Using the rules on page S-1 and the frequencies of detection from Table RI-1, methoxychlor would not be selected as a COPEC due to low frequency of detection, while endrin and endrin ketone should have been included along with endrin aldehyde.

8. **Intake Factors, Table 7-3:** This table would be easier to read if scientific notation were used.

9. **Assessment Endpoints, Table 7-4:** For carnivores and raptors, the principal exposure is via prey items. Therefore, the information in the right-hand column should describe food chain modeling, bioconcentration, etc. Toxicity to the predator via direct contact is not likely to be relevant and toxicity to food items via direct contact should be covered in assessments of those trophic levels.

10. **EPC, Sec. S.1.4, p. S-4, Table S-11:** The very useful discussion of the rules for determining EPC is much more detailed than that presented in Section 6.2.3 for human health. Please state that EPCs used for Site 2 are shown in Table S-11. Many EPCs for soil shown in Table S-11 differ from entries Table RI-1 for the same chemical. This is extremely confusing and requires clarification.

11. **Toxicity Benchmark Values, Secs. S.1.4, S.4.4, Tables S-4 and S-17:** We are unable to decipher how the toxicity screening criteria and toxicity benchmark values were derived and how they are used. What is the column labeled "Dose" in Table S-4? Is this an administered dose from a laboratory study? If so, what is the literature reference for the study? Is a "Modifier" the same as an uncertainty factor? How does one link the values in Table S-4 to those in Table S-17? If an allometric extrapolation was performed, what values were used for body weights and where did they come from? The text in Section S.3.2, "Body Size Scaling", is not adequate to reproduce the derivation. Please present tables with complete derivations of these toxicity criteria. The same comment applies to Table S-9 and toxicity criteria for plants and invertebrates.

12. **Risk Characterization, 7.5, Table S-16:** The Navy claims that a comparison of hazard indices, chemical by chemical and species by species, for Site 2 versus the reference area yields no differences greater than an order of magnitude. The construction of Table S-16 made such comparisons very cumbersome. Please construct tables with data from the site and the reference area juxtaposed for each species, e.g. one table for each species or two species per table at most. Also, please present summed hazard indices for each indicator species.

The Navy seems interested in basing its interpretation of the ecological assessment on the number and magnitude of hazard quotients which exceed those seen for the reference area. If this is the case, it would be useful to create a summary table with all the hazard indices, by chemical and species, which exceed the reference area. This table should contain some representation of the degree to which the value in the reference area was exceeded.

13. **Ecological Significance, Sec. 7.5.2, p. 7-21:** We cannot agree with the Navy's interpretation of the results of the ecological assessment, because we are unsure of the COPEC, the EPC, and the toxicity criteria.

Conclusions and Recommendations

1. The Navy should complete its analysis of the 43 samples designated as background, especially for cadmium. Such analysis should include plots of cumulative probability. If additional data are required to resolve ambiguities for one or more metals, the data base may be expanded to include samples from other locations on the base. Such an expansion need not be limited to Site 17; it could include data from all the sites investigated in Operable Units 2 and 3.

2. The Navy has probably overestimated risks to human health by choosing the maximum value detected to represent exposure. The Navy should propose a method more in keeping with the concept of the "reasonable maximum exposure". We are unsure whether dermal intakes have calculated correctly.

3. The ecological risk assessment can probably be made acceptable upon clarification of how exposure point concentrations were selected, how toxicity criteria for non-human receptors were derived, and by presenting the risk characterization in a more intelligible format.

Reviewer: Michael J. Wade, Ph.D., D.A.B.T. MJW
Senior Toxicologist, HERS

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

State of California

Memorandum

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

Date: May 15, 1996

From: CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - SANTA ANA REGION
2010 IOWA AVENUE, SUITE 100, RIVERSIDE, CALIFORNIA 92507-2409
Telephone: CALNET 632-4130 Public (909) 782-4130

Subject: DRAFT REMEDIAL INVESTIGATION REPORTS, LANDFILL SITES 2 AND 17, EL TORO MARINE CORPS AIR STATION

We have reviewed the subject reports dated March 13, 1996 and recieved by us on March 21, 1996. Based on the data in the reports, we have the following comments:

A. For Site 2

1. Provide a Chapter 15 closure cap for the landfill (Section 2581, Division 3, Title 23, CCRs) to minimize water infiltration and to eliminate the discharge of waste to waters of the state. In accordance with Section 2581, a two-foot foundation layer, a one-foot 10-7 cm/s low permeability layer, and a two-foot vegetative layer are required for the cap. Closure and postclosure maintenance plans are required and need to be submitted for our approval. For closure requirements, please see Section 2580. A copy is attached for your information.

2. Install a gas extraction and collection system to eliminate gas migration to the groundwater and gas emission to the atmosphere. Install gas monitoring probes to detect any gas migration to the atmosphere. For landfill gas related issues, the California Integrated Waste Board and the SCAQMD should be contacted. **Findings: Hot spots of soil gas are sporadic across the central portion of the landfill and consist primarily of Freon 12; volatilization of landfill gases will occur.**

3. Submit a Report of Waste Discharge (ROWD) for an Evaluation Monitoring Program (EMP) for the site. The ROWD shall consist of Form 200 and shall include the information required under Section 2550.8(k)(5) for the proposed EMP. The purpose of the EMP is to assess the nature and extent of the release from the landfill in the groundwater. After the EMP is completed, the MCAS El Toro shall submit an engineering feasibility study, proposing groundwater remediation alternatives, and a workplan for Corrective Action Program (CAP).

Findings: The presence of TCE, PCE, other VOCs, metals, and general water quality parameters indicate that the landfill has leached to groundwater and these contaminants have been transported by groundwater to off-site locations. The extent of the landfill boundary was defined; however, the extent of contamination off the site has not been defined.

4. Institute a surface water monitoring program. Monitor the surface water (Borrengo Canyon Wash) for metals, VOCs, and general minerals. Quarterly or semi-annual monitoring is recommended. **Findings: At Site 2, VOCs and high levels of metals were found in the surface water. At Site 17, large pieces of landfill debris were found in the drainage; no surface water sampling was conducted.**

B. For Site 17

Recommendations for Site 17 are essentially the same as those for Site 2 except that a gas monitoring program should be instituted. A gas extraction and collection may not be needed because only soil gas with low concentrations of VOCs and methane below the regulatory thresholds were found. VOCs were found in the groundwater but below USEPA's MCLs.

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

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

taminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) All residual wastes, including sludges, precipitates, settled solids, and liner materials, shall be compacted, and the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, and further provided that the moisture content of residual wastes, including sludges, does not exceed the moisture-holding capacity of the waste either before or after closures. Surface impoundments which contain only decomposable wastes at closure may be closed as land treatment facilities under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Sections 13260 and 13263, Water Code.

HISTORY

1. Change without regulatory effect of NOTE filed 4-6-88; operative 4-6-88 (Register 88, No. 17).

§ 2583. Waste Pile Closure Requirements.

(a) Waste piles shall be closed in one of two ways, as approved by the regional board:

(1) All waste materials and any components of the containment system which are contaminated by wastes shall be removed from the waste pile and discharged to an appropriate waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any soil or other materials beneath the closed waste pile that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such contaminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) A waste pile may be compacted, covered, and closed as a landfill under Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, or contains only dry waste and was not required to have a leachate collection and removal system under Section 2543(a) of this subchapter. Waste piles which contain only decomposable wastes may be closed as a land treatment facility under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2584. Land Treatment Facility Closure Requirements.

(a) During the closure and post-closure period, the discharger shall:

(1) continue all operations necessary to maximize degradation, transformation, or immobilization of waste constituents within the treatment zone,

(2) continue all ground water and unsaturated zone monitoring in compliance with Article 5 of this subchapter,

(3) continue all operations in the treatment zone to prevent runoff of waste constituents,

(4) maintain the precipitation and drainage control systems.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

Article 8. Closure and Post-Closure Maintenance

§ 2580. General Closure Requirements.

(a) Partial or final closure of new and existing classified waste management units shall be in compliance with the provisions of this article. If a unit has been partially closed in accordance with an approved closure plan by the effective date of these regulations, the cover over the closed portion does not need to be modified to conform to these regulations, unless monitoring data indicate impairment of beneficial uses of ground water. Classified waste management units shall be closed according to an approved closure and post-closure maintenance plan which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls in Article 4 of this subchapter, and the monitoring program requirements in Article 5 of this subchapter, throughout the closure and post-closure maintenance period. The post-closure maintenance period shall extend as long as the wastes pose a threat to water quality. For land treatment facilities, the postclosure maintenance period shall extend until treatment is complete.

(b) Closure shall be under the direct supervision of a registered civil engineer or a certified engineering geologist.

(c) Class II waste management units and Class III landfills shall be closed in accordance with one of the following options:

(1) landfill: pursuant to Section 2581 of this article;

(2) surface impoundment: pursuant to Section 2582 of this article; (3) waste pile: pursuant to Section 2583 of this article; or

(4) land treatment: pursuant to Section 2584 of this article.

(d) Closed waste management units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.

(e) Vegetation for closed waste management units shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the final cover.

(f) The regional board shall require the discharger to establish an irrevocable closure fund or provide other means to ensure closure and post-closure maintenance of each classified waste management unit in accordance with an approved plan.

Note: Authority cited: Section 1058, Water Code. Reference: Section Water Code.

§ 2581. Landfill Closure Requirements.

(a) Final Cover requirements:

(1) Closed landfills shall be provided with not less than two feet of appropriate materials as a foundation layer for the final cover. These materials may be soil, contaminated soil, incinerator ash, or other waste materials, provided that such materials have appropriate engineering properties to be used for a foundation layer. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice. A lesser thickness may be allowed for waste management units if the regional board finds that differential settlement of waste, and ultimate land use will not affect the structural integrity of the final cover.

(2) Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the foundation layer and compacted to attain a permeability of either 1×10^{-6}cm/sec or less, or equal to the permeability of any bottom liner system or underlying natural geologic materials, whichever is less. Permeability determinations for cover materials shall be as specified in Article 4 of this subchapter and shall be appended to the closure and maintenance report.

(3) Closed landfills shall be provided with not less than one foot of soil, containing no waste or leachate, placed on top of the material described in subsection (a)(2) of this section; the rooting depth of any vegetation planted on the cover shall not exceed the depth to the material described in subsection (a)(2) of this section.

(4) The cover shall be designed and constructed to function with the minimum maintenance possible.

(b) Grading requirements:

(1) Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least three percent. Lesser slopes may be allowed if an effective system is provided for diverting surface drainage from covered wastes.

(2) Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by water and wind shall be protected or designed and constructed to prevent such erosion.

(c) Throughout the post-closure maintenance period, the discharger shall:

(1) maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors;

(2) continue to operate the leachate collection and removal system as long as leachate is generated and detected;

(3) maintain monitoring systems and monitor the ground water, surface water, and the unsaturated zone in accordance with applicable requirements of Article 5 of this subchapter;

(4) prevent erosion and related damage of the final cover due to drainage; and

(5) protect and maintain surveyed monuments.

Note: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2582. Surface Impoundment Closure Requirements.

(a) All free liquid remaining in a surface impoundment at the time of closure shall be removed and discharged at an approved waste management unit. All residual liquid shall be treated to eliminate free liquid.

(b) Following removal and treatment of liquid waste, impoundments shall be closed in one of two ways, as approved by the regional board:

(1) All residual wastes, including sludges, precipitates, settled solids, and liner materials contaminated by wastes, shall be completely removed from the impoundment and discharged to an approved waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any natural geologic materials beneath or adjacent to the closed impoundment that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such con-

Cal/EPA

California
Environmental
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Agency

*Integrated
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Management
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APR 30 1996

Pete Wilson
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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 Remedial Investigation Report for Operable Unit 2B - Site 17, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

We have reviewed the subject document (six volumes) dated March 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:

1. Section 4.3.2, Perimeter Gas Migration Sampling, states that "Four gas migration samples were collected at four sampling stations at **Site 2**". It appears that this is a typographical error; if so, please correct it, otherwise please provide an explanation.

2. It appears that the field explorations aimed at delineating both the vertical and lateral extent of the landfill were limited to certain portions of the site (based on difficult terrain conditions). Since the field investigation has shown that the site's negative environmental impacts are minimal and since the site will remain as non-irrigated open space, the extent of the field investigations is satisfactory. However, should this site be affected by closure activities at other sites on the base (clean closure and/or landfill consolidation) or other postclosure land use is proposed, further field explorations may be advisable.

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

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TATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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(310) 590-4858

May 17, 1996

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 REMEDIAL INVESTIGATION 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 March 13, 1996 received at our office on March 21, 1996, prepared by Bechtel National, Inc. The report presents the results of Remedial Investigation (RI) conducted 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 comments, the Regional Water Quality Control Board comments dated May 15, 1996, and the California Integrated Waste Management Board comments dated April 30, 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 agreed upon 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

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DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Remedial Investigation Report For Site 2, OU-2B
Marine Corps Air Station-El Toro
Dated March 1996

GENERAL COMMENTS:

The report presents the results of the Remedial Investigation (RI) conducted at Site 2, the Magazine Road Landfill, to support decisions regarding the need for and scope for future remediation at the site. Data to support the landfill extent include visual mapping, surface geophysics, trenching (twelve trenches 8-180 feet long were completed to 2-9 feet deep), soil borings, topographic and base maps, aerial photograph review, and interviews with MCAS El Tor personnel. The report contains data and results from Phase II RI. In addition, the report presented previous investigations such as Phase I RI and Air SWAT. To determine the nature and extent of contamination, the report described the sampling activities performed in air, soil gas, soil, groundwater, sediment, surface water, and flora and fauna as follows:

Air Sampling: twenty-nine (29) air samples were collected during Phase II RI. Eleven (11) instantaneous surface samples 2-3 inches from the surface. Six (6) ambient air samples and twelve (12) isolation flux samples were taken. According to the fate and transport model, the low-level volatile organic compounds (VOC) emissions from the landfill surface are not impacting ambient air quality offsite.

Soil Gas: During Phase II RI 342 shallow soil gas samples were collected at 278 locations from depth 15 feet below ground surface (bgs). Several areas of total VOC concentrations exceeded the hot spot threshold of 300 ppm_v.

Perimeter Gas Migration Sampling: Samples were collected at four sampling stations during the Air SWAT at depth of 6 feet bgs. Twenty (20) samples collected at six sampling stations during Phase II RI at 10, 25, and 40 feet bgs. Results from both the Air SWAT and the Phase II perimeter gas suggest that methane is not migrating beyond the landfill perimeter in excess of the federal standard of 5 percent (50,000 ppm_v). Control of methane emissions in a limited area of the landfill would be necessary to bring the landfill into compliance with South Coast Air Quality Management District (SCAQMD) Rule 1150.2

Soil Sampling: During Phase I RI, 14 shallow soil samples from eight sampling locations (0-2 feet bgs) were taken. Fifteen (15) composite surface samples from 15 randomly selected locations (less than .5 feet bgs) were collected during Phase II RI. Low levels of VOCs, TPH, SVOCs, and Aroclor were detected in shallow soil. Metals detected were below background levels.

