Marine Corps Air Station El Toro
Installation Restoration Program

Public Information Materials

4/24/96
Restoration Advisory Board Meeting
held at Irvine City Hall
Irvine, CA

Materials/Handouts Include:

- RAB meeting agenda*
- Public notice announcing RAB meeting
- Draft RAB meeting minutes from 2/28/96 RAB meeting*
- Sign-in sheets 4/24/96 RAB 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 Remedial Investigation Report, OU-2A, Site 24"*
- Cal-EPA, DTSC comments on "Draft Phase II Remedial Investigation Report, OU-2A, Site 24"*

* denotes handed out at meeting

MCAS El Toro
Restoration Advisory Board
Meeting

24 April 1996 6:30-9:00 PM

Irvine City Hall
Multipurpose Room L102
One Civic Center Plaza
Irvine

AGENDA

• **Welcome/Introductions/Agenda Review**	Joseph Joyce
• **Old Business**	Marcia Rudolph
Approval of 2/28/96 Minutes	
• **New Business**	
Air Sparging Technology Groundwater Cleanup Pilot Test (Site 24)	Pat Brooks CLEAN II Program
Tank 398 Update, Jet Fuel Removal and Cleanup	Bill Sedlak OHM Remediation Services Corp.
Groundwater Monitoring Status Report	Andy Piszkin U.S. Navy - Southwest Division, Naval Facilities Engineering Command
Early Actions (Landfills - Sites 2 and 17) Slide Show	Bill Sedlak
Regulatory Agency Comment Update	Bonnie Arthur U.S. Environmental Protection Agency Tayseer Mahmoud Cal-EPA, Dept. of Toxic Substances Control
• **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
28 FEBRUARY, 1996

DRAFT MEETING MINUTES

A Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, 28 February at the Irvine City Hall, City Council Chambers. The meeting began at 6:40 p.m. These minutes summarize the discussions and presentations from this meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Navy Co-Chair and BRAC Environmental Coordinator Joseph Joyce called the meeting to order. Community Co-Chair Marcia Rudolph asked all attendees to introduce themselves.

OLD BUSINESS

Review and Approval of Minutes of 31 January, 1996 Minutes

Ms. Bonnie Arthur, U.S. Environmental Protection Agency (U.S. EPA) requested a change to the 31 January minutes. The RAB voted to approve the minutes as corrected. The revision to the minutes is included as an attachment.

Agenda Review

Mr. Joyce reviewed the agenda, reminded attendees to sign in, and mentioned the updated "blue sheet," which contains release dates of documents slated for RAB review.

Site Tour Overview

RAB member Don Murphy, at the request of Mr. Joyce, reported on the tour of the Installation Restoration Program (IRP) sites at MCAS El Toro including a viewing of chemical spill areas and the bioremediation treatment area near Irvine Boulevard, as well as other IRP sites. Ms. Rudolph encouraged those interested in touring specific sites to call Mr. Joyce or Ms. Charly Wiemert at (714-726-2840). Regarding an earlier suggestion that the cleanup be videotaped at various stages, Ms. Rudolph believes the landfill sites are good candidates. She added that this tour made the Marine Corps' current downsizing obvious, due to the lessening of vehicles and personnel at the station.

Ms. Rudolph stated that the demolition disposal area demonstrates how the facility, which is built into the side of a hill, can perform disposal operations near residential and transportation areas. Stating that the landfills need quick remediation, Ms. Rudolph complimented Mr. Joyce for urging the Navy to act quickly. Mr. Joyce said base tours will be available throughout the project, and thanked Ms. Wiemert and Mr. Vish Parpriani for their key support role.

Environmental Cleanup Progress Report - Joseph Joyce

The Operable Unit (OU) 2A Draft Remedial Investigation (RI) Report was released 20 February to subcommittee members. The environmental project team is currently writing draft RI reports for other Installation Restoration Program sites. Two of these draft RI reports, for Sites 2 and 17, will be released 20 March. A presentation on the Tank 398 report is scheduled for the next RAB meeting.

Mr. Joyce mentioned that, according to an earlier agreement, no RAB meeting was scheduled for March. Discussion on this was tabled until the end of the meeting.

NEW BUSINESS

Regulatory Agency Comment Update: Bonnie Arthur, U.S. Environmental Protection Agency

Ms. Arthur said that U.S. EPA had issued comments on the Draft Proposed Plan for OU-1 (primarily offsite groundwater) several weeks ago. The preferred groundwater remediation alternative described in the Draft Proposed Plan is a joint desalter project between the Marine Corps/Navy and the Orange County Water District. The recommended contingency alternative in the Draft Proposed Plan is a Marine Corps/Navy stand-alone project. Ms. Arthur said that it is EPA's understanding that the recommended contingency alternative proposed may change given the Navy's intent to evaluate additional alternatives for the principal aquifer based on EPA and Cal/EPA's comments on the Draft Interim Action Feasibility Study for OU-1. U.S. EPA is currently reviewing the OU-2A Draft RI report, which addresses soil and groundwater in the source area.

Groundwater Treatment and Cleanup Levels - Lynne Preslo, Senior Vice President of Technical Services, The Earth Technology Corporation

Ms. Preslo's remarks focused on setting realistic goals for groundwater cleanup, and included a retrospective of how groundwater cleanup regulations and technology have evolved. She served on the National Research Council committee for Groundwater Cleanup Alternatives that conducted a National Academy of Sciences study to help form the basis of groundwater and soil cleanup policies. The committee, which was sponsored

by EPA, the Department of Defense, and the Department of Energy, convened in 1990 and the results were published in 1994. The basic findings are that low cleanup levels cannot be achieved because subsurface conditions (not just available technology) and that hundreds to thousands of years would be required to reach these low levels in some instances. Meanwhile, billions of dollars are being spent to cleanup groundwater problems that cannot be cleaned up to those levels. In addition, she is an expert in the Containment Zone Policy under consideration in California. The policy, now in its second draft, sets up a framework to develop realistic remedial alternative strategies and cleanup goals. It remains to be seen if and when the Containment Zone Policy will be adopted throughout the state.

Ms. Preslo said that the "how clean is clean" issue and the fact that cleanup goals were frequently not met came to public and press attention in the late 1980s. People began asking if aquifer restoration was achievable within reasonable time frames and costs. Ms. Preslo believes many environmental regulations were adopted before the technical and economic implications of subsurface remediation, or cleanup, were fully understood. In providing some historical perspective, she said that when environmental remediation began in the late 1970s and early 1980s, available geotechnical sampling techniques were adapted to environmental work. Early efforts tried to determine what kind of media the fluids moved through, the subsurface chemistry, the partitioning between various media, and residual saturation.

Ms. Preslo provided details on various subsurface conditions, the flow of groundwater, and the actions of contaminants present in the subsurface. She also discussed various case studies that supported the National Research Council committee's findings. One such study examined a groundwater pump-and-treat system in California that involved removal of contaminated groundwater from a three portions of an upper unconfined aquifer, treatment on the surface with liquid phase carbon, and then reinjection into the lower aquifer. Thus, contamination levels dropped significantly but there was a leveling off and concentrations were still above cleanup goals. This study was representative of several others examined.

In explaining how contaminant removal levels off during a cleanup project, ("asymptotic trends"), Ms. Preslo said contamination declines almost exponentially at most sites in the first three to five years. Then, the concentration levels out or "asymptote out" at concentrations still above the cleanup level. When this information was paired with the cost and the number of cleanup sites nationwide, the "how clean is clean" issue was introduced. Recent emphasis on risk/benefit ratios has led to increased economic analysis of federal Resource Conservation and Recovery Act (RCRA) corrective actions. The Containment Zone Policy attempts to balance technical feasibility, cost risk, and potential benefit from groundwater cleanups. The National Research Council Committee was charged in 1990 to ascertain the capabilities of pump-and-treat, define limits to restoration, seek alternative or innovative technologies, determine the socioeconomic

consequences, establish alternative goals, and seek policy alternatives. The Committee reviewed a range of pump-and-treat systems nationwide and assigned four categories of cleanup difficulty, based on subsurface hydrogeology (from simple to complex) and contaminant chemistry (from simple to complex). Category 1 was "simple" clean up; Categories 2 and 3 were uncertain to highly uncertain, and Category 4 is technically impracticable and probably cannot reach specified cleanup levels. Enhancements might increase the amount of contamination removed, she said, but cleanup standards are still not attained.

Ms. Preslo summarized the Committee's recommendations which include having expert panels evaluate site characteristics, remedy selection and performance; establishing a central, broadly accessible site information repository; systematically evaluating the ability to reach cleanup goals; educating the press and public; identifying and eliminating disincentives to early action; and developing an institutional structure for these issues. The use of better site characterization, technical practicability issues, and risk-based decisions should lead to the improvement of remedial management scenarios. These scenarios might include source removal or treatment, hydraulic containment or control, institutional controls, and basin-wide groundwater resource management. Ms. Preslo added that new guidance documents are needed at the federal and state levels.

The proposed Containment Zone Policy would give site owners a framework to build realistic groundwater management strategies using existing resources without committing additional resources to sites that cannot effectively be cleaned. Ms. Preslo supports the policy as a good way of conserving resources and stated that it is not an aquifer abandonment policy.

A RAB member commented that as technology improves, contaminants that cannot be remediated today may be good candidates for future remediation; Ms. Preslo responded that even in the most advanced research sites, complete cleanup is not being achieved. She still supports pump-and-treat remediation methods for some uses, but prefers them for containment rather than complete cleanup. Responding to another question, she said that adding surfactants (chemical agents to enhance cleanup) to contamination sites is not especially practicable; all enhancements run the risk of worsening the problem.

Regarding the National Resource Council Committee's four categories of cleanup difficulty, a member asked if owners of a Category 3 or 4 site should still try to clean up to the point of "diminishing returns." Ms. Preslo answered that some site owners want up-front waivers specifying that the regulatory agencies agree that complete cleanup will not be achieved; however, advance waivers are unlikely. Operational data is needed to prove that what owners knew at the beginning of the project is still true several years later. It is unrealistic, she said, to hope that most Category 4 sites can be truly cleaned up; hydraulic containment would be a better solution. End use of the land will play a large part in determining the cleanup solution.

Another member asked if using heavier-drop pumps early in pump-and-treat projects and lighter-drop pumps later would help solve the problem. Ms. Preslo stated that Earth Tech has done this, as well as moving pumps from one area to another to optimize systems. She said the effect of weather on potential loss of hydraulic containment would have to be monitored on a site-specific basis, but she has not yet seen a site where weather has caused such a loss.

Studies are underway to improve ways of identifying dense non-aqueous phase liquids (DNAPL) locations. The current method is a multi-step approach involving site history, volume, and concentration level of contaminants. The method relies more on circumstantial than direct evidence, she said. Another member asked if MCAS El Toro has a DNAPL contamination problem: Mr. Andy Piszkin, Remedial Project Manager, from the Southwest Division Naval Facilities Engineering Command, answered that the February 20 Draft Remedial Investigation Report for the TCE source are (Installation Restoration Site 24) showed no evidence of DNAPLs. As a point of clarification, Mr. Piszkin asked at what concentrations do most VOC remedial actions asymptote out. Ms. Preslo responded that most VOC remedial actions level out at concentrations in the hundreds of parts per billion.