Sixteen (16) subsurface samples (greater than 10 feet bgs) were collected during Phase I RI from a soil boring and four Phase I monitoring well soil borings. Forty-four subsurface samples were collected during Phase II RI from eight monitoring well soil borings. Low levels of VOCs, SVOCs, pesticides, herbicides, and metals were detected. Herbicides were

detected at significant concentrations in one sample from a depth of 50 feet bgs.

Leachate: Based on groundwater contamination at Site 2, leachate from landfill has evidently impacted groundwater.

Groundwater: Groundwater contamination was identified at Site 2 during Phase I RI based on four sampling events collected from four monitoring wells. During Phase II RI, eight additional monitoring wells were installed to evaluate the horizontal and vertical extent of contamination. Hydropunch groundwater samples were collected from Phase II monitoring well locations. A total of 28 groundwater samples have been collected at Site 2. TCE maximum concentration of 91 µ/l was detected. SVOCs and metals were detected above the MCLs. SVOCs appear to be limited to the vicinity of monitoring wells 02NEW2, and 02_DGMW59.

Sediment: Fifteen (15) sediment samples were collected from six Phase I RI locations at depths of 0, 2, and 4 feet bgs. Three sediment samples were collected during Phase II RI. VOCs, SVOCs, pesticides, herbicides, and metals were detected at low concentrations. The highest TRPH concentration was 4,555 mg/kg at the stained area location 01_SA3.

Surface Water Drainage: Two drainages bound at Site 2 landfill, the Borrego Canyon Wash to the east and the west fork of Borrego Canyon Wash on the west. Surface water samples runoff were collected during storm events in 1993 from Phase I four locations. For Phase II RI, surface water samples were collected from three locations in 1996. VOCs, TPH, metals, and gross alpha/beta were detected in surface water samples during Phase I RI. The evaluation of whether the detected concentrations are significant will occur when the 1996 results are available and will be incorporated into the Final RI Report.

Surface Water Seep: During Phase II RI, samples were collected from two locations. VOCs, SVOCs, pesticides, and metals were detected.

Potential for further erosion of landfill by surface storm runoff with associated transport of debris and waste materials exist under the current conditions of the site.

Flora and Fauna: The Department reviewed the data in Appendix Q, Part III. Discounting duplicates and spikes: there were 15 plant samples collected for fixed based laboratory analysis of 70 organic, pesticide and herbicide chemicals along with 23 inorganic analytes; there were 11 mammalian samples collected for fixed based laboratory analysis of 53 organic, pesticide and herbicide chemicals along with 23 inorganic analytes.

The reference site had 15 plant samples for fixed based laboratory analysis of 68 organic, pesticide and herbicide chemicals along with 23 inorganic analytes; and there were 5 mammalian samples collected for fixed based laboratory analysis of 53 organic, pesticide and herbicide chemicals along with 23 inorganic analytes.

SPECIFIC COMMENTS:

1. **Executive Summary, Remedial Action Objectives**

   Add the following remedial action objective:

   - Containment monitoring and/or treatment for groundwater. This remedial action objective is listed under DQO #6 on Table 1-1.

2. **Executive Summary, Nature and Extent of Contamination, page ES-5**

   The Report concludes that gross alpha and beta activity in groundwater is a result of naturally occurring potassium in the area. Additionally, Section 4.6.4 - Gross Alpha and Gross Beta, reports gross alpha and gross beta values are a reflection of natural processes, providing no other explanation for MCL accedences. The text states, "The levels detected in groundwater samples collected up- and down gradient of Site 2 do not definitively indicate that the landfills have contributed to gross alpha and gross beta particle activity in groundwater." However, the distribution of reported gross alpha and gross beta particle activity does not necessarily indicate that the landfill is not a contributing factor. It is suggested to calculate a base-wide and/or site-specific background value for gross alpha and beta values before concluding elevated values in groundwater are resultant only from naturally occurring processes.

3. **Executive Summary, Potential Fate and Transport Mechanisms, page ES-6**

   The Report concludes that TCE and PCE contamination in groundwater appears to be derived from point sources in the landfill. This conclusion needs clarification. Include a discussion in Section 4 - Nature and Extent of Contamination, how the analytical and physical data collected during the Phase I and Phase II remedial investigation identifies multi-point sources in the landfill. Later in the document, but not in the executive summary, it is noted that these sources are most likely no longer present. This point should be restated in the executive summary if it supportable.

4. **Executive Summary, Human Health Risk Assessment, page ES-7, 4th paragraph**

   The values represent individual risk calculated under the USEPA and Cal-EPA methods respectively. Therefore, it is probably better to identify them as such and clarify that they do not represent a range.

5. Section 1.1.1, Guidance and Agreement, Figure 1-3

Revise Figure 1-3 to add the Remedial Design step before Remedial Action. Also, add Certification step after Operation and Maintenance.

Reference to Department of Health Services now being California Environmental Protection Agency (Cal/EPA) is not accurate. The correct reference is Department of Toxic Substances Control (DTSC). Both DTSC and California Regional Water Quality Control Board (RWQCB) are under the umbrella of CAL/EPA.

Rewrite the sentence regarding FAA signatory agencies as follows: "The BCT consists of representatives from SWDIV, U.S.EPA, and Cal/EPA (DTSC & RWQCB)."

6. Section 1.1.2, Remedial Investigation Approach

Reference to Cal/EPA should be changed to DTSC.

7. Section 1.2.2.2, Recent Station Operations

Revise the 1st sentence in the 2nd paragraph to read as follows: Currently, hazardous materials/wastes are managed under appropriate Federal, State, local, and DoN requirements.

Also, reference to on-Station RCRA-Interim-Status Storage Facility is not accurate because the term Interim-Status refers to temporary authorization until a final permit is received from the regulatory agencies. Please note that MCAS El Toro was issued a RCRA Hazardous Waste Storage Permit in August 1993. DTSC terminated the permit on March 8, 1996 after we accepted the closure certification for Building 673-T3. MCAS El Toro is allowed to store hazardous waste at generator accumulation areas for periods less than ninety (90) days.

8. Section 2.7.4, Analytical Methods, page 2-29, Table 2-6

The analyses biochemical oxygen demand and chemical oxygen demand were apparently not performed for the soil samples. This would be expected since these analyses are not used for solids such as dry soil. The total organic carbon measurement for soil should have been adequate. Confirm that these analyses were not performed or provide the data with interpretation.

9. Section 2.9.5, Groundwater Sampling, page 2-41

The text reports that dissolved oxygen measurements were recorded and presented in Appendix J. However, these data are not reported in Appendix J or anywhere else in the RI Report.

10. Section 3.1.4, Surface Water, page 3-5, Figure 3-2

Consider changing the descriptor from an active stream channel to an ephemeral stream channel.

11. Section 3.3, Regional Geology, Figure 3-4

Please show Site 2 on Figure 3-4.

12. Section 3.5.2, Regional Occurrence and Movement of Groundwater

Please change "...approximately 45 to 60 feet bgs in the foothills..." to "approximately 30 to 60 feet bgs in the foothills...." Recent water level measurements indicate depth to water in 02_UGMW25 is about 30 feet below the top of the well casing.

The discussion provides depth to groundwater below ground surface (bgs), however, groundwater contours elevations on Figure 3-8 are shown from mean sea level (MSL). Please clarify the text by providing the elevations of ground surfaces above MSL when reporting the distances below ground surface.

13. Section 3.7.1, Vegetation Communities, page 3-52, top line

"...(Section 6)..." should be ...(Section 7)....

14. Section 4, Nature and Extent of Contamination, page 4-1, 3rd paragraph, 2nd to last sentence

Consider adding clarification of the RI focus by including the following at the end of the sentence, "...[in the media surrounding the landfill] and defining the areal extent of the landfill."

15. Section 4, Nature and Extent of Contamination

Please include a table in Section 4 listing the analytical methods employed for soil and groundwater samples.

16. Section 4.1.3, Trenching, page 4-9

It came to DTSC's attention that medical waste was exposed during trenching at Site 2. Please indicate in the final report if medical waste was exposed while trenching.

17. Section 4.2.2, Integrated Surface Air Sampling, page 4-23,Table 4-4

The air flux data seem to conflict with other results and the text may benefit from a greater discussion of these trends. This comment uses methylene chloride as the example; however, the flux data for several other compounds also appear suspect.

The table indicates that methylene chloride was not detected during the Phase II work in the integrated surface air samples. However, the Phase II isolation flux chamber showed measurable levels of methylene chloride in three of the six locations examined. The ambient air samples and shallow soil gas for Phase II also showed that methylene chloride was not detected. It seems unusual that there would be a measurable flux of an analyte which was not found by any other technique, unless the sensitivity of the analyses were substantially different.

18. Section 4.4.1, Shallow Soil, page 4-55

The process for the selection of COPCs is inconsistent in the text and should be clarified.

The text states that "All organic compounds detected in shallow soil with concentrations that exceed U.S. EPA residential soil PRGs are considered COPCs." However, on page 4-1 and 4-2 and in Section 6 the text indicates that a very different process (yet consistent with USEPA guidance) was used to identify COPCs.

Later, on page 4-187, 5th paragraph, the text notes that the distribution of the COPCs defined by PRGs is provided on Figure 4-26 the presentation within this figure may be in conflict with the COPCs listed in the baseline human health risk assessment.

19. Section 4.4.2, Subsurface Soil, page 4-57, Table 4-12

This table and other similar tables (e.g., Tables 4-13 and 4-16) in the RI do not achieve consistency between the indicated and the apparent units of measure for some of the organic analytes. For example, in Table 4-12 TPH and metals are presented for each boring in units [apparently] equivalent to mg/kg and SVOC data are [apparently] in units of microgram/kg; yet the indicated unit for all of these analytes is microgram/kg. Either the unit indicator or the numeric values must be corrected. Additionally, the complementary comparison PRG column in the table is in units of mg/kg and this makes comparisons between units cumbersome. Regulatory standards, such as PRGs, should always show exceedences by flagging the value (italics, bolding, highlighting, etc.).

20. Section 4.4.2, Subsurface Soil, page 4-117, Table 4-18, footer

The note indicates that shaded rows contain analytes detected above the PRG but it is not clear if these analytes are COPCs as defined in the risk assessment or by some other means or if this table is in fact a screening mechanism to develop a list of COPCs. In addition, background levels are provided in the table, yet no comparisons are apparently made with these values. Please make the entries in this table

consistent with the risk assessment.

21. Section 4.6, Groundwater, page 4-125, Table 4-21

Include the most recent analytical data from the Site 5 upgradient monitoring well, 05_UGMW27, in Table 4-21 since data from this well is used to evaluate the nature and extent of contamination for Site 2.

The analyte trichloroethylene as a target analyte appears twice in separate rows. This appears to be an error in presentation and should be in one row.

22. Section 4.6, Groundwater, page 4-139, Table 4-21

Several general chemistry parameters are presented with MCLs in apparently incorrect units. Confirm and correct if necessary the units for chloride, fluoride, sulfate, and bicarbonate.

23. Section 4.6.1.2, Monitoring Well Groundwater Samples, page 4-168, Figure 4-18

Here and elsewhere, consider listing the date of the sampling event in addition to the non-specific marker - sampling event 1, 2, 3 or 4.

24. Section 4.6.1.2, Monitoring Well Groundwater Samples, Figure 4-23

Figure 4-23 is a cross section showing the vertical distribution of TCE in groundwater at Site 2. It appears that Section B-B' printed on the cross section is a typographical error. Also, quantify the VOCs in the groundwater.

25. Section 4.6.3, Metals, page 4-180, 2nd paragraph

The text should be corrected to read Table 4-25 and the stated value of 36 percent of the manganese detections as above the MCL should be checked. The table does not support such a percentage and it indicates that the MCL is 0.5 mg/L and the maximum detected level was 0.367 mg/L.

26. Section 4.6.4, Gross Alpha and Gross Beta, page 4-183

The discussion of gross alpha and gross beta activity seems to require further development. There is insufficient data presentation to assess the degree of counting error associated with the measurements and this fact combined with the limited overall data set for radionuclides makes it difficult to determine if a measurement of 6 pCi/L is significantly different from 26 pCi/L.

27. Section 4.6.4, Gross Alpha and Gross Beta, page 4-184, Figure 4-25

The figure is apparently a description of gross alpha activity measurements and does not include gross beta and thus, the title should be changed.

28. Section 4.6.5, General Chemistry, page 4-183

Further explanation discussing the processes why TDS decreases down gradient should be included in Section 4.6.5 (reported TDS concentrations for the up gradient monitoring wells 02New11 is 1000 mg/l and 02_UGMW25 is 1380 mg/l, yet the reported concentration for the down gradient monitoring well, 02NEW1 is 428 mg/l).

29. Section 5.1.1.2, Geology/Hydrology, page 5-2, last sentence on the page

The persistence and extent of groundwater flow velocities identified in the document require enhanced discussion and clarification.

The text on page 5-2 identifies flow velocities between 15 to 280 ft/year in groundwater beneath the landfill. Later in the document on page 5-24 the text identifies a velocity of 142 ft/year in the southwest of the site and a velocity of 210 ft/year at the southwestern edge and west of the site. Later, the text notes that the velocity in the western and southwestern area was calculated at 12 ft/year. The extent of these vastly different flow velocity zones should be clarified. This point is significant because the flow and contaminant modeling work included in this report are dependent upon these values.

30. Section 5.1.2.4, Surface Water and Sediment

The 1st paragraph indicates that additional surface water samples will be collected when flow occurs in Site 2 drainage. Please provide approximate dates when the samples will be collected. Also, how will the data be reported to the agencies? Please note that Sections 4.8 and 4.9 indicate that Phase II surface water samples were collected.

31. Section 5.2.1.1, Physicochemical Parameters, page 5-11

The text identifies an average on-site value for total organic carbon as 137 mg/kg; however, there are no data referenced to support this value and the depth and type of material (e.g., clay or silty sand) to which this value applies are not noted.

32. Section 5.2.1.3, VOCS, page 5-15, Table 5-3

The authors should consider the anaerobic biodegradation half-life research conducted by the CLEAN I OU-1 IAFS team. Their research apparently concluded that the VOC biodegradation half-life is about 10 years and thus, significantly greater than the values listed in this table.

33. Section 5.2.1.3, VOCS, page 5-16, Figure 5-4

The order of preference for each degradation pathway should be identified as well as the relative rates (persistence). That is, is trans-1,2,DCE the preferential pathway and is the rate relatively fast until vinyl chloride is formed and then the rate of degradation of vinyl chloride is relatively slow?

34. Section 5.2.1.5, Metals, page 5-17

The statement regarding the altering of the "...chemical (valence) state..." of anthropogenic chemicals should be clarified. It is not clear what the meaning of this statement is. Neither is the intent of the statement that supersaturated metals may precipitate out of solution to form "...sediments..." It seems unlikely that the authors intended to use the word sediments.