ADDITIONAL DISCUSSION

After Ms. Preslo's presentation, Mr. Dan Jung with the City of Irvine, advised members of the El Toro Reuse Planning Authority (ETRPA) meeting scheduled for Thursday, 29 February at City Hall at 5:00 p.m. A consultant will discuss aviation reuse issues.

Additional discussions focused on news coverage of cleanup funding problems, the debate over future reuse of the base, and the RAB's role in communicating information back to the community.

MEETING EVALUATION

One member suggested that a microphone would help technical presenters make their remarks easier for the largely non-technical audience to understand. Others commented that this meeting offered an excellent balance between technical information and site activity reports; and one member was pleased that the meeting started on time and would probably finish on time. Discussion focused on the meeting room facilities, the structure of question-and-answer sessions after the meeting, and the possibility of having someone explain how the information from Ms. Preslo's talk might apply to MCAS El Toro.

Discussion followed on whether a March meeting would be held. Some members suggested that, while an official RAB meeting may not be feasible (due to budget constraints), the OU-2 subcommittee and interested members of the RAB could get together on 27 March. RAB members will be notified as details are confirmed.

FUTURE MEETING DATE AND LOCATION

The next RAB meeting is scheduled for Wednesday, 24 April, 1996 at the City of Irvine, Conference and Training Center, at 6:30 p.m.

Attachments:
- Sign-in sheets
- Revision to 1/31/96 RAB meeting minutes

Handouts provided at the meeting and available at the Information Repository:
- RAB meeting agenda
- RAB meeting minutes - January 31, 1995 meeting
- "Blue Sheet" - Revised MCAS El Toro RAB Major Document Release and Review Dates, revised 2/27/96
- Presentation - Realistic Goals for Pump-and-Treat or "When Can We Turn It Off?"
- U.S. EPA comments on "Draft Operable Unit 1 Proposed Plan"
- Press Release, El Toro Reuse Planning Authority announces public meeting for 2/29/96

Aquifer	TCE highest concentration	TCE drinking water standard
Shallow (on-base)	3000 parts per billion (ppb)	5 ppb
Principal (off-base)	34 ppb	5 ppb

Drinking water standards are used for comparison. While this water is not presently used as drinking water, today's cleanup to these standards are considered protective of human health for future users.

Contaminants have been detected in the principal aquifer, and contractors are now collecting additional data as part of the quarterly groundwater monitoring program. Three multiport wells in an off-base area of the principal aquifer had detections of TCE above the drinking water standard during the first and second rounds of groundwater monitoring conducted by the DON.

To provide additional history regarding the feasibility study, Ms. Arthur outlined the proposed Irvine Desalter Project. In 1985, TCE was detected in off-base groundwater, so the Orange County Water District (OCWD) installed monitoring wells. The Marine Corps/Navy and OCWD began examining a shared desalter system. In September 1994, the first Draft Interim Action Feasibility Study included the desalter as a component of the cleanup alternatives evaluated. In these alternatives, the Marine Corps/Navy would treat the water to remove volatile organic compounds (VOCs), including TCE, to meet drinking water standards. Because the desalter was put on hold, pending negotiations with the Navy, the regulatory agencies asked the Marine Corps/Navy to develop other alternatives. Several new ones were proposed in the October 1995 Revised Draft Interim Action Feasibility Study, the subject of the current review cycle. Of the 12 alternatives that were evaluated for their implementability, technical effectiveness, and cost effectiveness for addressing VOC contamination in the shallow groundwater and the principal aquifer, two alternatives were considered front runners by the Marine Corps/Navy: Alternative 2A (DON stand-alone project) and Alternative 6A (a joint DON/OCWD project).

U.S. EPA's major comments in regard to the Revised Draft Interim Action Feasibility Study:

- If the desalter remains on hold, U.S. EPA is not satisfied with the Alternative 2A, the proposed DON stand-alone project;

- Alternative 2A, proposed for addressing the deep aquifer, has very low effectiveness: a 23% reduction in the size of the plume over 20 ~~10~~ years and an approximate cost of $25 million; and

U.S. EPA agrees with the Marine Corps/Navy that some type of remedial action is warranted in both the shallow and principal aquifers. The Agency recommended that

"BLUE SHEET"

REVISED

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~~	
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		

Tank 398 Site Update

Free Product Removal Project

MCAS El Toro
Restoration Advisory Board
April 24, 1996

Tank 398 Site Background

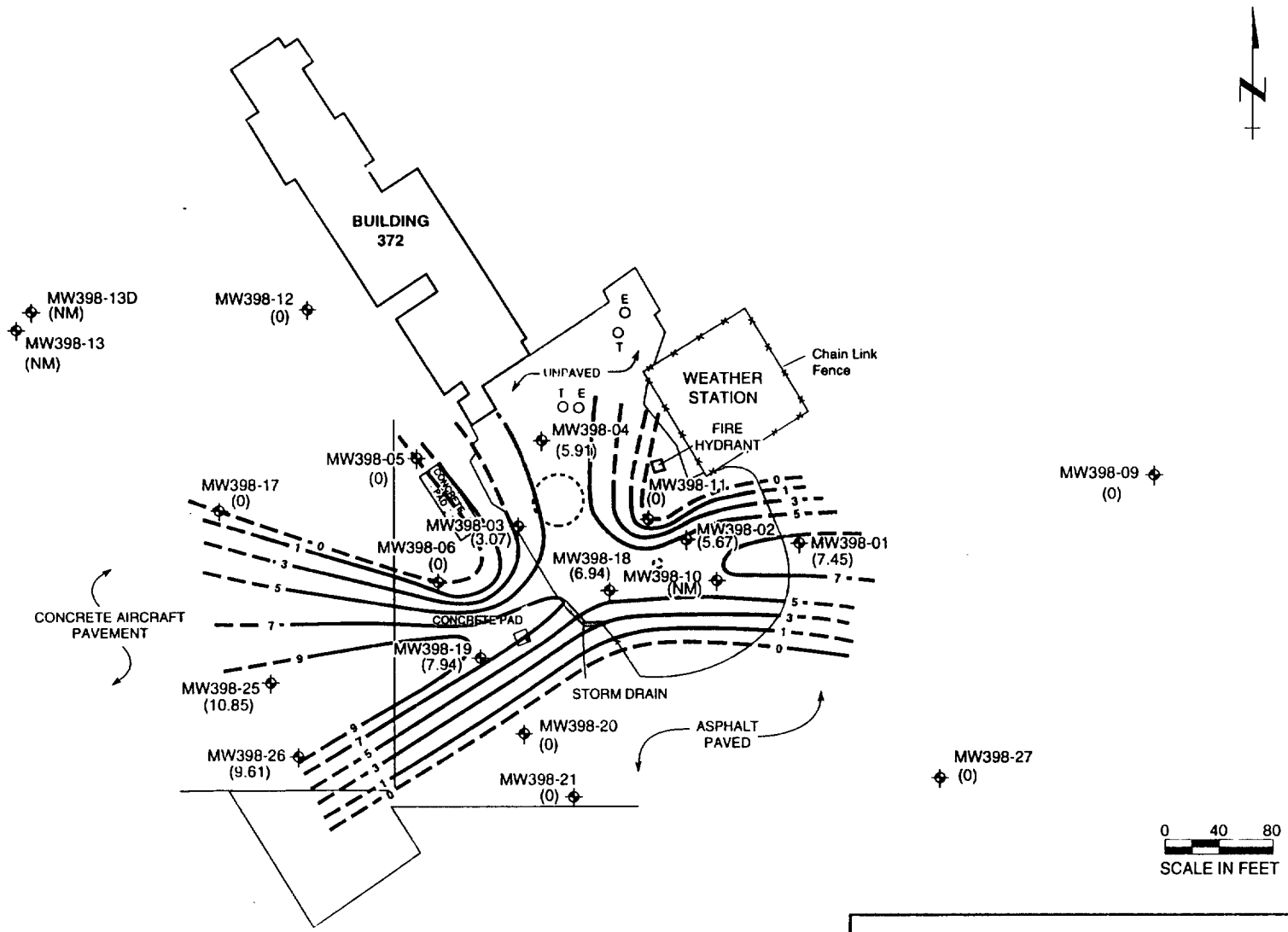
- **Tank 398 was a 110,000 gallon JP-5 tank used for refueling of aircraft**
- **Groundwater 200 feet deep at site**
- **Fuel found in the soil in 1988 and subsequently free product was discovered under the site**
- **Pilot tests conducted indicated that the free product could be removed by pumping.**
- **OHM was contracted to install and operate a remediation system for recovery of the free product in late 1994.**

Free Product Recovery System

- Final Construction/Operations Plan issued May 1995
- System construction completed Dec 95
- System components:
  - ► Six pneumatically driven recovery pumps
  - ► Steel collection piping system
  - ► Air compressor
  - ► 4,000 gallon product storage tank
  - ► Control system

Site Data, June 1995

- Free product thickness measured
  - ► Range from none to nearly 11 feet
- Horizontal extent not defined to east/west
- Contour map shows interpretation of data



LEGEND

- Well Location
- O Manhole (T-Telephone, E-Electrical)
- Interpretive Contour Line of Apparent Free-Product Thickness in Feet (dashed where inferred)
- (8.49) Measured Free-Product Thickness in Feet
- (NM) Not Measured

Note:
Free-product thickness per field measurements, no correction factor applied. Actual free-product thickness in formation may vary considerably. Thickness only shown where free-product was found; free-product was not found in other wells.

04/96.ET

MARINE CORPS AIR STATION
EL TORO
TANK 398 SITE
INTERPRETIVE CONTOURS OF APPARENT FREE-PRODUCT THICKNESS
JUNE 1995

FIGURE 2-8

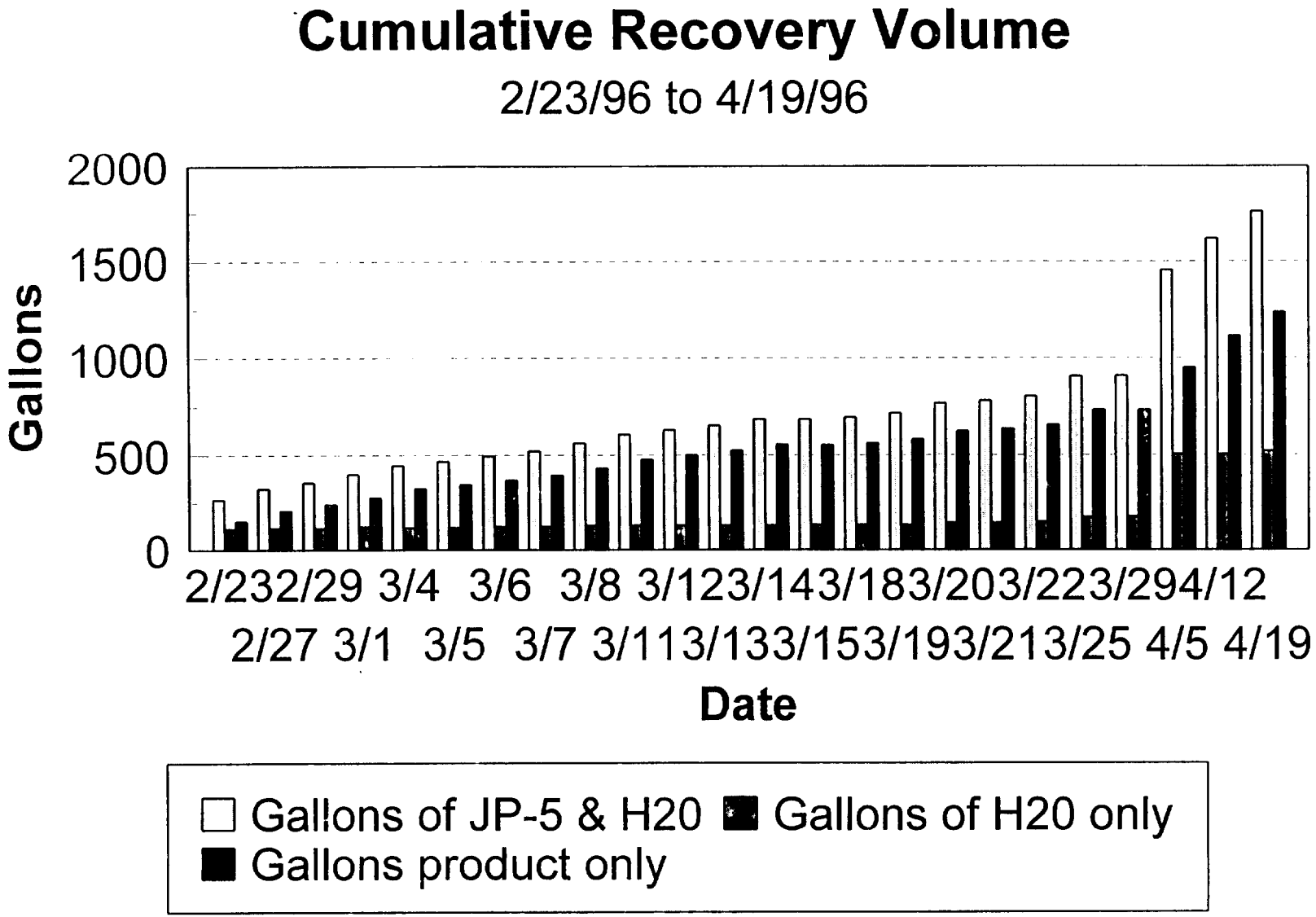
New Recovery Well

- Planned up to 3 new recovery wells at site
- Clay layer over free product layer was Identified on previous well logs
- One well installed to date due to concerns about site geology
- Placed slightly west of wells MW398-25 and -26
- 6-inch steel casing with wire-wrapped screen
- Limited free product thickness at well RW-1

Recovery System Status

- Startup Activities
  - ► Began on 4 Dec 1995
  - ► Wells MW398-04, -25, -26 do not support pumping due to poor recharge into well
  - ► Wells MW398-02, -10, -19 support pumping
- Initial Operation
  - ► Initial recovery limited by pump, geological issues
  - ► 160 gallons pumped from 4 Dec to 16 Feb
  - ► Pump inlets changed, manually adjust height
- Current Operation
  - ► System adjusted to match site conditions
  - ► Product recovery increased to 100 - 120 gal/week
  - ► 1,250 gallons currently (April 19)

Free Product Recovery

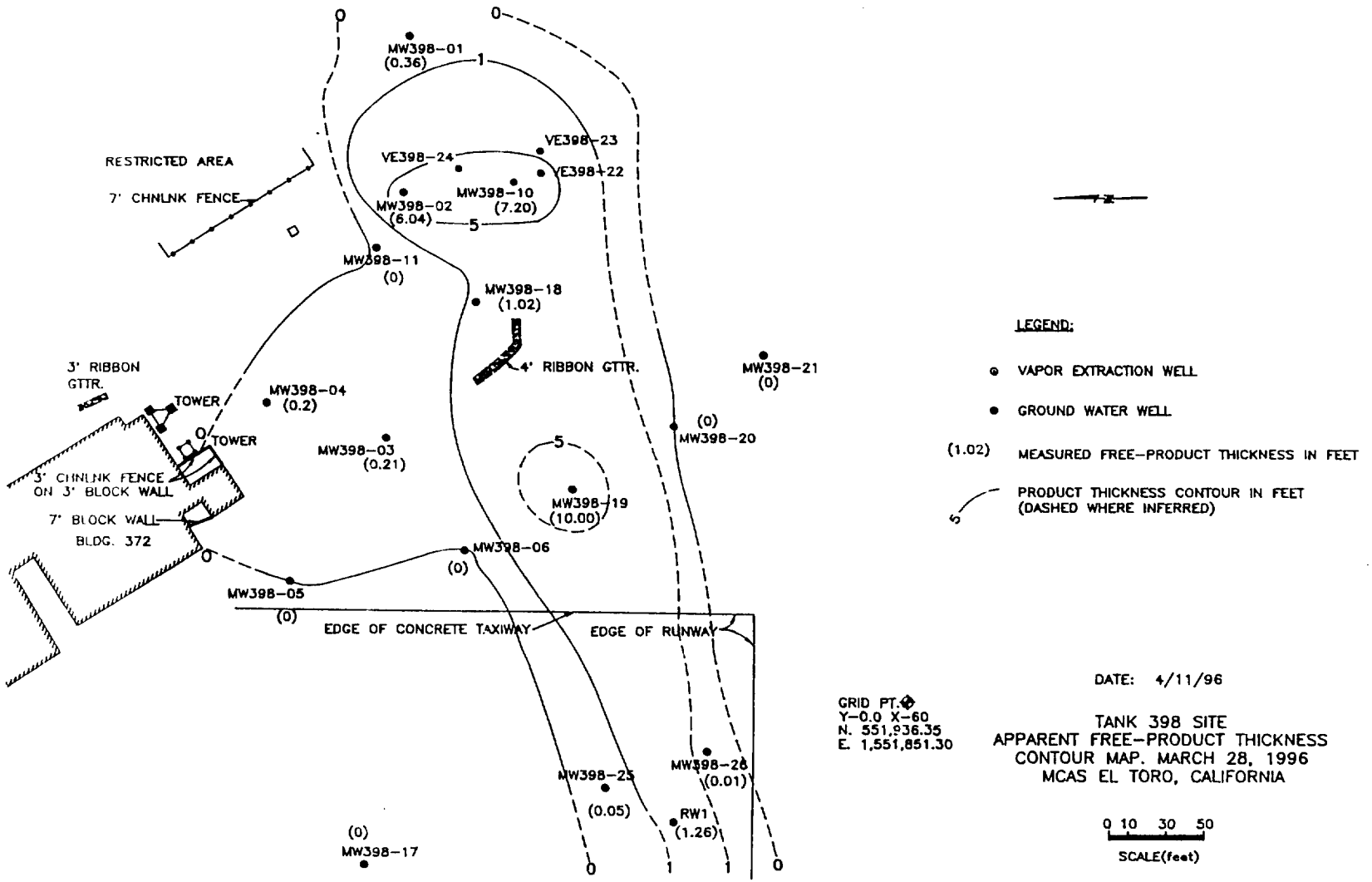


Free Product Plume

- Product thickness lower than in 1995
  - ► Thickest near MW398-19, -02 and -10
  - ► 1 Foot or less in MW398-04, -11, -01, -18, -25, -26
- Revised contour interpretation
- Free product under confined conditions in some locations

Additional Work Underway At Tank 398 Site

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


MW398-01
(0.36)
VE398-23
VE398-24
VE398-22
MW398-10
(7.20)
MW398-02
(6.04)
RESTRICTED AREA
7' CHNLNK FENCE
MW398-11
(0)
MW398-18
(1.02)
4' RIBBON GTTR.
3' RIBBON
GTTR.
TOWER
TOWER
MW398-04
(0.2)
MW398-03
(0.21)
MW398-21
(0)
MW398-20
(0)
3' CHNLNK FENCE
ON 3' BLOCK WALL
7' BLOCK WALL
BLDG. 372
MW398-19
(10.00)
MW398-06
(0)
MW398-05
(0)
EDGE OF CONCRETE TAXIWAY
EDGE OF RUNWAY
MW398-25
(0.05)
MW398-26
(0.01)
RW1
(1.26)
(0)
MW398-17
LEGEND:
VAPOR EXTRACTION WELL
GROUND WATER WELL
(1.02) MEASURED FREE-PRODUCT THICKNESS IN FEET
PRODUCT THICKNESS CONTOUR IN FEET
(DASHED WHERE INFERRED)
GRID PT.
Y-0.0 X-60
N. 551,936.35
E. 1,551,851.30
DATE: 4/11/96
TANK 398 SITE
APPARENT FREE-PRODUCT THICKNESS
CONTOUR MAP. MARCH 28, 1996
MCAS EL TORO, CALIFORNIA
0 10 30 50
SCALE(feet)

Landfill Actions

- Install security fencing
  - ► Minimize unauthorized access
  - ► Eliminate illegal dumping
- Remove debris from stream channels
  - ► Prevent further movement downstream
  - ► Reduce exposure of debris to storm water
- Protect banks from further erosion
  - ► Prevent storm water from eroding into landfill

Site Issues

- Very complex site
- Several endangered/protected species
  - ► California Gnatcatcher
  - ► Coastal sage
- Borrego Canyon Wash flows through Site 2
- Future improvements in vicinity of Site 2

Insitu Air Sparging for Groundwater Cleanup

MCAS El Toro
Operable Unit 2A - Site 24

VOC Source Area

Site 24, the Volatile Organic Compound (VOC) Source Area, is the source of VOCs in the regional groundwater. Most of the contaminated soil is beneath Buildings 296 and 297, the aircraft refurbishing hangars.

Most of the groundwater beneath the site's 200 acres is contaminated with trichloroethene (TCE) above the U.S. EPA's maximum contaminant level for drinking water of 5 micrograms per liter. The leading edge of the groundwater hotspot is located at Site 24; the trailing edge is beneath Building 296.

Vadose zone contamination was characterized with a soil gas survey. Approximately 40 acres of the site had reported concentrations of TCE. Most of the soil gas concentrations increased with depth. In general, the areas with the highest concentrations of TCE in the soil gas had elevated concentrations of TCE in the underlying groundwater.

***Insitu* Air Sparging is one of the remedial technologies being considered for removing VOCs from the groundwater at Site 24. Several case studies reported at the U.S. EPA Superfund XVI Conference reported successful remedial efforts for VOCs using air sparging.**

Q. How does *insitu* air sparging remove VOCs from groundwater?

A. The air sparging technology takes advantage of the volatility of VOCs. Clean air injected into the aquifer causes the VOCs dissolved in groundwater to partition into the sparging bubbles.