35. Section 5.2.1.5, Metals, page 5-17

It appears that the authors believe that the landfill is under anaerobic or anoxic conditions and thus the reduction processes occurring are releasing free manganese and iron to solution. This seems to be supported by the groundwater data; however, the necessary interpretation and discussion is missing from the text. In addition, it appears that the authors did not intend to limit biodegradation to PAHs and the text should probably be changed to read "...organics..." in place of "...PAH compounds..."

These statements may be supported or refuted by the presentation of dissolved oxygen data from the wells screened near the landfill and within the main part of the VOC plume. Since these dissolved oxygen values are absent from the report, it is not possible to finalize the assessment at this time.

36. Section 5.3, Contaminant Migration, page 5-18

The text notes that the significance of the impact from VOCs will decrease as the source mass decreases. The subsequent modeling for groundwater was conducted with no source term so the meaning of the statement is unclear. Do the authors mean that there are continuing VOC sources in the soil, in the groundwater pore paces, or elsewhere?

37. Section 5.3.2, Groundwater Transport, page 5-24

The authors may want to consider a semiquantitative assessment of the potential for the presence of DNAPL similar to that provided in the CLEAN I OU-1 RI Report and CLEAN II Site 24 RI Report. Such an evaluation would provide additional support for their position regarding the absence of a continuing source.

38. Section 5.3.2, Groundwater Transport, page 5-24

The issue of concern here is that the mathematical modeling does not accurately reflect the site-specific conditions and may be conflict with the conceptual model presented within this section.

The text identifies a velocity of 142 ft/year in the southwest of the site and a velocity of 210 ft/year at the southwestern edge and west of the site. Later, seemingly in conflict with this statement the text then notes that the velocity in the western and southwestern area was calculated at 12 ft/year. Apparently this low velocity is for

the bedrock zone where the highest TCE level was detected in 02_DGMW60. The order of magnitude difference in velocities is due to the fact that the other values are representative of the faster moving flow through the alluvium above the bedrock.

On page 5-25 the authors note that their conceptual model is as follows: "Movement of the VOC contaminant plume through this area [12 ft/yr] is slow. However, in areas adjacent to this low-velocity zone, flow rates are as high as 210 ft/yr. As contaminants enter the region of higher-flow velocities (and a higher flux), they are diluted and dispersed rapidly down gradient to concentrations below regulatory criteria." While the distance "...down gradient..." at which this dilution becomes most evident is not stated, it can be inferred that it is not far from the current detected high of TCE. This being the case, the conceptual model is not supported by the mathematical modeling predictions which follow directly within this section of the RI. Inspection of the modeling results clearly indicates that the dilution phenomenon theorized above is of lesser significance that suspected and the plume will move several thousand feet away from its current location at levels in excess of MCLs over the next 30 years.

It appears that the pivotal assumption of the conceptual model is based on a single step drawdown test result (Phase II at 02_DGMW60 and k=0.0636 ft/day); however, no other measured bedrock hydraulic conductivities were close to this value. Consider that 02NEW2 had a k=1.24 ft/day and Phase I measured k=0.38 ft/day in 02_DGMW60 and 0.52 ft/day in 02_DGMW61. The authors should consider a reexamination of this situation, decide which model is preferred, and then fully explain their rationale for their conclusion.

39. Appendix R, page R-6

The authors note that the model was calibrated to hydraulic conductivity values between 1 and 4 ft/day; whereas, the actual values ranged between 0.06 and 4.7 ft/day. The difference between 0.06 and 1 ft/day is large enough to require greater scrutiny. Additionally, the model was adjusted for three zones of hydraulic conductivity; 4 ft/day, 2 ft/day, and 1 ft/day blocks. This approach does not compensate for the apparently very localized, yet significant area of low flow velocities near 02_DGMW60.

40. Section 7.2.2.4, VOCS in Groundwater, page 5-26 and 5-27, Figures 5-5 and 5-6

As noted previously, the modeling predictions are not supportive of the conceptual model which hypothesizes that the concentrations away from the current plume center should be rapidly diluted to levels below MCLs. In addition, the figures include a curious smearing effect along the northern no-flow boundary. This may be an artifact of the modeling mathematics and should be explained since it seems to imply that something, whether it be a pumping well, a low flow condition or something else, is restricting the transport of the VOCs along this barrier. The concentration contour values are not readable on Figure 5-6 and the

contours themselves are entirely absent from Figure 5-6b.

41. Appendix R, page R-6

The text indicates that the simulated flow field is in good agreement with the observed data. However, the presentation of the observed heads with the predicted heads is not provided so it is not possible to assess the accuracy of the statement.

42. Section 5.4, Summary of Fate and Transport, page 5-30

This summary reiterates the hydrogeologic conceptual model and neglects to account for the conflicting mathematical modeling results and thus the text should be reconsidered. Also, the issue of intermedia transfer should be addressed to a much greater degree within this and preceding subsection. The fact that groundwater is continually rising and falling and thus creating varying redox conditions within the landfill as well as possibly mobilizing readily soluble materials should receive more attention. The implications of these effects can be significant when considering final remedial actions needed for contaminant control.

43. Section 6, Human-Health Risk Assessment, page 6-1

Please make the selection of COPCs in both the Human-Health Risk Assessment and Ecological Risk Assessment consistent with Section 4, Nature and Extent of Contamination.

44. Section 6.1.2, COPCs in Soil and Sediment, page 6-6

The text notes that there are no background results for PAHs; however, CLEAN II under CTO-065 recently completed a PAH background study. If possible, these data should be considered as part of this assessment if they apply. See also Note C of Table 6-2 on page 6-17 and the second full sentence on page 6-19.

45. Appendix G, Figure G-1

The text associated with this figure does not include an adequate discussion of the flow chart items which extend out past the "yes" following the "Proportion of Non-Detect Data ≥15%." Include an explanation why an adjustment to the mean and standard deviation would be required and how it would be done. In addition, explain why an adjustment is only required for data sets with percentage non-detects ≥15 percent but ≤ 50 percent.

Pages G-4 through G-19 are missing.

46. Appendix T, Ecological Risk Assessment, page T-14, Table T-11

A 95 percent UCL is presented in the table for what is apparently (though not labeled as such) the surface concentrations; however, no complementary UCL is provided for the subsurface soil. Maximum and minimum and other basic statistics are provided; however, the data set (surface or subsurface) to which they apply is not indicated.

47. Appendix T, Ecological Risk Assessment, pages T-15 andT-16, Table T-11

The number of samples 'N' should be mentioned for each analyte.

48. Section 7.2.2.4, Exposure Pathways of Concern, page 7-8, 4th sentence

Please check the meaning of the sentence. Instead of "devoid of vegetation" the sentence probably should say "presence of vegetation."

49. Section 6 and Section 7, Human-Health Risk Assessment and Ecological Risk Assessment

For additional comments, please see attached Memorandum dated May 14, 1996 from DTSC staff Toxicologist, Dr. John Christopher.

50. Section 8.1.2, Nature and Extent of Contamination

One page 8-15 the 5th bullet item provides a general statement that sediment samples contained TRPH, TPH as gasoline, and MCPP, arsenic, and beryllium which exceed PRG's . . . etc. The statement may not be entirely true. Please rewrite that statement to specify which constituents were exceed.

51. Section 8.2.2, Recommended Remedial Action Objectives

See specific comment #1 regarding containment monitoring and/or treatment for groundwater.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
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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
Office of Scientific Affairs (OSA)
Human and Ecological Risk Section (HERS)

DATE: 14 May 1996

SUBJECT: MCAS El Toro: Site 2
PCA: 14740 Site: 400055-45

Background

Region 4 OMF has asked OSA for continuing support on issues regarding risk assessment at Marine Corps Air Station (MCAS) El Toro. This is 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). Site 2 is a landfill in the northern portion of the base. It has significant ecological resources both on the sites and close by. Under the current reuse plan, future development for residential use could occur nearby.

Document Reviewed

We reviewed "Draft Remedial Investigation Report, Operable Unit 2B, Site 2, Marine Corps Air Station El Toro, California". This document, dated March 1996, was prepared by Bechtel National, Inc., contractors to SWDIV.

Scope of Review

The document was reviewed for scientific content. Minor grammatical or typographical errors that do not affect the interpretation have not been noted. However, these should be corrected in any future version of the document. We assume that

sampling of environmental media, analytical chemistry data, and quality assurance procedures have been examined by regional personnel. If inadequacies in this regard for the purposes of risk assessment were encountered, they are noted. Any future changes or additions to the document should be clearly identified.

General Comments

1. **Overall Impression:** The risk assessments of human and ecological health are quite thorough but not always clear. OSA disagrees with some of the methods used. Several clarifications are required. The document can be made acceptable with respect to risk assessment upon adequate responses to the comments below.

2. **Ambient Concentrations of Metals:** The Navy used the maximum value detected in the set of background values for metals in soil, which might have led to inappropriate elimination of cadmium as an inorganic constituents of concern. The Navy's analysis of their set of background values for soil is incomplete.

3. **Human Health Risk Assessment:** The assessment is quite thorough and well written, but we believe the Navy has overestimated risks for the site. Potential exposures to organic chemicals were estimated using the maximum value detected instead of the recommended 95% upper confidence on the mean. Dermal intakes might have been overestimated.

4. **Ecological Risk Assessment:** We cannot accept the Navy's conclusions regarding non-human receptors because of questions about the methods used. Exposure point concentrations did not match those used to assess human health. The derivation of the toxicity criteria was not clear.

Specific Comments

1. **Ambient Concentrations of Metals, Appendix G:** OSA does not approve of the use of upper tolerance limit (UTL) for estimating quantiles of distributions of ambient concentrations of metals, as described on page G-2. The UTL, which is an upper bound on a quantile, can yield an inflated estimate when the sample size is small. For this reason, we recommend using a simple estimate of the quantile, provided the raw or transformed data can reliably be fitted to a normal distribution. If metals are selected as chemicals of potential concern with this procedure but these metals are actually present within the range of background, subsequent levels of decision in the process, i.e. risk assessment and risk management, can be used to correct inequities.

In fact, the method used for selection of inorganic constituents of concern was to compare the highest value detected (C_{MAX}) at the site to the highest detected value among 43 samples judgmentally determined not to have been impacted by site-related activities. OSA does not agree the use C_{MAX} for this purpose for two reasons. First, chemical analysis samples might reveal anthropogenic impacts where none were thought to occur. Second, simple statistical methods, such as plotting cumulative probability, are readily available to determine whether C_{MAX} is a reasonable estimator. These simple methods have been employed successfully at several other Navy bases in California.

Table G-4 presents the summary statistics for ambient metal concentrations. The column labeled "Calculated UTL Value" contains the value for C_{MAX} for 11 of 23 metals, which would seem to make "UTL" a misnomer. With the exception of cadmium, the values shown in this column are similar to values we have seen to represent the upper range of ambient conditions for other military bases in Orange County. The value for cadmium is extremely high; C_{MAX} for cadmium was perhaps one order of magnitude higher than we would have expected. We are accustomed to seeing the 95th quantile for cadmium between 1 and 2 mg/kg. The use of 11.4 mg/kg could have led to inappropriate exclusion of cadmium as a chemical of concern. The Navy should present a detailed analysis of ambient cadmium concentrations.

2. **Chemicals of Potential Concern (COPC) in Water, Secs. 6.1.3-6.1.4, Tables SI-2 and SI-3:** Values for selenium and chromium in the upgradient well are surprisingly high. Please explain this. It seems possible that these metals might have been inappropriately eliminated as COPC.

3. **Exposure Point Concentration (EPC), Sec. 6.2.3, p. G-11, p. S-1, Table SI-1:** A potential problem arises when C_{MAX} is used as the EPC. The rules described on page S-1 for selecting EPC seem reasonable, especially if high detection limits or very low frequencies of detection are encountered, because these conditions make estimates of the mean uncertain or artificially inflated. However, in Table SI-1 for Site 2, C_{MAX} is selected as the EPC for all 41 detected organic chemicals, even though detection limits are acceptably low for nearly every chemical. Surely, something is wrong with such a method. The Navy and the agencies should meet to arrive at a consensus on this subject.

4. **Dermal Absorption Factor, Table SII-1:** Department guidance allows a default value of 10% (1E-01) for dermal absorption of organic chemicals. However, on the first two pages of this table, the exponent for the dermal absorption factor is shown as 1E-00. Does the Navy mean to imply that these organic chemicals are

absorbed to the extent of 100% through the skin? For endosulfan I and endrin aldehyde, the value shown is 5E-00. Surely, this is an error. Please check to see which value was used in the risk assessment. It seems possible that dermal intakes might have been overestimated. In view of the rather striking contribution of the total hazard at this site estimated for the herbicide MCPP via the dermal route, we strongly urge the Navy to verify that reasonable values were used for estimation of dermal intakes.

5. **Risk Characterization, Sec. 6.4, pp. 6-16 ff.:** Figures 6-2 through 6-7 are particularly well done; contributions to risk and hazard by pathway and chemical are clearly and dramatically shown for each receptor group. In section 6.4.2.1, please use scientific notation for numbers with many zeroes to the right of the decimal.

   The factors enumerated in comments 3 and 4 suggest that the Navy has overestimated risk and hazard at Site 2. Therefore, we do not disagree with the Navy's conclusions regarding human health risk.

6. **Uncertainty in the Exposure Assessment, Sec. 6.5.2, p. 6-29:** Somewhere in this section, the Navy should present a discussion of how the use of C_{MAX} as the exposure point concentration might have overestimated risk or hazard.

7. **Chemicals of Potential Ecological Concern (COPEC), Sec. 7.2.2.3, p. 7-6, Table 7-1, Sec. T1.1, p. T-2:** We note that the following metals were selected as COPEC (Table 7-1) but were deselected as COPC for human health after comparison with background (Table SI-1): aluminum, arsenic, barium, cadmium, cobalt, selenium, thallium, vanadium, and zinc. Departmental guidance on ecological risk assessment, cited in the Navy's report, does present a discussion on why COPC do not necessarily have to match COPEC. However, comparison with background should yield identical lists of metals. Treatment of background concentrations of metals continues to be a problem; the Navy, the Department, and USEPA must resolve this confusion and controversy.

8. **Intake Factors, Table 7-3:** This table would be easier to read if scientific notation were used.

9. **Assessment Endpoints, Table 7-4:** For carnivores and raptors, the principal exposure is via prey items. Therefore, the information in the right-hand column should describe food chain modeling, bioconcentration, etc. Toxicity to the predator via direct contact is not likely to be relevant and toxicity to food items via direct contact should be covered in assessments of those trophic levels.