Q. How are the VOCs captured once the sparging bubbles leave the groundwater?

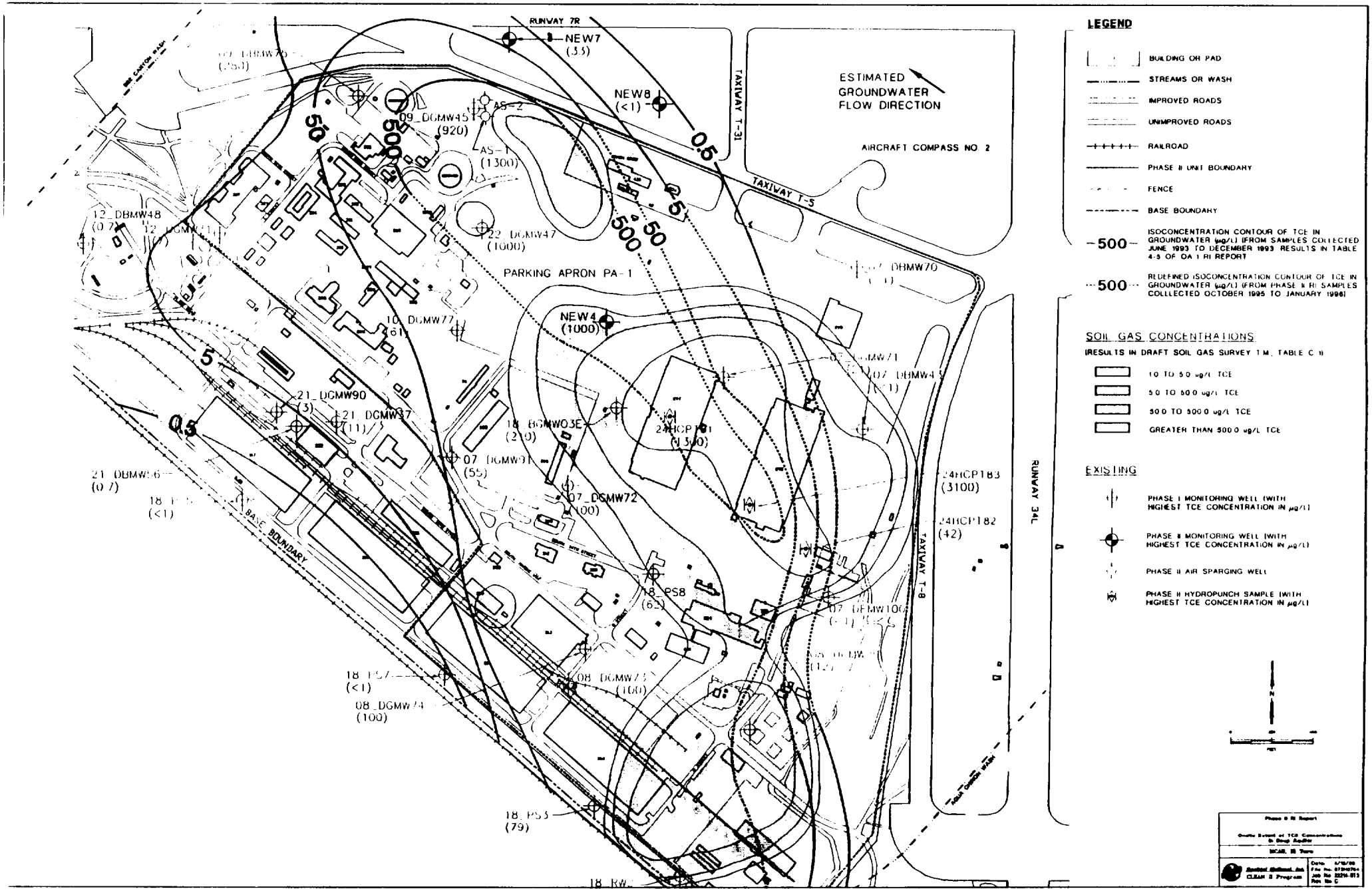
A. VOC vapor is captured using standard soil vapor extraction technology and the vapor is treated before discharging to the atmosphere.

Q. Are there site conditions that could hamper the implementation of *insitu* air sparging at Site 24?

A. Silt and clay layers present in the aquifer may influence the distribution and collection of the sparging bubbles. A pilot test is being conducted to evaluate this potential problem.

Q. What criteria will be used to evaluate the pilot test?

A. To be considered effective, the pilot test must demonstrate that VOC vapor can be successfully captured, that VOC concentrations are reduced in the groundwater, and excessive well screen clogging does not occur after injection of the clean air.



LEGEND

- BUILDING OR PAD
- STREAMS OR WASH
- IMPROVED ROADS
- UNIMPROVED ROADS
- RAILROAD
- PHASE II UNIT BOUNDARY
- FENCE
- BASE BOUNDARY
- –500– ISOCONCENTRATION CONTOUR OF TCE IN GROUNDWATER (µg/L) (FROM SAMPLES COLLECTED JUNE 1993 TO DECEMBER 1993 RESULTS IN TABLE 4-3 OF OA 1 RI REPORT
- ···500··· REDEFINED ISOCONCENTRATION CONTOUR OF TCE IN GROUNDWATER (µg/L) (FROM PHASE II RI SAMPLES COLLLECTED OCTOBER 1995 TO JANUARY 1996)

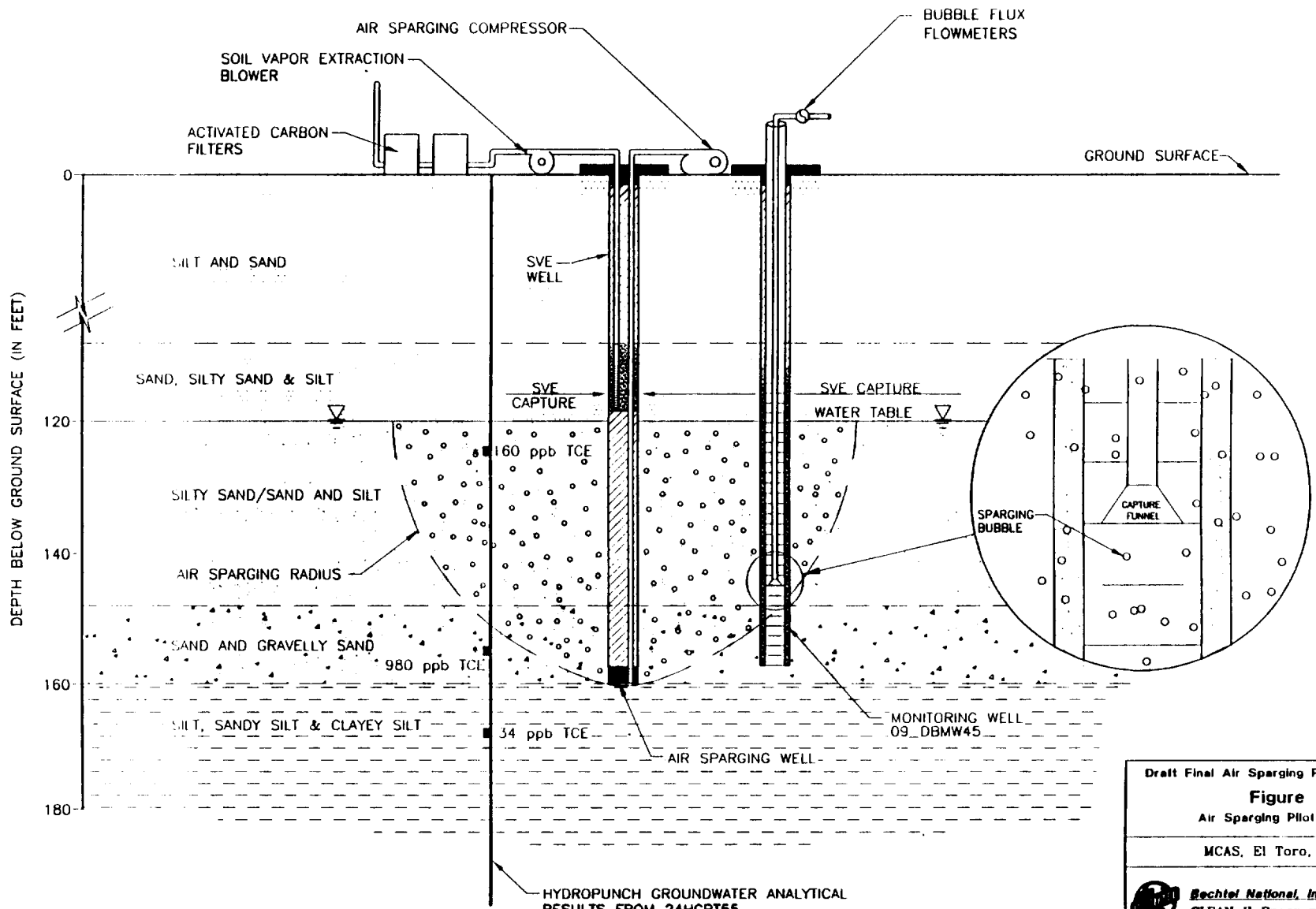
SOIL GAS CONCENTRATIONS

(RESULTS IN DRAFT SOIL GAS SURVEY T.M., TABLE C-1)

- 1.0 TO 5.0 ug/L TCE
- 5.0 TO 50.0 ug/L TCE
- 50.0 TO 500.0 ug/L TCE
- GREATER THAN 500.0 ug/L TCE

EXISTING

- PHASE I MONITORING WELL (WITH HIGHEST TCE CONCENTRATION IN µg/L)
- PHASE II MONITORING WELL (WITH HIGHEST TCE CONCENTRATION IN µg/L)
- PHASE II AIR SPARGING WELL
- PHASE II HYDROPUNCH SAMPLE (WITH HIGHEST TCE CONCENTRATION IN µg/L)



Draft Final Air Sparging Pilot Test Work Plan

Figure 3-2

Air Sparging Pilot Test Setup

MCAS, El Toro, California

Bechtel National, Inc.
CLEAN II Program

Date 3/19/96
File No 073M0635
Job No 22214-073
Rev No B

MCAS EL TORO
Groundwater Sampling

Results

Ist Quarter 1996

4/24/96 RAB Meeting

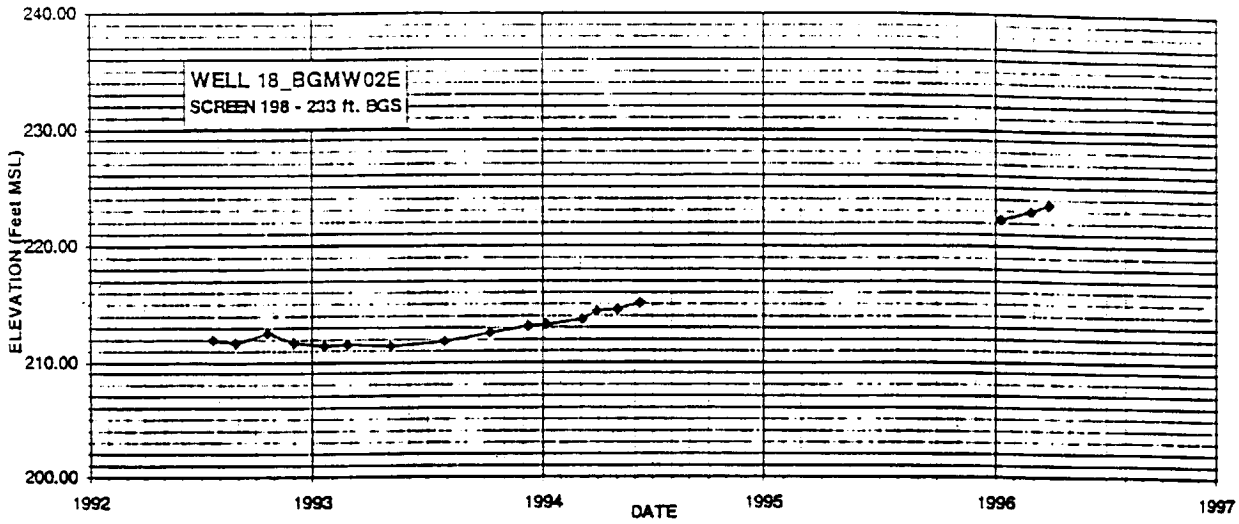
(c:ap\eltoro\cdmfed01.ppt)

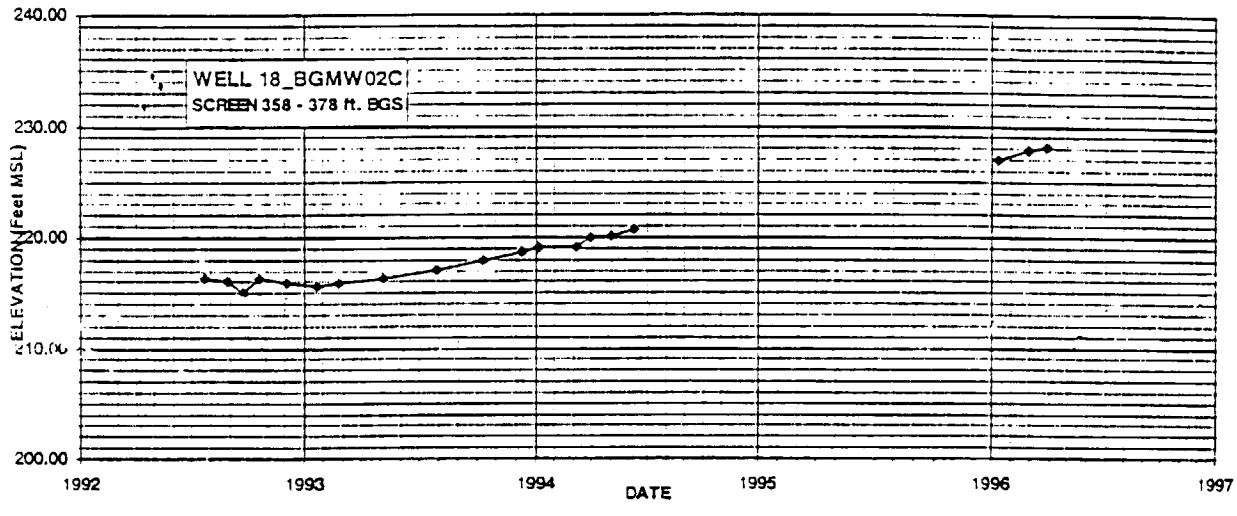
Primary Objectives

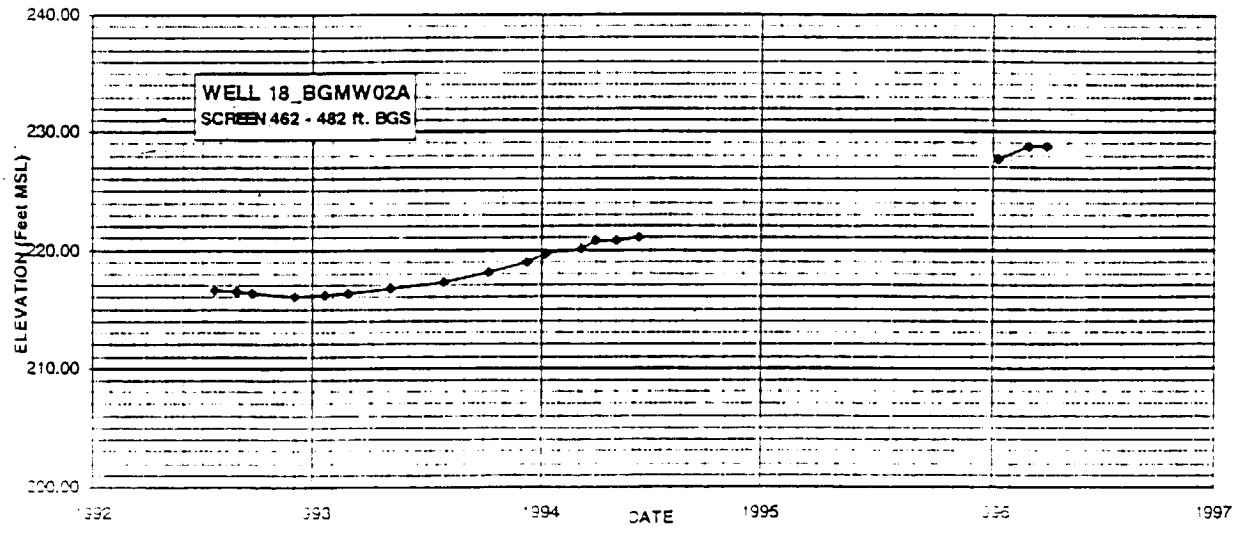
- Monitor and Document Groundwater
  - » Quality & Flow
- Monitor and Assess Existing Plumes
  - » Extent & Movement
- Provide Support Data
  - » Remedial Design & Remedial Actions

Results

- Groundwater Elevations
- Volatile Organic Compounds (VOCs)
- Petroleum Hydrocarbons (Benzene)
- Semi-VOCs
- Pesticides & Herbicides
- Metals & General Chemistry
- Site-Specific Analyses







1992 - 1994 data from SWDIV (1994)

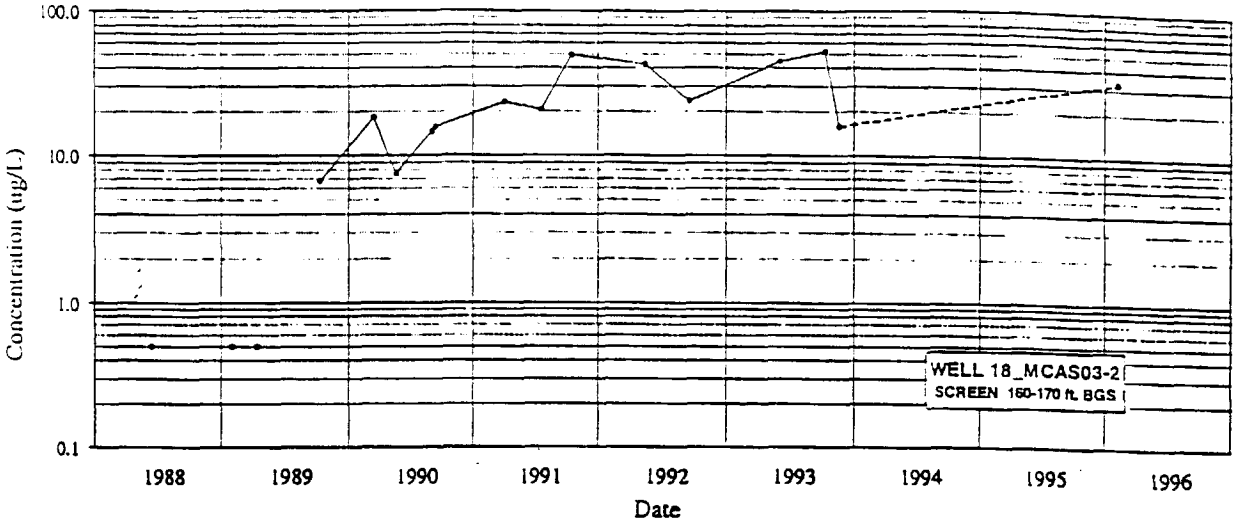
CDM FEDERAL PROGRAMS CORPORATION

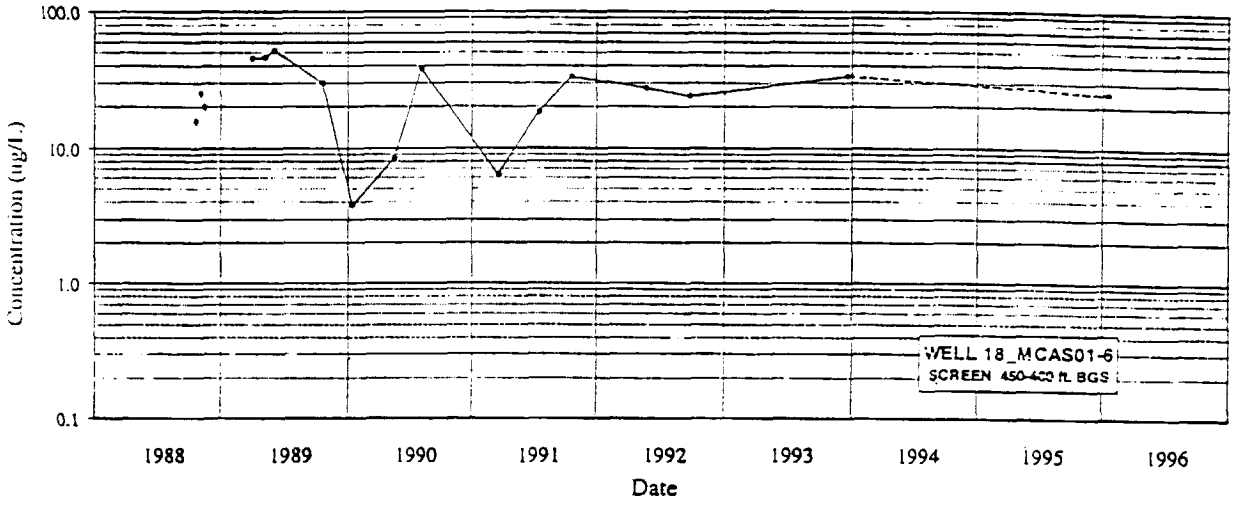
Groundwater Elevation Hydrographs
MCAS El Toro Monitoring Well Cluster 18_BGMW02

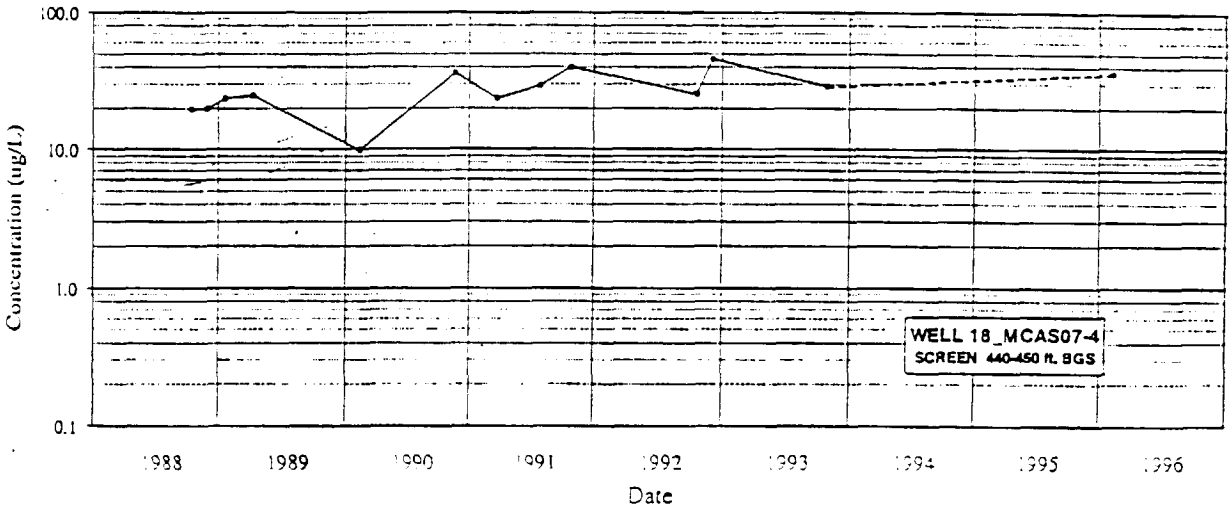
Data Trends Report
Figure 3-6

VOCs (solvents)