10. **EPC, Sec. T.1.4, p. T-4, Table T-11:** The very useful discussion of the rules for determining EPC is much more detailed than that presented in Section 6.2.3 for human health. Please state that EPCs used for Site 2 are shown in Table T-11. Many EPCs for soil shown in Table T-11 differ from entries Table SI-1 for the same chemical. This is extremely confusing. Why are EPCs for metals in surface soil used for ecological risk uniformly lower than those used for human health? Why aren't entries for EPC the same in the two tables for DDE and Aroclor 1260? Why do heptachlor epoxide and methoxychlor appear as detected chemicals in Table T-11 but not in Table SI-1? Under the heading "Distribution" in Table T-11, does "neither" mean the same as "nonparametric" in Table SI-1?

11. **Toxicity Benchmark Values, Secs. T.1.4, T.4.4, Tables T-4 and T-17:** We are unable to decipher how the toxicity screening criteria and toxicity benchmark values were derived and how they are used. What is the column labeled "Dose" in Table T-4? Is this an administered dose from a laboratory study? If so, what is the literature reference for the study? Is a "Modifier" the same as an uncertainty factor? How does one link the values in Table T-4 to those in Table T-17? If an allometric extrapolation was performed, what values were used for body weights and where did they come from? The text in Section T.3.2, "Body Size Scaling", is not adequate to reproduce the derivation. Please present tables with complete derivations of these toxicity criteria. The same comment applies to Table T-9 and toxicity criteria for plants and invertebrates.

12. **Risk Characterization, 7.5, Table T-16:** The Navy claims that a comparison of hazard indices, chemical by chemical and species by species, for Site 2 versus the reference area yields no differences greater than an order of magnitude. The construction of Table T-16 made such comparisons very cumbersome. Please construct tables with data from the site and the reference area juxtaposed for each species, e.g. one table for each species or two species per table at most. Also, please present summed hazard indices for each indicator species.

    The Navy seems interested in basing its interpretation of the ecological assessment on the number and magnitude of hazard quotients which exceed those seen for the reference area. If this is the case, it would be useful to create a summary table with all the hazard indices, by chemical and species, which exceed the reference area. This table should contain some representation of the degree to which the value in the reference area was exceeded.

13. **Ecological Significance, Sec. 7.5.2, p. 7-21:** We cannot agree with the Navy's interpretation of the results of the ecological assessment, because we are unsure of the COPEC, the EPC, and the toxicity criteria.

Conclusions and Recommendations

1. The Navy should complete its analysis of the 43 samples designated as background, especially for cadmium. Such analysis should include plots of cumulative probability. If additional data are required to resolve ambiguities for one or more metals, the data base may be expanded to include samples from other locations on the base. Such an expansion need not be limited to Site 2; it could include data from all the sites investigated in Operable Units 2 and 3.

2. The Navy has probably overestimated risks to human health by choosing the maximum value detected to represent exposure. The Navy should propose a method more in keeping with the concept of the "reasonable maximum exposure". We are unsure whether dermal intakes have calculated correctly.

3. The ecological risk assessment can probably be made acceptable upon clarification of how exposure point concentrations were selected, how toxicity criteria for non-human receptors were derived, and by presenting the risk characterization in a more intelligible format.

Reviewer: Michael J. Wade, Ph.D., D.A.B.T. MJW
Senior Toxicologist, HERS

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

State of California

Memorandum

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

Date: May 15, 1996

From: CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - SANTA ANA REGION
2010 IOWA AVENUE, SUITE 100, RIVERSIDE, CALIFORNIA 92507-2409
Telephone: CALNET 632-4130 Public (909) 782-4130

Subject: DRAFT REMEDIAL INVESTIGATION REPORTS, LANDFILL SITES 2 AND 17, EL TORO MARINE CORPS AIR STATION

We have reviewed the subject reports dated March 13, 1996 and recieved by us on March 21, 1996. Based on the data in the reports, we have the following comments:

A. For Site 2

1. Provide a Chapter 15 closure cap for the landfill (Section 2581, Division 3, Title 23, CCRs) to minimize water infiltration and to eliminate the discharge of waste to waters of the state. In accordance with Section 2581, a two-foot foundation layer, a one-foot 10-7 cm/s low permeability layer, and a two-foot vegetative layer are required for the cap. Closure and postclosure maintenance plans are required and need to be submitted for our approval. For closure requirements, please see Section 2580. A copy is attached for your information.

2. Install a gas extraction and collection system to eliminate gas migration to the groundwater and gas emission to the atmosphere. Install gas monitoring probes to detect any gas migration to the atmosphere. For landfill gas related issues, the California Integrated Waste Board and the SCAQMD should be contacted. **Findings: Hot spots of soil gas are sporadic across the central portion of the landfill and consist primarily of Freon 12; volatilization of landfill gases will occur.**

3. Submit a Report of Waste Discharge (ROWD) for an Evaluation Monitoring Program (EMP) for the site. The ROWD shall consist of Form 200 and shall include the information required under Section 2550.8(k)(5) for the proposed EMP. The purpose of the EMP is to assess the nature and extent of the release from the landfill in the groundwater. After the EMP is completed, the MCAS El Toro shall submit an engineering feasibility study, proposing groundwater remediation alternatives, and a workplan for Corrective Action Program (CAP).

Findings: The presence of TCE, PCE, other VOCs, metals, and general water quality parameters indicate that the landfill has leached to groundwater and these contaminants have been transported by groundwater to off-site locations. The extent of the landfill boundary was defined; however, the extent of contamination off the site has not been defined.

4. Institute a surface water monitoring program. Monitor the surface water (Borrengo Canyon Wash) for metals, VOCs, and general minerals. Quarterly or semi-annual monitoring is recommended. Findings: At Site 2, VOCs and high levels of metals were found in the surface water. At Site 17, large pieces of landfill debris were found in the drainage; no surface water sampling was conducted.

B. For Site 17

Recommendations for Site 17 are essentially the same as those for Site 2 except that a gas monitoring program should be instituted. A gas extraction and collection may not be needed because only soil gas with low concentrations of VOCs and methane below the regulatory thresholds were found. VOCs were found in the groundwater but below USEPA's MCLs.

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

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

Article 8. Closure and Post-Closure Maintenance

§ 2580. General Closure Requirements.

(a) Partial or final closure of new and existing classified waste management units shall be in compliance with the provisions of this article. If a unit has been partially closed in accordance with an approved closure plan by the effective date of these regulations, the cover over the closed portion does not need to be modified to conform to these regulations, unless monitoring data indicate impairment of beneficial uses of ground water. Classified waste management units shall be closed according to an approved closure and post-closure maintenance plan which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls in Article 4 of this subchapter, and the monitoring program requirements in Article 5 of this subchapter, throughout the closure and post-closure maintenance period. The post-closure maintenance period shall extend as long as the wastes pose a threat to water quality. For land treatment facilities, the postclosure maintenance period shall extend until treatment is complete.

(b) Closure shall be under the direct supervision of a registered civil engineer or a certified engineering geologist.

(c) Class II waste management units and Class III landfills shall be closed in accordance with one of the following options:

(1) landfill: pursuant to Section 2581 of this article;

(2) surface impoundment: pursuant to Section 2582 of this article; (3) waste pile: pursuant to Section 2583 of this article; or

(4) land treatment: pursuant to Section 2584 of this article.

(d) Closed waste management units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.

(e) Vegetation for closed waste management units shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the final cover.

(f) The regional board shall require the discharger to establish an irrevocable closure fund or provide other means to ensure closure and post-closure maintenance of each classified waste management unit in accordance with an approved plan.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2581. Landfill Closure Requirements.

(a) Final Cover requirements:

(1) Closed landfills shall be provided with not less than two feet of appropriate materials as a foundation layer for the final cover. These materials may be soil, contaminated soil, incinerator ash, or other waste materials, provided that such materials have appropriate engineering properties to be used for a foundation layer. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice. A lesser thickness may be allowed for waste management units if the regional board finds that differential settlement of waste, and ultimate land use will not affect the structural integrity of the final cover.

(2) Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the foundation layer and compacted to attain a permeability of either 1×10^{-6} cm/sec or less, or equal to the permeability of any bottom liner system or underlying natural geologic materials, whichever is less. Permeability determinations for cover materials shall be as specified in Article 4 of this subchapter and shall be appended to the closure and maintenance report.

(3) Closed landfills shall be provided with not less than one foot of soil, containing no waste or leachate, placed on top of the material described in subsection (a)(2) of this section; the rooting depth of any vegetation planted on the cover shall not exceed the depth to the material described in subsection (a)(2) of this section.

(4) The cover shall be designed and constructed to function with the minimum maintenance possible.

(b) Grading requirements:

(1) Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least three percent. Lesser slopes may be allowed if an effective system is provided for diverting surface drainage from covered wastes.

(2) Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by water and wind shall be protected or designed and constructed to prevent such erosion.

(c) Throughout the post-closure maintenance period, the discharger shall:

(1) maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors;

(2) continue to operate the leachate collection and removal system as long as leachate is generated and detected;

(3) maintain monitoring systems and monitor the ground water, surface water, and the unsaturated zone in accordance with applicable requirements of Article 5 of this subchapter;

(4) prevent erosion and related damage of the final cover due to drainage; and

(5) protect and maintain surveyed monuments.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2582. Surface Impoundment Closure Requirements.

(a) All free liquid remaining in a surface impoundment at the time of closure shall be removed and discharged at an approved waste management unit. All residual liquid shall be treated to eliminate free liquid.

(b) Following removal and treatment of liquid waste, impoundments shall be closed in one of two ways, as approved by the regional board:

(1) All residual wastes, including sludges, precipitates, settled solids, and liner materials contaminated by wastes, shall be completely removed from the impoundment and discharged to an approved waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any natural geologic materials beneath or adjacent to the closed impoundment that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such con-

taminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) All residual wastes, including sludges, precipitates, settled solids, and liner materials, shall be compacted, and the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, and further provided that the moisture content of residual wastes, including sludges, does not exceed the moisture-holding capacity of the waste either before or after closures. Surface impoundments which contain only decomposable wastes at closure may be closed as land treatment facilities under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Sections 13260 and 13263, Water Code.

HISTORY

1. Change without regulatory effect of NOTE filed 4-6-88; operative 4-6-88 (Register 88, No. 17).

§ 2583. Waste Pile Closure Requirements.

(a) Waste piles shall be closed in one of two ways, as approved by the regional board:

(1) All waste materials and any components of the containment system which are contaminated by wastes shall be removed from the waste pile and discharged to an appropriate waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any soil or other materials beneath the closed waste pile that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such contaminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) A waste pile may be compacted, covered, and closed as a landfill under Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, or contains only dry waste and was not required to have a leachate collection and removal system under Section 2543(a) of this subchapter. Waste piles which contain only decomposable wastes may be closed as a land treatment facility under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2584. Land Treatment Facility Closure Requirements.

(a) During the closure and post-closure period, the discharger shall:

(1) continue all operations necessary to maximize degradation, transformation, or immobilization of waste constituents within the treatment zone,

(2) continue all ground water and unsaturated zone monitoring in compliance with Article 5 of this subchapter.

(3) continue all operations in the treatment zone to prevent runoff of waste constituents,

(4) maintain the precipitation and drainage control systems.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

Cal/EPA

California
Environmental
Protection
Agency

*Integrated
Waste
Management
Board*

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APR 30 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 Remedial Investigation Report for Operable Unit 2B - Site 2, Marine Corps Air Station, El Toro, California

Dear Mr. Mahmoud:

We have reviewed the subject document (six volumes) dated March 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 are providing the following comments:

1. Site investigation and sampling programs appear to be adequate for the purpose of initial site assessment. However, a waste characterization study may be required later on, if necessitated by the findings of the feasibility study, specifically, if a clean closure and/or consolidation of the landfill are considered.

2. Based on the information about negative impacts of the landfill on the environment (ground water contamination, gas migration, and soil contamination), an alternative addressing clean closure and/or waste consolidation should be considered for the purpose of the feasibility study. For your convenience, we have included a copy of Board's Local Enforcement Agency Advisory discussing the subject of clean closure which may be used as a guidance document in this matter.

3. The Remedial Investigation report does not include a discussion of potential impacts of ground water fluctuation and the landfill seep on landfill gas generation potential. As indicated during the April 24, 1996, meeting, ground water periodically rises into the waste fill and may, potentially, provide moisture necessary to generate landfill gas. Thus, the report should evaluate if such occurrence takes place at Site 2.

Recycled Paper

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

Attachment

LEA ADVISORY
No. 16 September 26, 1994

INTEGRATED WASTE MANAGEMENT BOARD

CLEAN CLOSURE

To All Local Enforcement Agencies

What is "Clean Closure"?

Clean closure of a solid waste disposal site refers to the complete removal of all waste and waste residuals, including contaminated soils. A clean closure is generally defined as being successful when waste materials and residuals are removed to a point where remaining contaminant concentrations are at or below background levels or clean up levels established by the relevant regulatory agencies. Clean closure is an alternative to more conventional closure methods (closure with waste in place) described in Title 14, California Code of Regulations (14 CCR), Division 7, Chapter 3, Article 7.8, and 23 CCR, Division 3, Chapter 15, Article 8. Clean closure may also be considered a remedial action or a step in a remedial action in some cases.

The California Integrated Waste Management Board (Board) has not adopted regulations specifically concerning clean closure. However, the Board's Closure and Remediation Branch has developed a set of guidelines for Board and Local Enforcement Agency (LEA) staff to follow when overseeing a clean closure. The following guidelines should not be construed as regulations. These guidelines, however, are consistent with existing law and regulations and are intended to ensure that public health and safety and the environment are protected from pollution due to the disposal of solid waste. These guidelines are also intended to provide a basis to allow Board and LEA staff of varying background and expertise to deal with clean closure issues in a consistent manner.

What Sites are Candidates for Clean Closure?

Clean closure may be an appropriate alternative for permitted, illegal, or abandoned solid waste disposal sites. Clean closure may also be an appropriate action for sites which closed prior to the current closure regulations, but which are facing a change in land use which may threaten the integrity of the closed site or pose a threat to public health and safety and the environment. Also, clean closure may be an appropriate part of a remedial action for previously closed sites which have developed environmental problems. Sites that generally lend themselves to clean closure include, but are not limited to:

- Small landfills and burn dumps;
- Non-hazardous woodwaste disposal sites;
- Solid and liquid waste treatment and/or processing units; and
- Sites where the cost of clean closure would be less than or equal to the costs of long term monitoring and postclosure maintenance of the site.

What are the Benefits of Clean Closure?

A properly performed clean closure ensures that waste materials and residuals are removed and disposed of in a safe and environmentally sound manner. In addition, clean closing a disposal site can create several advantages for an owner/operator. If done properly, the clean closure of an entire

Advisory notes are designed to guide and assist Local Enforcement Agenices and are not intended to supersede statute or regulation.

waste management unit (e.g., a landfill cell or contiguous group of cells) would eliminate the need for the following for that unit: (1) 30 years or more of postclosure maintenance; (2) potential future corrective actions; and (3) Board and LEA inspections of the site. While the clean closure of an illegal disposal site eliminates the necessity for LEA and Board staff inspections, in some areas, particularly rural areas where the use of such sites by local residents has become habitual, continued or even increased inspections may be needed temporarily to prevent reactivation of the illegal disposal site. By clean closing, an owner/operator may also increase the possible postclosure land uses for the site. Furthermore, clean closure plans are typically less involved than conventional closure plans. However, the owner/operator will have to evaluate the potential costs and benefits of clean closure versus those of a conventional closure on a site-by-site basis to determine the viability of this option.