- 163 Ports Tested
- Off-Station Regional Plume
  - » Extent Same & Concentrations Same
- On-Station Source Area
  - » Extent Same & Concentrations Less
- Site 2 Landfill
  - » Extent Same & Concentrations Same
- Site 6/19 Area Detects Need Validation







● TRICHLOROETHYLENE (TCE) Fed. MCL 5.0 ug/L

CDM FEDERAL PROGRAMS CORPORATION

TCE Concentration in Groundwater, 1988 - 1996
MCAS Multiport Monitoring Wells in Main VOC Plume

Data Trends Report
Figure 3-11

Benzene

- 45 of 163 Ports Tested had Detects
- Vicinity of Fuel Farms 2 and 5/6
- Generally Low Concentrations
- New Detects in 2 Deep Zone Wells
- New Detects Need Validation

Semi-VOCs

- 12 of 78 Ports Tested had Detects
- Fewer Ports had Detects
- Fewer Compounds Detected
- Concentrations Less

Metals

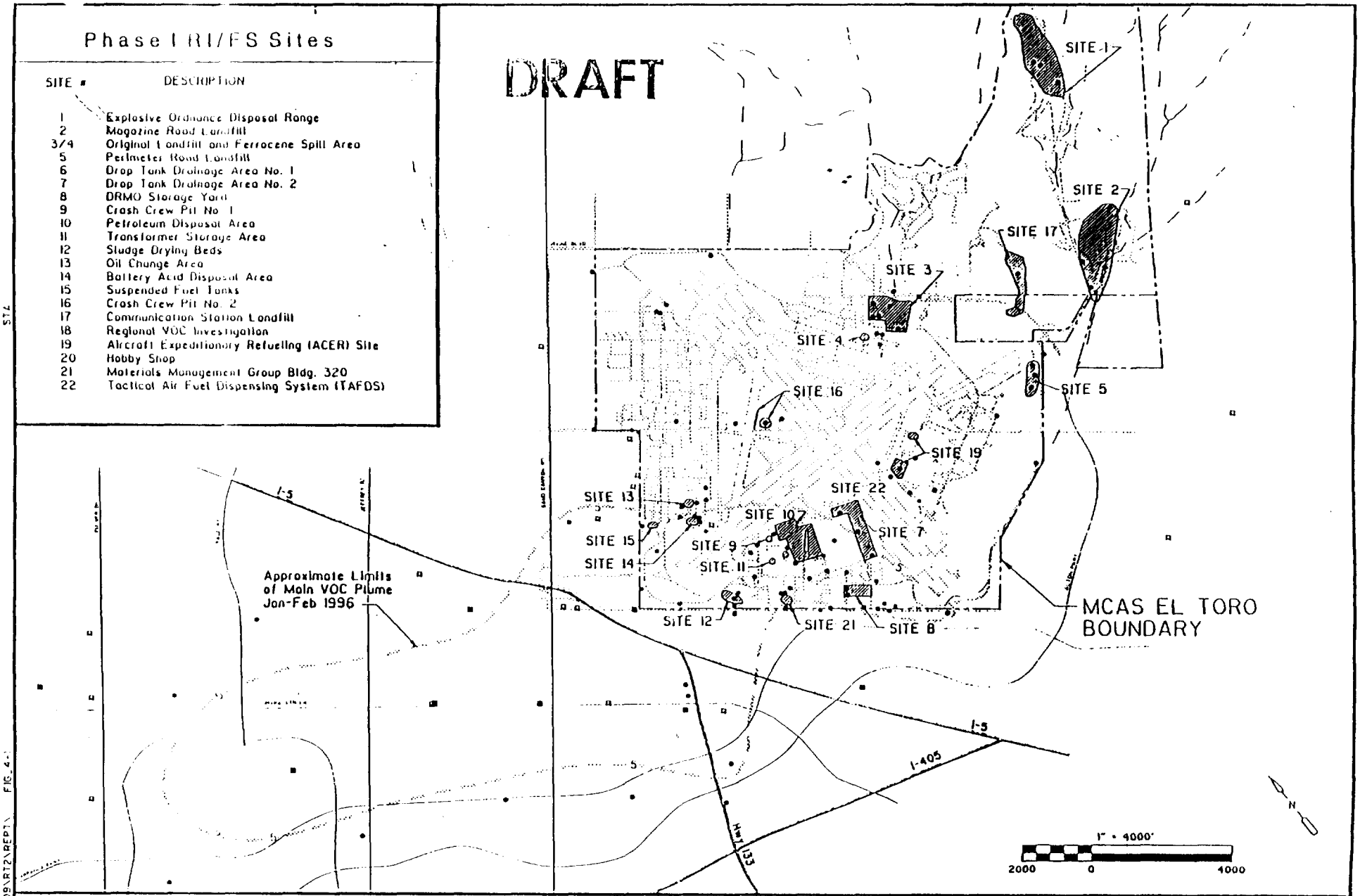
- All Ports Tested - Filtered & Unfiltered
- All Previous Data from Filtered Samples
- Filtered vs. Unfiltered Results
  - » No Significant Findings or Surprises
  - » More Review in Data Validation
- Results Generally Confirm Past Data

Specific Analyses

- Nitroaromatics & Nitroamines
  - » Explosive Ordinance Disposal (EOD) Range - No Detects
- Cyanide
  - » Sludge Drying Beds - No Detects
- Gross Alpha/Gross Beta
  - » EOD Range and Landfills
  - » 2 Higher Gross Alpha Detects (landfills)

Recommendations

- Continue Groundwater Monitoring
  - » Measure Water Levels - 2 Month Intervals
  - » Maintain Set of Analytical Parameters
  - » Reduce Frequency of Sampling
- Further Assess Benzene Contamination



MCAS El Toro Groundwater Monitoring Program
Data Trends Report

Figure 4-1
LOCATION OF PHASE I RI/FS SITES

CDM FEDERAL PROGRAMS CORPORATION
a subsidiary of Camp Dresser & McKee Inc.

D:\CADD\6206\009\RT2\REPT\ FIG. 4-1 ST4

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

April 22, 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 2A-Site 24" for MCAS El Toro, received on January 20, 1996. Overall, the report is well written and the investigations are complete for Site 24. We appreciate the high level of teamwork from the Navy/Marine Corps and contractors. Please address the enclosed comments (Enclosures A and B) in the revised report. If you have any questions, I can be reached at 415/744-2368.

Sincerely,

Bonnie Arthur
Remedial Project Manager
Federal Facilities Cleanup Office

Enclosures

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

ENCLOSURE A

EPA COMMENTS ON THE DRAFT PHASE II
REMEDIAL INVESTIGATION (RI) REPORT
OPERABLE UNIT (OU) 2A - SITE 24

MAJOR

1) Pages ES-1; 4-10, Section 4.2.1; 6-5, Section 6.2.1; 6-26; The draft final OU 2A RI report must clarify the following issues: A) Any potential non-volatile organic compound (VOC) soil source areas are considered part of the remedial investigation/feasibility study (RI/FS) for OU 3. OU 2A was established to further investigate the VOC source area which had been initially investigated in the CLEAN 1 Phase 1 investigations.

B) During the preparation of any FS for groundwater at MCAS El Toro, including OU 2A, inorganics must be evaluated and obviously included in the consideration of cleanup alternatives. Inorganic compounds in the groundwater have been assessed as part of the OU 1 risk assessment. As agreed by the BCT, the groundwater samples collected as part of the Phase II investigation for OU 2A included metals analyses as well as VOCs. Many of these metals are believed to result from naturally occuring metals in the soil. An ongoing effort for OU 1 includes evaluation of background inorganics levels in groundwater. As new basewide groundwater samples were collected in February/March, this issue should be resolved soon. The OU 2A RI must include an overview of the OU 1 groundwater RI/FS and coordination efforts between OUs 1 and 2A.

C) The OU 2A risk assessment does not present a complete assessment of risk for the groundwater within this area. Total risk for groundwater has been calculated as part of the OU 1 risk assessment and this should be discussed in the RI as the OU 2A risk assessment only addresses risk contributed by VOCs.

2) Pages 3-30; 4-78, Section 4.2.4.2; Figure 4-15; The following three areas require further delineation in the remedial design phase. Sufficient data has been collected to complete the feasibility study/record of decision: A) Additional borings which assess the groundwater approximately 180 feet bgs, under Building 297, sampled at the bottom of Boring 24CPT81, B) Horizontal delineation upgradient of the main VOC source area near Buildings 296 and 297, and C) Figure 4-15; additional monitoring wells upgradient of 18_PS3.

3) Pages 4-40, 4-61; The text discusses a TCE detection in the soil gas (Figure 4-4) near a hazardous waste storage area on the

east end (south end of cross-section D-D') of Building 360. TCE concentration levels in the vadose zone and shallow aquifer may be attributed to this storage area (this storage area does not appear to be included in list of surface sources in Table 4-3), however, the soil gas levels may also be attributed to the storm drain conveyance system to Agua Chinon Wash (the conveyance system is incorrectly referred to on page 4-61 as Bee Canyon). Please describe how the hypothesis of the conveyance system as the probable source will be validated?

4) As the draft final report will include validated data which was unvalidated in the draft RI, please revise the text accordingly.

5) Page 4-65, Figure 4-14; The BCT has had ongoing discussion with the Navy and CLEAN I contractors regarding using tighter concentrations ranges (ranges of 5-10 ppb or 5-20 ppb maximum) to depict the extent of TCE concentrations on groundwater isoconcentration plume maps. Please consult with the BCT or OU I Navy RPM regarding this issue.

6) Page 4-65, Figure 4-14; Please change the title of this figure to "On and Off-site Extent of TCE Concentrations in Principal Aquifer" as onsite plumes are shown on this map. Additionally, as the onsite VOC-contaminated principal aquifer is excluded from Site 24, refer to the Interim Action OU 1 Feasibility Study for detail regarding proposed action for this area, as well as the coordination efforts between both Operable Units.

7) Page 7-6, Sections 7.2.2.1 and 7.2.2.2; Please further refine the Remedial Action Objectives (RAOs) with the BCT prior to submittal of Feasibility Study.

MINOR

1) Page 1-12; The original date for the draft Phase II was fall 1994.

2) Page 2-4, Section 2.2.4; Change "Base Closure Plan" to "Base Realignment and Closure Plan."

3) Page 2-7, Figure 2-3; The outline is not clear around Building 296.

4) Pages 2-18, 2-20; It would be helpful to cross-reference to some of the figures which appear later in the report, which depict the TCE groundwater hot spot discussed in the text.

5) Page 2-26; The TOC analyses are not mentioned here although plans for analyses are mentioned on pages 2-9 and 2-19.

6) Page 2-29, Section 2.9.3.1; Where in the text are the results of the soil field duplicates discussed?

7) Page 3-4, Section 3.1.2.2; Show former location of Building 1589 on a map, possibly with dotted lines.

8) Page 3-5; Misnumbering starting with this page (missing pages 3-6, 3-8, 3-10).

9) Page 3-15, Figure 3-5; One building has different numbers (#655 and #855) on Figures 2-7 and 3-5.

10) Page 4-13; Misnumbering starting with page 4-13 (missing pages 4-14, 4-16, 4-18, 4-20, etc.).

11) Page 4-59; Are the locations for sample points 24SS5, 24CPT1 and 24CPT81 depicted on Figure 4-12?

12) Page 4-75; Add key for data qualifiers.

13) Page 7-6, Section 7.2.2; Delete "Interim" from last sentence.