What Does the Clean Closure Process Involve?

The clean closure of a solid waste disposal site is a multiple step process. The steps may include, but are not limited to:

1. Site characterization;
2. Clean closure plan preparation;
3. Review and approval;
4. The actual clean closure; and
5. Verification and approval of the clean closure.

Who Evaluates Clean Closure Proposals?

Adequate advance notification of the appropriate regulatory agencies (Board, Regional Water Quality Control Board [RWQCB], LEA, and in some cases the Air Pollution Control District [APCD] and/or Department of Toxic Substances Control [DTSC] or other agencies as necessary) is necessary to allow review and approval of any proposals as well as observation of the site prior to, during, and after clean closure to verify that the site has been properly clean closed. For clean closures of permitted solid waste disposal sites and those which are subject to 14 CCR, Division 7, Chapter 5, Article 3.4, the review and approval process for clean closure plans is the same as that for conventional closure plans and is described in 14 CCR, Division 7, Chapter 5, Article 3.4. For other sites, the position of coordinating agency for the review and the timeline for the submittal and review of documents by the various agencies should be agreed upon by the agencies at the beginning of each project. The timely submittal of appropriate documentation (e.g., site characterization studies or clean closure plans) allows the approving agencies an opportunity to review and comment on the proposed clean closure prior to the actual clean closure of the site. Failure to involve all of the regulatory agencies early in the clean closure process may lead to lack of final approval of the clean closure of the site and the application of the regulatory requirements described below.

The Board (Closure and Remediation Branch), RWQCB, and LEA must each make a final determination that a solid waste disposal site has been properly clean closed. The determination that a site has been successfully clean closed implies that the potential threats to public health and safety and the environment due to the disposal of solid waste at the site have been mitigated by the clean closure. An owner/operator must provide to these agencies an adequate characterization of the site

and satisfactory evidence that all waste and waste residuals were removed and properly disposed of. If these agencies determine a clean closure was not properly completed, 14 CCR, Division 7, Chapter 3, Article 7.8, and 23 CCR, Division 3, Chapter 15, may apply to the site. If the site was operating on or after January 1, 1988, 14 CCR Division 7, Chapter 5, Articles 3.4 and 3.5 will most likely also apply.

What Information Should be Provided in Clean Closure Proposals?

The minimum components of a clean closure plan should include, but not be limited to:

- Site characterization;
- Excavation and material management;
- Confirmation of waste and degraded material removal; and
- Postclosure maintenance and land use.

The plan should be prepared by a registered civil engineer, a certified engineering geologist, or other qualified person depending on the complexity of the site. The owner /operator should submit all information regarding clean closure proposals, including clean closure plans, to all of the appropriate regulatory agencies.

SITE CHARACTERIZATION

The site characterization phase of the clean closure process is probably the most critical phase as it will determine the suitability of the site for clean closure. A complete site characterization will define the extent and character of the wastes present and the levels and extent of any contamination due to the disposal of waste at the site. A complete site characterization may prevent unplanned for and expensive surprises after the actual clean closure process has been initiated. Depending upon the complexity of the site, it may be necessary or advisable to involve the regulatory agencies prior to or during the site characterization process to ensure that an adequate characterization is performed.

- For sites with known or suspected environmental problems, site characterization may occur under an enforcement order by one or more regulatory agencies who may require submittal of a workplan prior to the site characterization.

- For complicated sites, it may be beneficial to submit the results of the site characterization study to the regulatory agencies for review prior to development of the clean closure plan rather than as part of the clean closure plan.

- For relatively uncomplicated sites, it may be adequate to submit the results of the site characterization with the clean closure plan for review.

The owner/operator should supply the following information regarding the site:

- Name and legal description of the site.
- Description of the historical development of the site.
- Name of legal owner/operator, including title, address, and telephone number.
- Map showing the assessor's parcel number, site plot plan, and parcel map including: legal boundaries of the site and adjacent land use, location of existing and proposed footprint of refuse/waste, location of all structures within a 1000-foot radius of the site, including all existing and proposed (if any) environmental monitoring, collection, and control systems.
- A description of all refuse/waste materials encountered at the site including how the waste was generated and the method of disposal used. Provide type of waste, volume, and dimensions of each disposal area at the site. Include any chemical characterization of the waste if available or if requested by the regulatory agencies.
- If burning of waste occurred at the site, a chemical characterization of the ash.
- Sampling results identifying backgound levels of the constituents of concern.
- A description of the character and extent of any soil or ground water contamination discovered during the site characterization study.
- A description of the geology and soils at the site.
- A description of the occurrence of surface water on and adjacent to the site and an estimate of the depth to ground water at the site.
- A description of all existing and proposed environmental monitoring, collection, and control systems for the site as required by the regulatory agencies.
- Information on the occurrence and character of ground water as required by the RWQCB. This information may include but not be limited to:

  A description of the occurrence and character of ground water on and adjacent to the site.

  A detailed geologic map of the site with cross sections showing the relationships between the refuse/waste and geologic units and ground water levels.

  A conceptual hydrogeologic model for the site.

EXCAVATION AND MATERIAL MANAGEMENT

Excavation and removal of solid waste may be considered a project under the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). An environmental document or appropriate exemption under CEQA or NEPA may have to be secured and submitted as part of the clean closure plan prior to approval. All applicable federal, state, and local permits (e.g., grading permits, Fish & Game approvals, OSHA reviews, etc.) should be obtained prior to any excavation.

The owner/operator should supply the following information regarding the site and the proposed clean closure:

- Identification of health and safety issues regarding the proposed site activities and a detailed protocol indicating what measures will be taken to ensure protection of the public health and safety and the environment.
- A plan to evaluate and dispose of any hazardous waste encountered during the clean closure operations.
- An excavation plan.
- A description of the sequence of excavation operations including the proposed removal rate and timeframe for the excavation operation.
- A description of the protocol to be followed in monitoring, collecting and controlling leachate, ground and surface water and landfill gas.
- A description of the proposed sampling and testing protocols for verification of clean closure.
- A description of the transport and fate and/or final disposition of the waste materials and residuals that will be excavated from the site.
- A drainage and winterization plan (when applicable).
- Any mitigation measures as called for in any necessary CEQA or NEPA document.
- Financial assurance for the project as necessary.

CONFIRMATION OF REFUSE/WASTE AND DEGRADED MATERIAL REMOVAL

The following activities should be planned for and implemented:

- Observation and documentation of removal of refuse/waste.
- Documentation verifying the final disposition of all refuse/waste materials.
- Adequate sampling must be performed after excavation to verify the removal of all waste materials and residuals, including interpretation of the test results by a qualified professional.
- Prepare and submit a map with a letter certifying that the constituents of concern concentration levels in the target media are either at or below the clean up limits established for the project.
- Submit a report documenting the activities which have occurred and verifying completion of clean closure to the appropriate regulatory agencies.
- Indicate on the site deed and/or title that the project was completed and where it was located.
- If the constituents of concern clean up level has not been met and further excavation is deemed not practical, develop and implement a remedial action plan for the site.
- If the site cannot be clean closed then closure and postclosure maintenance plans should be developed and submitted for review and approval, prior to implementation.

POSTCLOSURE MAINTENANCE AND LAND USE

One of the advantages of clean closing a solid waste disposal site is that a postclosure maintenance plan should not be needed if the entire site has been successfully clean closed. A

description of the proposed postclosure land use should include:

- The proposed postclosure land use for the site.
- If the clean closure was part of a remedial action, describe any postclosure maintenance activities needed to comply with the implementation of the remedial action plan.
- If the clean closure was not successful, a postclosure maintenance plan and a financial assurance mechanism for postclosure maintenance are needed and should be included with the verification report.

These guidelines are intended to provide useful direction for the clean closure of a variety of site types and site conditions. In some instances, certain portions of the information outlined above may not be applicable to a given site or the level of detail necessary may vary due to site conditions. However, it is necessary for all of the regulatory agencies involved to agree on what information is and is not necessary, and the level of detail required, to allow the owner/operator to prepare the necessary documents and to carry out a clean closure that can be approved by all of the agencies.

Additional Information

If you have any questions regarding clean closure, please contact the Closure and Remediation Branch staff person assigned to your jurisdiction for assistance.

Sincerely,

Douglas Okumura, Deputy Director
Permitting and Enforcement Division

For Back copies of the LEA Advisory call (916) 255-2287

(LEA Advisory # 1, Oct. 6, 1992, Asbestos Containing Waste Disposal)
(LEA Advisory # 2, Feb. 17, 1993, 1992 Legislation Impacts Existing Waste Programs)
(LEA Advisory # 3, June 10, 1993, Site investigation Process for Investigating Closed, Illegal, and Abandoned Disposal Site's)
(LEA Advisory # 4, Sept. 23, 1993, Permitting of Fuel Contaminated Soils Treatment/Processing Facilities)
(LEA Advisory # 5, Dec. 15, 1993, Use of Non Hazardous Contaminated Soil as Daily Cover)
(LEA Advisory # 6, Dec. 16, 1993, Aspergillus, Aspergillosis, and Composting Operations in California)
(LEA Advisory # 7, Dec. 30, 1993, Subtitle D Questions and Answers)
(LEA Advisory # 8, June 24, 1994, General Guidance for Implementing AB 1220 in the Regulation of Solid Waste Disposal Sites, REVISED)
(LEA Advisory # 9, Feb. 10, 1994, Solid Waste Ranking System User Guide: Site Investigation Process (SIP) Part II)
(LEA Advisory #10, Mar. 17, 1994, Procedural Change in Approving Alternative Cover Demonstration Projects Using Geosynthetic Blankets)
(LEA Advisory #11, Mar. 24, 1994, Metallic Discards Management)
(LEA Advisory #12, Mar. 29, 1994, Permitting of Non-Traditional Facilities)
(LEA Advisory #13, May 17, 1994, Wood Waste Landfills)
(LEA Advisory #14, May 25, 1994, Revised Policy and Procedures for Maintaining the Inventory of Solid Waste Facilities Which Violate State Minimum Standards)
(LEA Advisory # 15, June 8, 1994, Completion of Solid Waste Information System Inspection Reports for Disposal Sites and Transfer Stations)

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

May 20, 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 Remedial Investigation Report, Operable Unit 2B-Site 2" and the "Draft Phase II Remedial Investigation Report, Operable Unit 2B-Site 17" for MCAS El Toro, received on March 20, 1996. Overall, the reports are well written. We appreciate the high level of teamwork from the Navy/Marine Corps and contractors. Please address the enclosed comments (Enclosures) in the revised reports. If you have any questions, I can be reached at 415/744-2368.

Sincerely,

Herb Levin for

Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

Enclosures

cc: Mr. Tayseer Mahmoud, DTSC
Mr. Larry Vitale, RWQCB
Mr. Dante Tedaldi, Bechtel
Mr. Larry Nuzum, Southwest Div.

ENCLOSURE A

EPA COMMENTS ON THE DRAFT OU 2B - SITE 2
REMEDIAL INVESTIGATION REPORT

MAJOR COMMENTS

1) Page 4-11, Figure 4-3; The text concludes that the boundary of the landfill has been determined by the investigation. However, in the southeast portion of the landfill, near trench locations 02TR6 and 02TR12, landfill materials were encountered and there are no further trench locations outside of the landfill to establish the boundary. Please clarify.

2) Page 4-33, Figure 4-9; Please discuss with the BCT the possibility of expanding the boundary of the landfill to include soil gas location 2SG121.

3) Page 4-35, Table 4-8; The key at the end of the table indicates that all shaded sample locations were re-evaluated as part of Tier 2. If the criteria to conduct Tier 2 sampling is a total VOC concentration of 300 ug/L or greater, please clarify why the following additional sample locations were not evaluated as part of Tier 2: 2SG15S, 2SG42S, 2SG42W, 2SG53, 2SG54N?

4) Page 5-29; Elevated levels of both gross alpha and beta radioactivity were measured in surface water samples. The text discusses only a relationship of potassium and beta levels. Provide some discussion regarding possible factors contributing to elevated alpha levels.

5) Page 6-19, first paragraph; Update the discussion of PAHs to include results of recent basewide PAH reference study.

6) Page 7-8, Table 7-1; Clarify why VOCs found in soil are not included in the table as VOCs were detected in low levels. Is the discussion included elsewhere?

7) Page 8-4, Table 8-1; page 8-35, section 8.2.2; Add "cleanup groundwater to maximum contaminant levels" to list of recommended remedial action objectives. Please discuss with BCT.

8) Throughout report and Appendix G; Please refer to any ubiquitous organics as anthropogenic, instead of background.

MINOR COMMENTS

1) Page ES-10; Typographical error in question.

2) Page 2-29, 2nd paragraph; Clarify whether the "background levels" referred to are describing alpha/beta radioactivity or VOCs? Also, what is the reference for VOC background levels as

ENCLOSURE B

MEMORANDUM

DATE: April 25, 1996

SUBJECT: Review Comments on Draft Phase II Remedial Investigation Report Operable Unit 2B Site 17 dated March 1996 for MCAS El Toro, California

FROM: Rachel Simons

TO: Bonnie Arthur

General Comment:

1. In general, the Navy has done a thorough job of investigating the landfill. The nature and extent of the landfill appears to be sufficiently characterized.

Specific Comments:

1. **Section 1.2.2.3 History of Site 17 Landfill Operations, page 1-18**

Aerial Photograph Review

In a 1980 aerial photograph, stained areas were observed on the northern portion of the site. Did any soil sampling target these previously stained areas?

2. **Section 3.1.4 Surface Water, page 3-9**

According to this section, surface water runoff from surrounding hill slopes can collect on flat and low depression areas resulting in localized ponding. If surface water runoff is potential pathway for contaminant migration, were the ponding areas targeted for surface soil sampling?

3. **Figure 3-4 Region Geology, page 3-13**

Please show Site 17 on this figure.

4. **Section 4.3.1 Shallow Soil Gas, page 4-32**

Please correct the typographical error for the US EPA, 1992b reference. It appears that 1991b is the correct reference.

referenced in the text?

3) Page 4-3; Which map includes Zones A-G?

4) Page 4-9; It would be helpful to also include a description in the text of Trench 02TR11 shown on Figure 4-3.

5) Page 4-13; Please correct discrepancy between Figure 4-3 and Table 4-2 for trench locations 02TR07 and 02TR08. The text boxes for these trenches states that landfill wastes were encountered. However, Table 4-2 states that no landfill wastes were encountered within each of these trenches.

6) Page 4-66, Table 4-14; Typographical error for El Toro arsenic level.

7) Page 4-180, Section 4.6.3; Include a discussion of the metals, in addition to manganese, which have detections above MCLs in groundwater.

8) Page 5-9, Section 5.2; Refer to the earlier text where "Chemicals of Potential Concern" are defined or repeat the description.