ENCLOSURE B

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

MEMORANDUM

SUBJECT: Review Comments of El Toro OU2a Phase II RI

FROM: Herbert Levine, Hydrogeologist
FFCO, Technical Support Section

TO: Bonnie Arthur, RPM
FFCO, Navy Section

General Comments

1. This report is very well written and appears to address the objectives stated. The data gaps identified in Phase I have been adequately addressed to support the FS.

2. Of the seven decisions identified through the DQO process the fifth, does groundwater under site 24 pose an unacceptable risk, is addressed through a baseline assessment only. The risk assessment assumes a residential drinking water well at the plume hot spot. Since this evaluation indicated unacceptable risk, the next step is to evaluate the more realistic scenario, are receptors off-site exposed at an unacceptable risk? What are the implications of not remediating the site 24 VOCs and letting this contamination migrate off-site? If we can assume that the groundwater contamination has reached steady-state, then the off-site data indicates risk in the 10^{-5} range. So, the data presented in this report should be evaluated in a risk management context.

Specific Comments

1. What is the purpose of Figure 2-2? The information presented in the text does not benefit from this Figure.

2. Figures 2-4, and 2-6 do not present soil investigation locations.

3. The title of Figure 2-8 is incomplete. The information presented in the text does not benefit from this Figure.

4. Section 3.6.1 Regional Aquifer Systems, page 3-37. The third paragraph discusses the lithologic separation of the shallower and deeper aquifers and cites multi-port and cluster wells as evidence. The CPT and hydropunch data indicates lithologic separation within the shallow aquifer as well.

5. Section 4.2.3 Regional Groundwater Conditions, page 4-61. Figures 4-13 and are not acceptable. Concentrations should be presented as isocontours as in Figure 4-15. Since data are not presented in these Figures, it is not possible to evaluate the hypothesis discussed with regards to possible impact of the Bee Canyon Wash.

6. Figure 4-15 shows that the Navy has adequately defined the VOC hot spot upgradient of 09_DGMW45. Why was the 5 ppb contour line not drawn between wells 12_DBMW48 and 12_UGM31? What is the significance of a 0.5 ppb contour line? I suspect that there is none and suggest using 5 ppb as the lowest contour interval.

7. Section 4.2.4.2 Vertical Characterization, page 4-78, fourth para, please add that the CPT data indicates silt and clay layers within the upper 40 feet of the shallow aquifer. It is also interesting to note that the hydropunch and CPT data shows higher concentrations in sands and silty sands with lower concentrations in silts and clays.

8. It would be useful to combine cross-sections from Sections 3 and 4 (e.g., Fig. 3-10 and 4-10, etc.) This would be very helpful for the project team to visualize the dimensional aspect to the contaminated areas. This would also be useful for the design optimization of the locations and lengths of extraction and injection wells.

9. Section 5.1.2 Chemical Persistence, page 5-2 and Figure 5-1. Figure 5-1 describes potential transformation pathways for PCE/TCE which is difficult to interpret. Is this showing transformation reversals or equilibrium potentials? (i.e., trans-1,2,-DCE to 1,2-DCA, cis-1,2-DCE to 1,2- DCA, and 1,1-DCE to 1,1-DCA). For example see, Vogel et.al., 1987,Transformation of halogenated aliphatic compounds. *Environ. Sci. Technol.* 21(8):722-736. Please add as a citation the origin of Figure 5-1.

10. Agree with modelling presented in Section 5.

11. Agree with most of Section 7. Section 7.2.1, last bullet is vague, please expand. Also, based on the data presented here and telephone discussions, it would be appropriate for the Navy to evaluate dual phase extraction wells. If the pump test do show that it is possible to achieve 75-80 ft. of drawdown (Pat Brooks, pers. com.) then the zone of interest (top 40 - 50 ft.) would be dewatered. The vapors remaining as soil gas should be collected.

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Gover

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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

(310) 590-4858

April 18, 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 SITE 24, OPERABLE UNIT 2A, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Joyce:

The California Environmental Protection Agency (Cal/EPA) has completed the review of the above subject document dated February 1996, prepared by Bechtel National, Inc. The report presents the results of Phase II Remedial Investigation conducted at Site 24. Site 24 is one of two sites in Operable Unit (OU) 2A designated as potential Volatile Organic Compound (VOC) source areas. Investigation of the other OU-2 site, the Major Drainages (Site 25), has not been completed and the results will be provided to the regulatory agencies as an addendum to this report.

This letter is to transmit the enclosed Department of Toxic Substances Control (DTSC) comments and the Regional Water Quality Control Board comments dated April 4, 1996 on the report. The report is well written. It is apparent after review of the *Report,* the BRAC Cleanup Team (BCT) commitment to the "interactive work plan" approach with regard to the remedial investigation for Site 24 has proven successful. Although there are still comments that must be addressed, the brevity of this review is a direct result of the information exchange at the pre-scheduled weekly technical meetings. 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

cc: Ms. Bonnie Arthur
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Region IX
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San Francisco, California 94105-3901

Mr. Lawrence Vitale
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
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Engineering Geologist
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Long Beach, California 90802

Lt. Hope Katcharian
Director, Environmental Engineering Division
Marine Corps Air Station-El Toro
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cc: Mr. Andy Piszkin
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Fountain Valley, California 92728-8300

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Comments on
Draft Phase II Remedial Investigation Report For Site 24, OU-2A
Marine Corps Air Station-El Toro
Dated February 1996

1. **Executive Summary, Conclusions**

Explain, in the text, that Data Quality Objectives (DQO) #1 satisfies the horizontal and vertical extent of VOC-contaminated soil to evaluate response actions.

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

Add Remedial Design (RD) step before Remedial Action (RA) on Figure 1-1. Also, you may want to add the Certification as the last step in the process.

3. **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.

4. **Section 1.2.4, Remedial Investigation, pages 1-13, 1-14, and 1-15**

The number identifiers for Buildings 296 and 297 on all figures showing the various hypotheses are transposed. Please correct this error.

Please mention in either this section or the Nature and Extent section that the three conceptual models representing the hypotheses are best comparable to the B - B' cross-section. This type of information may aid to quickly orient and familiarize the reader that is not as closely associated with the site as the BCT.

5. **Section 1.2.4.3, Hypothesis 3 - Detached Groundwater Hot Spot**

Please evaluate the possibility of another volatile organic compound (VOC) source area near building 360 at boring 24B1 and how it affects the predictions for hypothesis 3. Soil contamination is shown on Figure 4-11, Cross Section DD.

6. **Section 2, Figure 2-1**

The correct total for soil locations is 173.

7. **Section 2.5.3, Groundwater Monitoring Well Sampling**

Reference to Field Sampling Plan Attachment W, Section 6.3.22 is not accurate. The correct reference is Section 6.3.2.

8. **Section 3.1.2, Man-made Surface Features**

The text indicated that there are 25 USTs at Site 24 however, the UST locations shown on Figure 3-1 are more than 25. Please provide the accurate number of tanks.

9. **Section 3.1.2, page 3-3**

The text does not indicate if pure solvents were used in the degreasing pits. If this information is available, it should be included.

10. **Section 3.1.2.1, page 3-3, Building 296**

The text mentions a nitrate strip tank. Provide more details of this if possible. Agricultural nitrates have been a groundwater concern and the distinction should be made here if warranted.

11. **Section 3, Figures 3-1, 3-5, and 3-9**

Some figures (e.g., Figure 2-7) showed a building 655; however, other figures (Figure 3-1, 3-5 and 3-9) shows the building number as 855.

12. **Section 3.1.3.5, Abandoned Agricultural Wells**

Reference to Figure 2-5 for location of abandoned agricultural wells is typographical error. The correct reference is Figure 2-7.

13. Section 3.5.2, Stratigraphy, page 3-30

Please note in this section the following excerpts: "Similar units [fined grained] were found continuous and laterally extensive on a large scale, yet highly heterogeneous vertically or on a small scale due to the interbedded nature in which they were deposited" and "Lenses of both units are laterally extensive on a large scale and show a high degree

of heterogeneity on a small scale." These conclusions are a result of the cone penetrometer test (CPT) data collected during this phase of the remedial investigation. These conclusions regarding the stratigraphy of the site are in part the reason DTSC believes that the air sparging remedial action may not be the most favorable remedial alternative. This concern may be addressed after the evaluation of the air sparging pilot test results.

14. Section 3.6.3, Vertical Flow, page 3-39

DTSC disagrees with the conclusion that the stiff diagrams show a distinct difference in water chemistry between the shallow aquifer and deeper principle hydrogeologic unit across Site 24. Based on the stiff diagrams provided, there is very little distinction between the deep and shallow screened intervals. The only analyses that is distinctly different of the six stiff diagrams provided on Figure 3-13 is 24NEW5. All other diagrams show the same general pattern. Therefore, based on the set of analytical data provided in this section, we suggest that you delete the last paragraph of Section 3.6.3, stating "The differences in water quality between the shallow and deeper hydrogeologic unit suggest there is separation between the units. The significance of this separation is that VOC contamination of units deeper than the shallow aquifer would not be likely." Perhaps hydraulic separation between the water table aquifer and principal aquifer may be shown with hydrogeologic evidence but by no means can separation be shown using the data provided in this section. Furthermore, additional deeper groundwater data still needs to be collected and analyzed before conclusion can be drawn regarding the extent of vertical contamination.

Figure 3-13, State on the figure that analyses are represented by patterns based on milliequivalent per liter (meq/L) and, in addition to elevations of screened intervals relative to mean sea level, also provide screened intervals relative to land surface.

The text indicates that magnesium shows a large disagreement between the shallow and deep samples on the Stiff figures. The actual disagreement is about 1 meq/L and is much less than that for calcium; however, the trend is evident.

15. Section 4.1, Potential Source Identification, 1st Paragraph

The statement that active VOC sources assumed no longer to exist at site 24 is not accurate. It is more accurate to state that active **above ground** VOC sources are assumed no longer to exist.

16. Section 4, Nature and Extent of Contamination

Please superimpose the interpretive geologic cross-sections shown on Figures 3-10 and 3-11 onto Figures 4-10 and 4-11. This type of visually display of data will aid in the conceptualization of the fate and transport of contaminants.

Further characterization in groundwater is needed laterally at depth beneath Building 296. This data may be collected during the design phase of the remedial technologies. However, this issue should be included for discussion at BRAC Cleanup Team (BCT) meetings.

17. **Section 4.2.1, Soil Gas Analytical Results, Figure 4-3**

Besides the four profile charts shown in Figure 4-3, consider plotting all four vertical profiles on one graph with a maximum y-axis of 7,000 µg/L. This presentation would show that trend with depth was weaker than the current presentation suggests.

18. **Section 4.2.1, Soil Gas Analytical Results, page 4-40**

Soil and soil gas data are evaluated for Section A-A'. However, the soil is not evaluated **in the text** for Sections B-B', C-C', and D-D'. For consistency, please discuss the soil data potential VOCs contamination in the vadose zone shown on Cross Section B-B', C-C' and D-D'.

19. **Section 4.2.2, Soil Sampling Results**

Estimate the mass of contaminants in the soil and draw the soil plumes. You may delete the statement regarding soil sampling results being plotted but not contoured after you draw the soil plumes.

The statement that low levels of organic carbon **inhibit** the adsorption of VOCs in the soil should be changed to **does not promote**.