9) Page 5-18, Section 5.3; Include more detailed discussion regarding the El Toro "surface water." A good discussion is included on page 5-28.

10) Page 5-28, first paragraph, last sentence; Typographical error. Magnesium instead of manganese.

11) Page 6-5, Section 6.1.2; Helpful to identify the exposure scenarios prior to discussing a "recreational child."

12) Page 6-6, 6.1.2; Typographical error. Background analysis is included in Appendix G, not Appendix S.

13) Page 6-7; Clarify that Site 2 is part of the "1,700-acre area that has been set aside as a nature conservancy."

14) Page 7-19, Section 7.5.1.1; Provide the reference for the "selected toxicity benchmark."

15) Page 8-4, Table 8-1; DQO #6 states as an answer to "risk assessment" that "risks are present at downgradient monitoring wells for offsite residents." Clarify that these are hypothetical scenarios.

16) Appendix G; Please update with recalculated numbers. Also, it may be helpful to add a short discussion of results.

5. Section 4.4.1 Shallow Soil, page 4-44

Please change the reference to "background" pesticides to anthropogenic.

6. Section 4.4.2 Subsurface Soil, page 4-70

The fifth paragraph on this page states that radionuclides (gross alpha and beta) were detected at 5 sample locations. What is the source of this radioactivity? Is it naturally occurring? Can the results be compared to reference values (e.g. PRGs) or background values? Please expand this discussion as radionuclides were also detected in groundwater (see Section 4.6.5, page 4-105).

7. Section 4.5 Leachate, page 4-70

Could the leachate results be affected by the time of the year the sampling was performed? The lysimeters were in the ground from Oct. 26 to Nov. 7. According to Section 3.2 Meteorology and Climatology, most of the rainfall occurs from November to April. Please discuss with the BCT.

8. Table 8-1, Site 17 Summary and Conclusions, page 8-3

<u>DOO #5 - Determine if leachate is impacting soil or groundwater</u>

For risk assessment, the conclusion states that risks are present at downgradient monitoring wells to off-site residents. Please clarify that no risks are currently present as the groundwater beneath MCAS El Toro is not currently utilized as drinking water.

9. Table 8-1, Site 17 Summary and Conclusions, page 8-4

<u>DOO #6 - Determine nature and extent of groundwater contamination</u>

Potential response actions include restricting the extent of groundwater contamination. Does this mean an action to restrict groundwater migration will be implemented in addition to capping? Please clarify.

10. Section 8.2 Conclusions, page 8-27

<u>Conclusions # 5 and 6</u>

Both of these conclusions reference metals in the groundwater that could be leaching from the landfill. These conclusions can not be verified until the evaluation of background metals is complete. Please discuss with the BCT.

11. Section 8.2 Conclusions, page 8-27

Conclusions # 7 and 8

Clarify why surface water runoff was not collected since this is a potential pathway for contamination migration.

ENCLOSURE G

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 9

75 Hawthorne Street
San Francisco, CA 94105-3901

May 17, 1996

MEMORANDUM

SUBJECT: Comments of Draft Remedial Investigation Report for Site 2

FROM: Herbert Levine, Hydrogeologist
FFCO, Technical Support Section

TO: Bonnie Arthur, RPM
FFCO, Navy Section

Per your request I have reviewed the draft RI report for Site 2. In general there is a significant problem with the development of a conceptual hydrogeological model. The Navy interpreted water levels in alluvium and bedrock as occurring within one interconnected aquifer. It is more likely that there are multiple saturated zones adjacent to each other. The lack of a consistent conceptual model renders the numerical model inappropriate.

Specific Comments

1. Section 3.6.1 Site 2 Occurrence and Movement of Groundwater. The cross-section Figure 3-7 argues against the statement that there is a single shallow aquifer. There is no reason to assume that the water table in the alluvium has to correlate to the water level in bedrock. For the Section A-A'-A" there appears to be three saturated zones, saturated alluvium between A-A', saturated bedrock under A' and another saturated alluvium between A'-A". The same observation is appropriate for the B-B' section. It would be more appropriate to draw the static water level lines within each lithologic unit.

2. Section 3.6.2 Site 2 Aquifer Hydraulic Properties. The statement that well 02NEW2 is screened in bedrock is not verified by the as built construction log in Appendix J. The construction log clearly shows that this well is screened in the sand overlying the bedrock. Since there is some confusion it would be appropriate to add the screened intervals to the cross-sections. The hydrologic properties could then be added which would allow for visualization of hydrologic properties with associated lithologies. The data presented should be evaluated as the bedrock having at least an order of magnitude difference in hydraulic

Although Appendices R and S contain the IRIS files for the COPCs which are the risk drivers for the health risk assessments, a more complete and balanced description of their health effects should be summarized in the body of the RI documents as well.

Risk to Utility Maintenance Worker, § 6.4.3, p. 6-24 to 6-26: The rationale presented in this section for not quantifying the utility maintenance worker's health risk is that the exposure time associated with typical repairs is usually short and infrequent, that with short exposure times acute systemic toxicity is more of a concern than chronic toxicity, and that chemical concentrations in the surface soil are not high enough to cause acute systemic toxicity.

All of these statements may in fact be correct, but they should nonetheless be demonstrated through a quantification of health risk for this particular receptor, employing appropriate exposure assumptions (e.g., a soil ingestion rate of 480 mg/day). In order to quantify health risk, however, surface soil concentrations may have to be used as surrogate data, since the contaminant concentrations in the subsurface soil are not known for either site.

Toxicity Assessment, § 6.5.3, p. 6-29 to 6-31: In this section, the following statements are made: "The rate and extent of chemical absorption via the stomach and intestines are higher than via the skin. Therefore, the dose and risk associated with ingested chemicals should be higher than those associated with contact of chemicals with the skin." The first of these statements is generally true. However, the second statement does not follow from the first, but rather, is dependent upon the relative degree of exposure via the two routes.

Conclusion and Recommendations

The human health risk assessments conducted as Part of the Remedial Investigations for OU-2B, Sites 2 and 17 are consistent with USEPA Region IX guidelines, and are generally comprehensive and thorough. However, several procedural deficiencies were identified in the RI documents which could affect the quantification of health risks. Due to the nature of the these deficiencies, the potential risks to human health for Sites 2 and 17 are probably overestimated, rather than underestimated. The RIs can be made acceptable to USEPA Region IX, upon adequate response to the specific comments above.

cc: Doug Steele, USEPA Region IX
John Christopher, CAL-EPA/DTSC

jmp/eltoro7.mem

ENCLOSURE C

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

May 8, 1996

MEMORANDUM

SUBJECT: Draft Phase II Remedial Investigation Report, Operable Unit 2B - Site 2, Marine Corps Air Station, El Toro, California (EPA QAMS Document Control Number H6CA005096VSF1)

FROM: Lisa Hanusiak, Chemist
Quality Assurance Management Section, P-3-2

THROUGH: Vance S. Fong, P.E., Chief
Quality Assurance Management Section, P-3-2

TO: Bonnie Arthur, Remedial Project Manager
Navy Section, H-9-2

The subject remedial investigation (RI) report, prepared by Bechtel National, Inc. (BNI) and dated March 20, 1996, was reviewed. The following documents were used for reference: "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations" (EPA QA/R-5); "Preparation of a U.S. EPA Field Sampling Plan for Private and State-EPA Lead Superfund Projects" (9QA-06-93); "Guidance for the Data Quality Objectives Process" (EPA QA/G-4); "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (EPA-540/R-94/012); "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA-540/R-94-013); and "Final Quality Assurance Project Plan, Phase II Remedial Investigation/Feasibility Study (RI/FS), Marine Corps Air Station El Toro, California," prepared by BNI and dated July 1995.

The RI report contains an adequate evaluation of the data quality indicators, including precision, accuracy, representativeness, completeness, and comparability (PARCC). The results obtained for precision and accuracy were within the stated objectives listed in the Phase II RI/FS quality assurance project plan (QAPP).

The RI data were validated based on guidance provided in the National Functional Guidelines for organic and inorganic data review, and in accordance with the requirements specified in the Phase II RI/FS QAPP. The data validation procedures used for the RI Phase II data were consistent with Region 9 data validation

procedures. Conclusions concerning the usability of the RI Phase II data appear to be valid.

The sample collection and field measurement procedures were executed consistently with the procedures described in the QAPP. Comments on the RI report are provided below.

Concerns

1. [Section 2.16.3.1, Field Duplicates; Appendix O, Section O.1, Field Quality Control Sampling Summary and Results] The RI report contains inconsistent information regarding the collection of field duplicate samples for the soil matrix. The text in Section 2.16.3.1 states that field duplicate samples for soil were not collected. However, the text in Section O.1 of Appendix O states that field replicate samples were collected to check for soil homogeneity. The text in Sections 6.1.1 (Duplicates) and 6.2 (Field Quality Control Checks) of the Phase II RI/FS QAPP addresses the collection of field duplicate samples, but does not state whether soil field duplicate samples were planned for collection. This discrepancy should be addressed.

2. [Section 4.2.2, Integrated Surface Air Sampling] The text in Section 4.2.2 of the RI report compares the levels of volatile organic compounds (VOCs) detected in the landfill to results of a 1990 California Air Resources Board (CARB) Study which lists the median and the maximum levels of VOCs measured at landfill sites in California. The significance of VOCs present at concentrations above the median level but below the maximum detected level in the CARB Study is unclear. It is recommended that the discussion concerning the application of the CARB study to the conclusions of the RI be expanded.

3A. [Table 4-31, Compounds Detected in Surface Water - Phase I] Identical results for total metals and dissolved metals are presented in Table 4-31 of the RI report. It is unlikely that results for total and dissolved metals actually would be identical. The information presented in this table should be reviewed and verified against the source data.

3B. It is recommended that the RI report be expanded to include a discussion concerning the results for total and dissolved metals. Although the analysis of total and dissolved metals is not addressed in the Phase II RI/FS QAPP, a comparison of the total and dissolved concentrations would be appropriate since both analyses were performed.

Ms. Bonnie Arthur
May 8, 1996

Comments

1. [Executive Summary] Some of the text that should be included between pages ES-6 and ES-7 of the RI report appears to be missing.

2. [Section 2.5, Air Sampling; Table 2-4, Laboratory Analysis of Air Samples] The text in Section 2.5 of the RI report states that Table 2-4 presents the target list of analytes and associated analytical detection limits; Table 2-4 does not include detection limits. This discrepancy should be addressed.

3. [Table 2-6, Laboratory Analysis of Surface Soil, Subsurface Soil, and Sediment Samples] Table 2-6 of the RI report includes information for a number of analyses, including total Kjeldahl nitrogen (TKN), biochemical oxygen demand (BOD), and chemical oxygen demand (COD), that are generally performed on water samples only. Table 2-6 should be revised to include an exclusive and complete list of analyses performed on soil samples.

4. [Section 3.6.4, Site 2 General Water Quality Parameters] The units of concentration for water quality parameters discussed in Section 3.6.4 of the RI report should be revised from milligrams per kilogram (mg/kg) to milligrams per liter (mg/L).

5. [Table 4-12, Compounds Detected in Shallow Soil - Phase I] Results for metals are presented in Table 4-12 of the RI report in concentrations units of micrograms per kilogram (µg/kg). The units should be revised to mg/kg.

6. [Appendix O, Laboratory Analytical Data] According to information provided in Appendix O, dissolved silica was to be determined. However, Section 4 of the RI/FS report does not include results for silica analyses. This inconsistency should be clarified.

Questions or comments regarding this review should be referred to Lisa Hanusiak, EPA QAMS, at (415) 744-1528. Technical assistance for this review was provided by: Doug Lindelof, Environmental Services Assistance Team (ESAT) Contract No. 68D60005, Work Assignment (WA) No. 9-96-0-5, Technical Direction Form (TDF) No. 9605003.

ENCLOSURE D

COMMENTS ON THE OU 2B - SITE 17 PHASE II REMEDIAL INVESTIGATION REPORT

MCAS EL TORO

1.Technical Comments

.1. Page ES-6, 2nd paragraph

The text is inconsistent with respect to the issue of landfill leaching and the effect if any on groundwater quality.

The text states that "...elevated metals concentrations and low concentrations of organic compounds in soil and groundwater indicate that leaching of the landfill has occurred." However, in Section 5.1.3.2 the text states that "Samples taken from the monitoring wells surrounding the landfill have minimal reported concentrations of contaminants, except for manganese,. selenium, and thallium which exceed MCLs in one downgradient well and the upgradient well." Moreover, in Section 5.2.1.5 the text notes that "This exceedence is possibly due to marine siltstones and sandstones acting as water-bearing zones and as the source of the alluvial valley fill."

In addition, Section 5.1.2.3 states "Concentrations of VOCs and SVOCs were detected in downgradient wells but did not exceed their respective MCLs." However, in the next paragraph, the text states "[That for manganese. selenium, and thallium] These results are the only indication of a potential impact to groundwater in the area of the landfill..." It would seem that unless the upgradient well samples were found to contain VOCs and SVOCs, the presence of these classes of compounds at any level in the downgradient wells should be considered strong evidence of the landfill leaking.

.2. Page 1-21, Section 1.2.3.1

Clarify that the PRGs used represented residential exposure conditions. This is of considerable interest because the subsequent baseline risk assessment did not consider residential on-site exposures. Rather, residential exposures were to groundwater via ingestion and dermal contact and inhalation of vapors from groundwater.

.3. Page 2-30, Table 2-6

The analyses biochemical oxygen demand and chemical oxygen demand were apparently not performed for the soil samples. This would be expected since these

analyses are not used for solids such as dry soil. The total organic carbon measurement for soil should have been adequate. Confirm that these analyses were not performed or provide the data with interpretation.

.4. Page 4-43, Section 4.4.1

The discussion and presentation of data; specifically with respect to the term contaminants of potential concern, are inconsistent with the complementary discussions in the Human Health Risk Assessment in Section 6.

The text states that "All organic compounds detected in shallow soil with concentrations that exceed U.S. EPA residential soil PRGs are considered COPCs." However, in Section 6 the text indicates that a very different process was used to identify COPCs, see page 6-2, all of section 6.1.1. A notable example of the inconsistency is that iron, calcium, and sodium are identified in Section 4 as a COPC and efforts have been expended to track these analytes in the text and figures; however, these same essential nutritional elements are excluded from the baseline human health risk assessment.

Note that the text indicates that the distributions of COPCs in soil are presented on numerous figures in Section 4. These figures seem to perpetuate the inconsistency between the COPC listing in Section 6.

.5. Page 4-91, Figure 4-20

See previous comment.

The figure includes iron, sodium, calcium and magnesium which are essential nutritional elements. This leads the reader to believe that there is a justified level of concern with these elements when in fact there is not.

.6. Page 4-105, Section 4.6.4

There is negligible benefit if any to the assessment of nature and extent based on comparisons with Secondary MCLs. Secondary MCLs are regulations set by U.S. EPA that estimate desirable levels for drinking water that may adversely affect the aesthetic value of drinking water. They are not enforceable by the federal government.

.7. Page 4-107, 3rd paragraph

See previous comment.

.8. Page 5-7, Figure 5-2

The indicated groundwater flow direction appears to be different than the apparent flow direction shown on Figure 3-8 of the RI.

.9. Page 5-8, Figure 5-2

Based on the cross-sections in Figure 3-7 of the RI the waste (landfill) is not present to extent indicated on Figure 5-2. However, the trenching performed in this area seems to confirm some landfill in the area. Confirm and correct if necessary.

.10. Page 5-10, Table 5-1

As noted in preceding comments the COPCs listed in this table are not consistent with those presented in the Baseline Human Health Risk Assessment.

Page 5-14, Section 5.2.1.3

The text states that there are no VOCs at concentrations of concern at Site 17. It is not clear what is the intent of the term "...concentration of concern..." Is this a conclusion based on a screening against PRGs and MCLs or is it based on the baseline risk assessment results? The issue is further confounded by the statement two sentences later, "While trace concentrations of VOCs were detected in both media none were reported at levels that exceed the regulatory or established risk criteria for the Site."

.12. Page 5-15, Section 5.2.1.5

Considering the numerous statements in this RI regarding the leaching of metals from the landfill to groundwater it seems that the discussion of the presence of apparently elevated levels of metals in groundwater is insufficient. The authors should expand upon the single sentence which provides a very cursory explanation for the presence of selected metals. Moreover, the statement on page 5-15 seems to conflict with the statements about the leaching of metals from the landfill to the groundwater.

.13. Page 5-15, Section 5.2.1.6

The text does not attempt to relate site-specific results for pesticides and herbicides to the generic fate and transport discussion provided. The authors should avoid making broad-based statements without providing site-specific analytical support. For example, they might indicate the types of pesticides and herbicides detected and the relative levels; and then indicate if they are found at the surface or at depth or in groundwater. Is the fate and transport analysis for these compounds intended to address agricultural application, or does it address the possibility that the materials were disposed of in the landfill as waste? It is possible that the mobility and fate may be different under these circumstances.

.14. Page 5-21, Section 5.3.2

The text includes the sentences, "There are dissolved metals in groundwater in a downgradient monitoring well. No significant additional impact is expected in the future..." This statement requires revision. First, there is nothing particularly unusual about the presence of dissolved metals in groundwater, it is a completely normal occurrence and certainly samples collected upgradient support this (see last sentence on page 5-5). Second, the implication is made that the presence of dissolved metals is considered to be an "...impact..."; however, "No significant additional impact is expected in the future...". The authors seem to be implying that (1) the landfill has caused a degradation of groundwater quality; and yet (2) the same impact could not continue in the future even though all current and past conditions would tend to remain the same. This is a conflicting argument which should be corrected.

Section 6, General Issues Related to the Human Health Risk Assessment

.15.1. The text does not provide an adequate discussion of the relationship of the primary risk drivers to their occurrence and magnitude in the vicinity of Site 17. For example, the primary USEPA carcinogenic risk driver for groundwater is arsenic; however, the unfiltered value of 12.9 micrograms/liter is questionable as representative of groundwater conditions. This is evidenced by the maximum detected filtered concentration of 5 micrograms per liter which is barely above the detection limit and thus suspect itself. Of additional interest is the fact that the MCL is about four time greater than the highest measured arsenic concentration. It therefore appears that the risk managers would benefit from additional interpretation of the data presented in this RI. The authors should attempt to provide greater perspective on the relativism of the risk values presented. For organic compounds the primary risk drivers for groundwater were chloroform and bromodichloromethane; their detected levels were 0.9J and 0.4J microgram/L, respectively. Since these concentrations, as indicated by the "J" qualifier, are estimated and below the detection limit of 1 microgram/L; the final discussion should highlight this point as well as the fact that the MCLs for the compounds are one hundred times greater than the reported levels.

.15.2. The text does not appear to adequately address the issue of incremental cancer risk; defined as the cancer risk presented by the difference between the total and the background/ambient levels of a carcinogenic analyte. When the difference is calculated, both concentrations must be the same statistic. Risk assessment guidelines recommend using the 95 percent UCL on the mean concentration to calculate risk under the RME scenario. This draft RI report uses the 95 percent UTL of the background/ambient data set to identify the reference concentration. An analyte is considered a contaminant when a measured concentration exceeds the 95 percent UTL and this approach is

appropriate for screening risk assessments. However, for baseline risk assessments the UTL value should not be compared to the UCL for decision-making on background risk. For these purposes, the 95 percent UCL on the mean should be estimated for the background/ambient data set. This suggestion was explicity made by CTO-080 at a meeting between CLEAN I, CLEAN II and SWDIV in early December at CH2M-Hill's office in Santa Ana. At that time it was agreed that CLEAN II would recalculate the background inorganic levels using the 95 percent UCL on the mean. However, the draft RI report does not indicate that the calculations were completed.

.16. Page 6-8, Section 6.2.3

Include a table which lists the exposure point concentrations for each analyte under each exposure scenario.

Page 6-17, 2nd paragraph

The text does not indicate if total or hexavalent chromium values were used to calculate risk. This is significant considering that, according to the text, "Chromium was the sole contributor to the risk [for inhalation]."

.18. Page 6-17, Last sentence on the page

Similar to previous comment. Identify whether speciated chromium values were used.

The sentence indicates that chromium contributed to over 70 percent of CAL-EPA risk from ingestion of drinking water.

.19. Page 8-3, Table 8-1

The text presents conclusions about landfill leaching and the effect on groundwater quality which are unsupported by the discussions in the RI.

The text states that VOCs, metals, petroleum hydrocarbons, and general water quality parameters indicate that landfill contents have been leached to groundwater. There is limited (see comments regarding page ES-6) if any discussion of the basis for such a statement for these parameters.

.20. Page 8-14, Section 8.1.4

This subsection should include an enhanced discussion of relative risk, as described in the comments above.

For example, the text notes that the majority of the groundwater risk is due to arsenic but fails to mention that all arsenic values were well below the MCL.

.21. Page G-19, Figure 1

The text associated with this figure does not include an adequate discussion of the flow chart items which extend out past the "yes" following the "Proportion of Non-Detect Data _15%." Include an explanation as to why an adjustment to the mean and standard deviation would be required and how it would be performed. In addition, explain why an adjustment is only required for data sets with percentage non-detects _15 percent but _ 50 percent.

.22. Page S-9, Table S-15

There is no explanation for the use of identical values for all subsurface concentrations of PAHs. A 95 percent UCL is presented in the table for what is apparently (though not labeled as such) the surface concentrations; however, no complementary UCL is provided for the subsurface soil. Maximum and minimum and other basic statistics are provided; however, the data set (surface or subsurface) to which they apply is not indicated.

ENCLOSURE E

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

May 13, 1996

MEMORANDUM

SUBJECT: Review of El Toro Draft Site 2 Ecological Risk Assessment

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

TO: Bonnie Arthur, Remedial Project Manager
Navy Section

Overall, the Navy and their contractor should be complimented for the professional effort that is presented in the documents for the ecological risk assessment for El Toro MCAS. I have a few questions and comments that should be easily addressed. Please call me if you have any questions about my comments.

1. Section T.1.1, Chemicals of Potential Ecological Concern. When applying the second "rule" for elimination of chemicals, what was the consideration for concentration for those contaminants below the 5 percent level? For instance, even at less than 5 percent, a chemical could be at a concentration level that would be considered a "hot spot" and an ecological risk especially if the contaminant bioaccumulates. Please provide the page number and location in the document for the contaminants and concentrations for all locations where this rule was applied.

2. Same par, second bullet, what was 2-methyl-4-chlorophenoxyproprionic acid (MCPP) used for and in what process at the ETMCAS?

3. Bottom of page T-2, With soil representing 100 percent of a rat or a mouse's diet, why was an estimate used for contact rate (CM) for chemicals when estimating the exposure dose? If the strategy is to be as conservative as possible, then 100 percent contact rate should be used to predict the potential impact. Confirmation or validation samples can be performed to reduce the uncertainty in these predictions.

4. pT-6, Receptor Exposure Intake Factors, second paragraph, The portion of

the home range for the coyote not attributed to the site should be compared to the remaining area of the location of the base for the purpose of defining the forage area of this receptor outside of Site 2 to estimate the concentration of exposure for ingestion of incidental soil. The ingestion term for estimating the total dose must contain a concentration term for soil related to Site 2 concentrations and concentrations other than Site 2. The easiest choice for this concentration is to select the reference site concentration and to calculate the loading rate for the off-site portion of the total daily dose.

5. Table T-4, Screening Criteria for Soil COPECs. There is insufficient details provided to fully assess the adequacy of this step in the process. Table T-4 shows several column headings including the COPECs, the modifier, the test species, the toxicity endpoint, the screen criteria and the reference indicator. The citations as provided are inadequate because the critical data are not provided, for instance, "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.

6. p7-23, Uncertainty Analysis, There are a couple of statements made that need clarifying, for instance, 1) "However, in some cases the nature of the uncertainty is such that the impact of the assumptions made in the risk assessment cannot be determined." Where in this risk assessment does this statement apply?
2) "In particular, the amount of uncertainty in an ecological risk assessment cannot be easily quantified." Where in this risk assessment does this statement apply?

7. Tables T-11,12,13 and 14, The formula shown for estimating the daily dose for each receptor should not use any "modifiers" in the calculations so that the estimate will be the most conservative. For instance, the deer mouse at the reference site does not have any modifiers whereas the potentially impacted site has modifiers for surface soil, subsurface soil and water portions of the diet. To get the *most* conservative estimate, the highest concentration in either the surface or subsurface soil should be used for these predictions. This should be done for all receptors and all chemicals.

Another issue with the dose estimates includes the contribution from on-site versus off-site i.e., reference site that is reflected in the dose estimation formula

shown in Tables 14 and 15 (See No. 4 above). For instance, the incidental soil ingested for the coyote should have a component from the on-site contribution and the off-site contribution. This is also true for all other components of the ingestion pathway. The grand total is the addition of both the contribution from off-site and on-site which should then be compared to a critical toxicity level.

8. Section 7, p7-19, Hazard Quotient discussions for various receptors.
It appears that the hazard quotient for several contaminants at Site 2 for all of the receptors are above one indicating a potential problem. The fact that these estimates are above one strongly suggest that the input data needs to be validated and verified to reduce the uncertainty in order to obtain the best estimate of the impact to these receptors.

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 because it does not provide adequate logic and is not based on any strategy that EPA has seen in print or is aware of. Because the hazard quotient for several contaminants at the reference site for all of the receptors are above one indicate that the reference site is not really a valid reference site. A strategy that provides more logic is one where the contribution of contaminants from Site 2 is added to that contributed by the background to arrive at a "total" background makes more sense than the comparison presented.

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 gnatchatcher. This important receptor should be addressed in the risk assessment.

10. I would request that the Navy provide a strategy for reducing the uncertainty at Site 2 for the estimate of ecological risk. This strategy should include techniques and methods for more direct estimates for impact assessment rather than relying on the hazard quotient.

ENCLOSURE F

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

MEMORANDUM

TO: Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

FROM: Jeffrey M. Paull, MS HYG, MPH, CIH
Regional Toxicologist
Superfund Technical Support Section

DATE: May 14, 1996

SUBJECT: Review of "Draft Phase II Remedial Investigation Report, Operable Unit 2B, Sites 2 and 17," Marine Corps Air Station (MCAS) El Toro, California

Background

Remedial Investigation (RI) reports for Site 2, the Magazine Road Landfill, and Site 17, the Communication Station Landfill, were prepared by Bechtel National Inc. (BNI) on behalf of U.S. Department of the Navy, Southwest Division Naval Facilities Engineering Command (SWDIV), under the Comprehensive Long-Term Environmental Action Navy (CLEAN) II Program. The documents are dated March 13, and 14, 1996. The overall goal of the RIs was to collect sufficient data to support decisions regarding the need for, and scope of future remediation at these two sites, based upon USEPA presumptive remedies for municipal landfills, and federal, state, and local requirements for landfill closure.

We previously reviewed the Phase II RI/FS Risk Assessment Work Plan (January 20, 1995), the Revised Draft Work Plan (May 24, 1995), and the Final Work Plan (September 28, 1995). We also previously reviewed and commented upon the risk assessment- related portions of the draft Phase II RI/FS, dated March 17, 1995, for Site 2--the Magazine Road Landfill.

Scope of Review

We reviewed the sections of the above-referenced documents pertaining to human health risk assessment, principally Sections 6, and Appendices R and S. The documents were reviewed for scientific and technical accuracy, and for conformance with USEPA Region IX risk assessment guidelines, policies, and procedures. The RI documents were nearly identical with respect to methodology, organization, and format, therefore unless otherwise specified, our comments, and page citations apply to both documents.

We assume that sampling of environmental media, analytical chemistry and QA/QC procedures or data, and the assessment of contamination described and summarized in the RIs, have been adequately reviewed by appropriate USEPA Region IX and Cal/EPA staff. In addition, minor editorial and grammatical errors that do not affect the interpretation of the risk assessment are not addressed. We request that future changes in the document made in response to these comments be clearly identified.

Summary

The information and data presented in the RIs is comprehensive, logically structured, well-organized, and professionally presented. In general, the human health risk assessment sections of the RIs were consistent with USEPA Region IX risk assessment guidelines for conducting human health risk assessments, and no *major* methodological problems were evident. However, several procedural deficiencies were identified in the RI documents which could affect the quantification of health risks. Due to the nature of the deficiencies, it is unlikely that potential risks to human health for OU-2B, Sites 2 and 17 were underestimated, and, in fact, they may have been overestimated. These remaining technical issues, presented in our specific comment below, will need to be addressed, before USEPA Region IX can issue final approval of the RI documents.

Specific Comments

Executive Summary, Human Health Risk Assessment, p. ES-5: For the Site 2 RI, the sentence which reads "Several metal concentrations exceeded the background concentrations for MCAS El Toro; however, only two metal concentrations exceeded residential PRGs," should be followed by an explanatory sentence identifying which two metals these were.

Executive Summary, Human Health Risk Assessment, p. ES-7: For the Site 2 RI, there is text missing from the sentence ending with the phrase (e.g., dermal) at the top of the page. Judging from the sentence which appears in the same location for the Site 17 RI, the missing text involves a description of the exposure pathways which were assessed for the receptors identified on the previous page.

COPCs in Soil and Sediment, § 6.1.2, p. 6-5: It is stated in this section of the RIs that "Surface soil (0 to 2 feet bgs) is the soil of concern in the human-health risk assessment because a recreational child will come into contact with this media." Although it is true that surface soil is the primary media of concern for evaluating the direct soil contact exposure pathway, soil samples at depth are also important for evaluating health risks to on site-workers, and for evaluating potential contaminant migration to groundwater.