20. **Section 4.2.2, Soil Sampling Results, Table 4-9**

Include the units of measure for the Total Organic Carbon.

21. Section 4.2.2, Soil Sampling Results, Table 4-10

Indicated in a footer that CAS was the on-site laboratory and the acronym is for Columbia Analytical Services.

22. Section 4.2.2, Soil Sampling Results, Figure 4-12

The units of measure for TCE analysis should be corrected to µg/kg.

23. Section 4.2.3, Regional Groundwater Conditions

The Figures provided to illustrate groundwater plumes does not show the vertical extent of contamination. Please illustrate the groundwater plumes in 3D diagrams and quantify the VOCs in groundwater plumes.

Figure 4-13: This map does not include a reference for the source of the data used for construction. Indicate if data are from CLEAN I and CLEAN II or CLEAN I alone or CLEAN I and Orange County Water District.

24. Section 4.2.4, Site 24 Groundwater Conditions, page 4-62, 2nd Paragraph

Trihalomethanes are organic chemicals formed during the chlorine disinfection process of drinking water. They are not ". . .water treatment chemicals. . ."

25. Section 4.2.4.2, Vertical Characterization

The text notes that the predominant trend for the nested well 18_BGMW03 was upward between 9/92 and 8/94. However, in Section 5.1.4.5 the text indicates that the trend for nested well 03_DBMW03 was variable. Since the title of Section 4.2.4.2 is "Vertical Characterization" the section should provide a consistent statement.

26. Section 5.1.2, Chemical Persistence, Figure 5-1

Identify the difference between the solid and dashed lines.

27. Section 5.1.2, Chemical Persistence, Table 5-1

Please discuss in the text the information presented in Table 5-1 regarding Abiotic, Hydrolysis/Dehydrohalogenation for the VOC species.

28. Section 5.1.3, Contaminant Migration in the Vadose Zone, Page 5-6, 2nd Paragraph

The text should probably note that for soils with low organic carbon content, water saturation will result in almost complete suppression of organic compound adsorption on soil minerals. This point is significant because if the mineral sorption and the organic partitioning are both negligible (as may be the case for subsurface soils at MCAS El Toro Site 24) then slow desorption and problems

associated with irreversibility of sorption would be minimized; thereby facilitating insitu restoration efforts.

29. **Section 5.1.4.2, Dissolved Phase, Figure 5-4**

The dispersion illustration at T2 should not show backward diffusion. The mechanical dispersion should be vertical and horizontal but forward only. Also, provide a footnote to clarify the acronyms used on Figure 5-4.

30. **Section 5.1.4.3, Dense Nonaqueous-Phase Liquids**

Provide the density of water in Table 5-2 for clarification.

31. **Section 5.2.2.1 Aquifer Mixing Zone Calculations, Table 5-4**

Define the equations presented in the header of the table.

32. **Section 5.2.4.1, Primary Site 24 TCE Source Area, First Bullet Item, Pages 5-20**

Appendix N does not include the calculations as indicated by the existing text. These calculations should be added.

33. **Section 5.2.4.1, Primary Site 24 TCE Source Area, Table 5-6, page 5-21**

The infiltration rate for the modeling was about 0.7 ft/yr for runs 2 and 3 and 1 ft/yr for run 1. The text (page 5-19) noted that the different values were used to test model sensitivity. To satisfy that objective, the table should provide a listing of the results for all runs, i.e., runs 1, 2, and 3 at 1 ft/yr and runs 1, 2, and 3 at 0.7 ft/yr.

34. **Section 5.2.4.1, Primary Site 24 TCE Source Area, Table 5-6, page 5-21**

The table includes a vadose zone gas correction factor of six; however, no explanation is provided until three pages later. Consider a cross referencing footnote to the table or move the applicable text on page 5-24 to page 5-20.

35. Section 5.2.4.2. Tertiary Source Modeling

Under the title "Limited TCE Sources" the text identifies simulations with ". . .soil gas at 10 feet with a concentration of 270 µg/L and soil moisture at concentrations of 87 and 750 µg/L, respectively." Please clarify what the soil moisture concentrations are with respect to. Furthermore, the results in the subsequent paragraph and figures and table do not seem to be directly linked to the soil moisture content.

36. **Section 6, Risk Assessment**

The equation for Upper Confidence Limit on the mean of a lognormal distribution is correct; however, the definition of the constant "H" should be changed to "H = H-statistic (e.g., from tables A-10 or A-12 of Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. Van Nostrand Reinhold, NY, NY.)"

For additional comments on the risk assessment, see attached Memorandum dated April 9, 1996 from DTSC staff Toxicologist, Dr. John Christopher.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governo

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MEMORANDUM

TO: Tayseer Mahmoud
Office of Military Facilities (OMF)
Southern California Region, 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: 9 April 1996

SUBJECT: MCAS El Toro: Draft RI for Operable Unit 2A, Site 24, VOC Source Area
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 24 or Operable Unit (OU) 2A is located in the southwest area of the base, near Buildings 296 and 297. OU2A is the suspected source of trichloroethene (TCE) and other volatile organic chemicals (VOCs) which have contaminated the regional aquifer.

Document Reviewed

We reviewed "Draft Phase II Remedial Investigation Report, Operable Unit 2A - Site 24, Marine Corps Air Station El Toro, El Toro, California". This document, dated 20 February 1996, was prepared by Bechtel National, Inc., contractors to SWDIV. OSA received a request to review this document on 23 February 1996.

Scope of Review

Our review was focused on Chapter 6, "Risk Assessment". 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

The draft risk assessment is thorough and well written. OSA agrees with the Navy's quantitation of potential risks to human health for OU2A. The final document can be made acceptable upon adequate response to our specific comments below.

Specific Comments

1. **Data Evaluation, Sec. 6.2.1, pp. 6-5 ff.:** We understand that preliminary data were used in the analysis presented in this draft report. If finalized data, when available, lead to significant changes in calculations of risk or in conclusions, please contact us to discuss possible changes for the final report. Also, please display prominently any such changes in the final report.

   Steps 1 through 5 as shown summarize the recommended process for data validation. Steps 6 and 7 form a portion of selection of chemicals of potential concern. Please correct this.

   Although this document is intended to deal with organic constituents only, it will eventually be necessary to tie the results of this risk assessment in with the results from OU1, the regional groundwater plume. Inorganic constituents dominated estimates of risk in OU1; therefore, it will be necessary to identify inorganic constituents of potential concern for OU2A and estimate risks and hazards.

2. **Sec. 6.2.2.3, pp. 6-9 ff.:** The *H*-statistic is incorrectly identified as Henry's Law constant. Please correct this. Also, on page 6-10, the arithmetic mean value for PM_{10} in the El Toro area is given as 43.1 mg/m^3. Shouldn't this be 43.1 $\mu g/m^3$? If the wrong units were used in the inhalation terms of dose calculations, please correct these also.

3. **Table 6-4, p. 6-13:** Expressing concentrations in water in units of µg/L instead mg/L would make this table much easier to read and understand.

4. **Table 6-5, p. 6-15:** The value for exposure interval is given as 7.9E08 sec, which corresponds to about 25 yr. This value is appropriate for the industrial exposure,

but not for the residential or recreational settings. Please use a value corresponding to the selected exposure duration for the various scenarios.

5. **Table 6-7, p. 6-17:** We are accustomed to seeing risks for the residential being composed of 6 yr as a child and 24 yr as an adult. The value for "Exposure duration (cancer)" is 30 yr. What was used to calculate cancer risk for the resident? Also, for "Dermal absorption factor" and "Permeability constant", please correct the reference to "Table 6-6".

6. **Table 6-8, p. 6-21:** The second set of cancer potency factors for tetrachloroethene (PCE) are apparently those published by Cal/EPA. Please so indicate. The value for PCE via inhalation in the table (misprinted: "2.1E-02" not "2/1E-02") is about 10-fold higher than that published by USEPA. Cal/EPA values for TCE, the principal risk driver, are also higher than those published by USEPA. Please indicate in text what estimations of risk would be if Cal/EPA potency factors had been used.

7. **Discussion of Results, Sec. 6.2.4.3, p. 6-26:** Something is wrong with the second sentence of the second paragraph. Is a word missing? It is incorrectly stated in the fourth paragraph that the direction of bias cannot be determined when one-half quantitation limit is used in calculating average values. If limits of quantitation are steady, the bias is toward the low side. If some limits of quantitation are high, the bias is high. Please correct the text.

   Uncertainties in risk quantitation for this site must be framed in knowledge and uncertainty about TCE, because this chemical represents some 99% of the risk and hazard for OU2A. Please include text on page 6-27 specifically on the subject of TCE.

Conclusions and Recommendations

The draft risk assessment is generally well done. It can be made acceptable to OSA upon adequate responses to the specific comments above.

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

cc: Mr. J. Paull, 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: April 4, 1996

From: CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - SANTA ANA REGION
3737 MAIN STREET, SUITE 500, RIVERSIDE, CALIFORNIA 92501-3339
Telephone: CALNET 632-4130 Public (909) 782-4130

Subject: DRAFT PHASE II REMEDIAL INVESTIGATION REPORT, OPERABLE UNIT 2A, SITE 24, MARINE CORPS AIR STATION EL TORO, CTO 0073/0080

We have reviewed the subject report dated February 20, 1996 and received by us on February 22, 1996. We have the following comments for inclusion with other State comments.

SECTION 1 - INTRODUCTION

1.1.1 Guidance and Agreements

The FFA is a cooperative agreement between the DON, US EPA, and the California Environmental Protection Agency (CAL/EPA), represented by the Department of Toxic Substances Control (DTSC) and the Santa Ana Regional Water Quality Control Board (RWQCB) who are signatories to the agreement.

The Base Realignment and Closure Team (BCT) consists of representatives from the Navy (SWDIV), Marine Corps, U.S. EPA, and CAL/EPA (DTSC,RWQCB). Please note, all references to CAL/EPA include DTSC and RWQCB.

1.1.2 Remedial Investigation Approach

Under guidance documents used to develop Data Quality Objectives (DQOs), the fifth bullet should read, "Water Quality Control Plan for the Santa Ana River Basin".

1.3 CONCEPTUAL SITE MODEL

This section should be expanded to explain/demonstrate how the data supported the chosen conceptual site model.

SECTION 3 - PHYSICAL CHARACTERIZATION OF THE STUDY

3.6 HYDROGEOLOGY

Please include an explanation regarding the groundwater monitoring schedule. Also, during the Phase I investigation the required four consecutive rounds of groundwater monitoring were not performed. The current groundwater monitoring program may add new information to what is known about the groundwater characteristics at this site.

SECTION 4 - NATURE AND EXTENT OF CONTAMINATION

It would be beneficial to show in this section a block horizontal cross section of the groundwater contamination similar to the soil gas diagrams on Figures 4-6, 4-7, and 4-8.

4.2.1 Horizontal Characterization

Two values on Table 4-14 that are attributed to CAS lab are actually ITS lab results according to Appendix J. The two values are TCE 980µg/L (24HCPT55- 73W1003 ITS No. 24AS1 page J111-45) and TCE 1300 µg/L (24HCPT81-73W1079 ITS No. 24AS2A page J111-47). Also, please explain the two elevated soil gas blank values in Appendix J page JIV-71, Station No. 24SG31 CAS No.s TVH and 79-01-6. The values were 1370µg/L TVH and 6120µg/L TCE.

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

Lawrence Vitale

Lawrence Vitale
DoD Section