Since the groundwater beneath both Sites 2 and 17 show the presence of multiple contaminants, the lack of subsurface soil data is a shortcoming in the RIs that may hamper the effective evaluation of remedial alternatives. The uncertainty introduced in the risk assessment by this data gap, and the consequences for the evaluation of presumptive remedies involving the possible containment of groundwater migration, should therefore be discussed in the RIs.

COPCs in Soil and Sediment, § 6.1.2, p. 6-6: Many of the organic COPCs identified at Sites 2 and 17 are PAHs. It is stated in the Site 2 RI that, "These chemicals were not analyzed for in background samples because they are ubiquitous in an urban environment, and their presence at Site 2 may be unrelated to past practices."

This statement does not provide adequate justification for not identifying anthropogenic background concentrations for these contaminants. Similarly, no justification was presented for not assessing background concentrations of PAHs at Site 17.

We agree that PAHs from anthropogenic sources are widely distributed in the environment. However, this is precisely the reason that USEPA guidance recommends taking background samples--to distinguish between concentrations of contaminant attributable to past hazardous waste practices, and concentrations that are normally present in the environment.

If it can be demonstrated that PAH soil concentrations at Sites 2 and 17 are no different than background soil concentrations of these substances in uncontaminated locations at MCAS El Toro, then they would be eliminated as COPCs in the risk assessment. Elimination of PAHs as COPCs would significantly reduce the estimate of human health risk, since three PAHs-- benzo(a)pyrene, benzo(a)anthracene, and dibenzo(a,h)anthracene--were identified as risk drivers, accounting for greater than 70 percent of the soil risk at Site 2, and 50 percent of the soil risk at Site 17.

It is our understanding that a study to determine PAH reference levels has been recently completed at MCAS El Toro. We are uncertain why this study was not cited or referenced in the RI documents, but we anticipate the incorporation of the results of this reference study in the Revised Final RIs. Additionally, please note the distinction between use of the term "PAH" and "PAHs" in both documents.

Receptor Analysis, § 6.2.1, p. 6-7 to 6-8: Although children playing on the site, and people building homes near the site may be considered more of a possibility than someone repairing underground utilities, the risks to this potential receptor should still be quantitatively, rather than qualitatively assessed.

Exposure Point Concentration, § 6.2.3, p. 6-8 to 6-11: Under various conditions, listed in Appendices R and S, it is both reasonable, and appropriate to use the maximum concentration (Cmax) instead of the 95-percent upper confidence limit (95% UCL) as the exposure point concentration (EPC). However, the use of the maximum concentation as the EPC for all the COPCs detected in groundwater for both Sites 2 and 17 does not appear to be adequately explained, or justified by these criteria. Where sample size is adequate, and detection limits are acceptable, the use of C_{max} rather than the 95% UCL will tend to overestimate risk. Additional justification is required for the use of C_{max} for all COPCs detected in groundwater.

Toxicity Criteria for Dermal Exposure, § 6.3.4, p. 6-14 to 6-15: It is stated in this section, that when RfDs and CSFs are adjusted for gastrointestinal absorption, "oral toxicity criteria causes the dermal risk to exceed the oral risk by a considerable margin." This statement is followed by the editorial remark, "Toxicologically, this is rarely possible, and suggests that the standard procedure for estimating dermal risk needs further refinement."

However, adjusting RfDs and CSFs for gastrointestinal absorption, does *not* always result in the dermal risk exceeding the oral risk "by a considerable margin." In a paper prepared by this commentor, and recently submitted to a scientific journal for publication, adjusting toxicity factors for gastrointestinal absorption caused dermal risks to exceed oral risks for only twelve of twenty substances, and for five of these twelve substances, the dermal risk was within a factor of *two* of the oral risk. Other exposure factors, such as the skin surface area exposed, the duration of exposure, the skin absorption factor, and the ingestion rate, often determines which exposure route will predominate, and drive the risk.

Although we are not specifically objecting to the practice of not adjusting toxicity factors for gastrointestinal absorption when evaluating dermal risk, we think that the rationale presented for not considering adjustment may overstate the case, and recommend that the editorial remark which includes the phrase, "Toxicologically, this is rarely possible..." be omitted from the RI documents.

On-Site Recreational Use, § 6.4.1.1, p. 6-15 to 6-19: Justification should be provided for the selection of the elementary/high school age child as the potential receptor for the on-site recreational use scenario, the selection of two hours/day as the exposure frequency, and the elimination of the younger child as a potential receptor.

On-Site Recreational Use, § 6.4.1.1, p. 6-15 to 6-19: With respect to dermal contact pathway for exposure to PAHs, we request clarification of the statement, "A background cancer risk of 1.4×10^{-7} (for Site 2) and 1.7×10^{-6} (for Site 17) was estimated for the soil medium for the same type of exposures." This statement appears to contradict the statement made in § 6.1.2, and again in this section of the Site 2 RI, that, "PAH[s] were not included in the analyses of background samples, and the background risks for these chemicals are unknown at this time."

Off-Site Residents, § 6.4.1.2, p. 6-17 to 6-19: For Site 2, greater than 60 percent of the groundwater ingestion risk is due to heptachlor, identified in only two of three samples. For Site 17, arsenic, detected in only 2 of 2 samples, is the sole contributor to USEPA-quantified risk. The risk assessments should discuss the uncertainties inherent in basing conclusions regarding the quantification of human health risk on such small sample sets. In addition to the obvious statistical limitations of the data, this uncertainty discussion should include when these groundwater samples were taken, and the uncertainties associated with the possibility of migration of the groundwater plume, as well as with the possibility of natural attenuation over time, degradation rates and products (for organics such as heptachlor), and related factors.

On-Site Recreational Use, § 6.4.2.1, p. 6-23: For Site 2, on-site dermal contact with MCPP in the soil is responsible for greater than 90 percent of the hazard index estimated at 0.99 (essentially 1) for recreational use by children. Similar to the comment above, the uncertainty in this risk characterization should be discussed in light of the fact that the estimated half-life for MCPP ranges from 168 to 240 hours.

On-Site Recreational Use, § 6.4.2.1, p. 6-23: For Site 2, the risk for lead exposure is considered negligible, based on a comparison of the USEPA Region IX PRG. The document states that, "the maximum concentration at Site 2 of 121 mg/kg is below the residential PRG for lead of 130 mg/kg." This statement incorrectly cites the Cal-EPA PRG rather than the USEPA PRG for lead, which is currently 400 mg/kg for residential soil. It is also unclear why a comparison with PRGs is used to assess lead risk at Site 2, rather than the Cal-EPA pharmacokinetic model (Leadspread, Version 6), which is the more appropriate method, and which was employed at Site 17.

***Off-Site Residents*, § 6.4.2.2, p. 6-24 to 6-26:** In general, the explanation of the health effects for arsenic, chromium, fluoride, manganese, nickel, thallium, and vanadium, which appear in this section of the RIs are too brief, incomplete, and lacking in balance to be of much practical value. For instance, for Site 2, the document states, "It is important to note that the maximum concentration of fluoride measure[d] in the groundwater of 1.2 mg/L is less than half the drinking water standard of 4 mg/L. However, it could also be mentioned that cited cases of fluorosis have been associated with 2-5 ppm fluoride in water supplies. Although the document mentions manganese's low acute toxicity, it does not mention that it is also a chronic neurotoxin. With respect to nickel, the document emphasizes nickel itch, a type of skin sensitization not generally associated with exposure via drinking water, but fails to mention nickel's demonstrated carcinogenicity.

Although Appendices R and S contain the IRIS files for the COPCs which are the risk drivers for the health risk assessments, a more complete and balanced description of their health effects should be summarized in the body of the RI documents as well.

Risk to Utility Maintenance Worker, § 6.4.3, p. 6-24 to 6-26: The rationale presented in this section for not quantifying the utility maintenance worker's health risk is that the exposure time associated with typical repairs is usually short and infrequent, that with short exposure times acute systemic toxicity is more of a concern than chronic toxicity, and that chemical concentrations in the surface soil are not high enough to cause acute systemic toxicity.

All of these statements may in fact be correct, but they should nonetheless be demonstrated through a quantification of health risk for this particular receptor, employing appropriate exposure assumptions (e.g., a soil ingestion rate of 480 mg/day). In order to quantify health risk, however, surface soil concentrations may have to be used as surrogate data, since the contaminant concentrations in the subsurface soil are not known for either site.

Toxicity Assessment, § 6.5.3, p. 6-29 to 6-31: In this section, the following statements are made: "The rate and extent of chemical absorption via the stomach and intestines are higher than via the skin. Therefore, the dose and risk associated with ingested chemicals should be higher than those associated with contact of chemicals with the skin." The first of these statements is generally true. However, the second statement does not follow from the first, but rather, is dependent upon the relative degree of exposure via the two routes.

Conclusion and Recommendations

The human health risk assessments conducted as Part of the Remedial Investigations for OU-2B, Sites 2 and 17 are consistent with USEPA Region IX guidelines, and are generally comprehensive and thorough. However, several procedural deficiencies were identified in the RI documents which could affect the quantification of health risks. Due to the nature of the these deficiencies, the potential risks to human health for Sites 2 and 17 are probably overestimated, rather than underestimated. The RIs can be made acceptable to USEPA Region IX, upon adequate response to the specific comments above.

cc: Doug Steele, USEPA Region IX
John Christopher, CAL-EPA/DTSC

jmp/eltoro7.mem

ENCLOSURE G

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 9

75 Hawthorne Street
San Francisco, CA 94105-3901

May 17, 1996

MEMORANDUM

SUBJECT: Comments of Draft Remedial Investigation Report for Site 2

FROM: Herbert Levine, Hydrogeologist
FFCO, Technical Support Section

TO: Bonnie Arthur, RPM
FFCO, Navy Section

Per your request I have reviewed the draft RI report for Site 2. In general there is a significant problem with the development of a conceptual hydrogeological model. The Navy interpreted water levels in alluvium and bedrock as occurring within one interconnected aquifer. It is more likely that there are multiple saturated zones adjacent to each other. The lack of a consistent conceptual model renders the numerical model inappropriate.

Specific Comments

1. Section 3.6.1 Site 2 Occurrence and Movement of Groundwater. The cross-section Figure 3-7 argues against the statement that there is a single shallow aquifer. There is no reason to assume that the water table in the alluvium has to correlate to the water level in bedrock. For the Section A-A'-A" there appears to be three saturated zones, saturated alluvium between A-A', saturated bedrock under A' and another saturated alluvium between A'-A". The same observation is appropriate for the B-B' section. It would be more appropriate to draw the static water level lines within each lithologic unit.

2. Section 3.6.2 Site 2 Aquifer Hydraulic Properties. The statement that well 02NEW2 is screened in bedrock is not verified by the as built construction log in Appendix J. The construction log clearly shows that this well is screened in the sand overlying the bedrock. Since there is some confusion it would be appropriate to add the screened intervals to the cross-sections. The hydrologic properties could then be added which would allow for visualization of hydrologic properties with associated lithologies. The data presented should be evaluated as the bedrock having at least an order of magnitude difference in hydraulic

conductivity and transmissivity. This is an important with regards to interpreting groundwater flow.

3. Section 4.6.1.2 Monitoring Well Groundwater Samples. The premise of well 02_DGMW60 being downgradient of the landfill as a correlation to TCE concentrations might not be valid. It appears, from Figure 3-7, that landfill occurs above this well. Since there is no measurable TCE elsewhere and given the conductivity contrast between the alluvium and bedrock it might be more appropriate to consider the fill material above this well as the source of TCE. Figure 4-23 is missing.

4. Section 5.3.2 Groundwater Transport, the calculation of flow velocity is inaccurate. The data set is far too limited to define groundwater flow in the vicinity of this landfill. There are not sufficient number of wells in the alluvium to determine how water moves within these units. It is incorrect to assume an average porosity for alluvium and bedrock and assume that groundwater will flow from alluvium to bedrock and continue to flow in bedrock at the same rate. The hydraulic gradient presented here probably does not reflect reality. It is far more realistic to evaluate flow in each hydrologic unit.

5. Section 5.3.2.1 VOCS in Groundwater, no basis is presented for the statement that the TCE plume is 600 by 1,000 feet. Figure 4-22 does not show the areal extent of TCE in groundwater (assume the text is referring to Figure 4-20). The data presented (in Figure 4-20) show that TCE occurs in well 02_DGMW60 only. The extent of TCE should be shown (in Figure 4-20) as occurring adjacent to this well. Agree with the statement that the TCE found in this well (in the bedrock unit) is attributable to a release in the area of this well. An effective porosity of 0.30 for the bedrock is greater than expected for bedrock. The value calculated for effective porosity is representative of well graded sand. Agree with the interpretation that the bedrock is a low flow zone and contaminants which may enter the alluvium (from the bedrock) disperse and dilute below regulatory limits. This is sufficient for the purpose of this document. There is not sufficient data for a conceptual model for groundwater flow, therefore there is not sufficient data for a numerical model. The model domain does not incorporate hydraulic conductivity data presented in the text.

6. Appendix R,R.2 Conceptual Groundwater Model, Agree with the interpretation that preferential flow will occur in the alluvium and not the bedrock. This should be incorporated in the cross-section 3-7.

7. Appendix R,R.3.4 Hydraulic conductivity, Figure R-3 does not correctly incorporate hydraulic conductivities. Wells 02NEW1 and 02_DGMW60 are screened in bedrock and have conductivities less than 1ft/day. Well 02NEW8A is screened in bedrock and should not be included in the same hydraulic conductivity field as the alluvial wells. Since the model domain does not accurately incorporate hydraulic conductivities the model should not be viewed as valid.

8. Appendix R,R.3.8 Effective Porosity, agree that choosing an effective porosity of 0.2 is conservative, however assigning the same value to bedrock and alluvium is not a realistic

"BLUE SHEET"

REVISED for 5/29/96 RAB Meeting

MCAS EL TORO RAB

MAJOR DOCUMENT RELEASE & REVIEW DATES

Upcoming Major Documents	*Anticipated Release Date*	*Review Comments Due*	*Subcommittee*
BRAC CLEANUP PLAN (BCP)	~~1/96~~	~~2/96~~	BCP
- Final BCP	3/1/96		
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	6/96 & 9/96		
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
~~- Revised Draft Interim Action Feasibility Study~~	~~10/16/95~~	~~12/14/95~~	
~~- Draft Interim Action Proposed Plan~~	~~12/18/95~~	~~2/16/96~~	
- Remedial Investigation/Feasibility Study (RI/FS) Proposed Plan Public Comment Period	8/96	9/96	
- Draft Record of Decision (ROD)	11/96		
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	6/20/96	8/20/96	
• Landfills - Sites 2 and 17 - OU-2B			
~~- Draft Remedial Investigation (RI) Report~~	~~3/20/96~~	~~5/20/96~~	
- Draft Feasibility Study (FS) Report	7/19/96	9/18/96	
• Landfills - Sites 3 and 5 - OU-2C			
- Draft Remedial Investigation (RI) Report	4/19/96	6/19/96	
- Draft Feasibility Study (FS) Report	8/19/96	10/21/96	
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		